




2017 MIDWEST 
DEER & WILD TURKEY
STUDY GROUP MEETING



IOWA DEPARTMENT OF NATURAL RESOURCES

2017 Proceedings
Midwest Deer & Wild Turkey Study Group Meeting
August 28–31, 2017
Moravia, Iowa

41st Annual

2017 MIDWEST 
DEER & WILD TURKEY
STUDY GROUP MEETING

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Background

The Midwest Deer and Wild Turkey Study Group (MDWTSG) meeting is an annual gathering of wildlife managers sanctioned by and affiliated with the Midwest Association of Fish and Wildlife Agencies. Primary objectives of the meeting include dissemination of deer and wild turkey management strategies, discussion of emerging or existing issues associated with deer and wild turkey management, and coordination of regional deer and wild turkey management or research efforts. The meeting location rotates among the Midwestern states that are active within the group.

Forums such as the MDWTSG meeting provide valuable opportunities for state deer and turkey biologists to become acquainted with emerging issues and exchange information and ideas related to deer and turkey research and management. The need for state fish and wildlife agencies to establish and maintain deer and turkey biologist positions and support travel of these biologists to the annual MDWTSG meeting is imperative for exchanging information to promote quality wildlife management and research in each state. It is more important than ever that state agencies are at the forefront of issues related to deer and turkey management in order to protect the heritage and recreational opportunities of hunting for future sportsmen and sportswomen.

Meeting Time and Place

The Iowa Department of Natural Resources (DNR) hosted the 2017 MDWTSG meeting at Honey Creek Resort State Park at Lake Rathbun in Moravia, Iowa on August 28–31. The MDWTSG appreciates the financial support provided by the National Wild Turkey Federation (NWTF) and the Quality Deer Management Association (QDMA), as well as the various sponsors which provided donations for the event including (in alphabetical order) Bass Pro Shop, Bee Mindful, Boyt Harness Company; Cookies Food Products, Inc.; Custom Cutlery and Ironworks, Custom Jig and Spins, Eagle Optics, Fareway Economical Food Stores (#3861), G&L Clothing, Gary Plastic Packaging Corporation, Griebel Game Calls, Hunter Specialties, Lola’s Fine Hot Sauce, Mill Creek Trapping Supply, Mountain Man Game Calls, Palmer Candy Company, Peace Tree Brewing, Pure Fishing – Berkley, Rada Cutlery, Scheels, Simply Soothing; Skulls Unlimited, Int.; Sleepy Creek Tannery, Sportsman’s Warehouse, Tableboards by Spinella, and Vortex Optics.

Attendance

The 2017 meeting was attended, in total, by 49 participants and speakers, including state deer and/or wild turkey biologists from 12 Midwest member states (Indiana, Iowa, Illinois, Kansas,

Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, and Wisconsin), and biologists and researchers from the NWTF, QDMA, US Fish and Wildlife Service, US Department of Agriculture Animal and Plant Health Inspection Service, Iowa State University, South Dakota State University, and Michigan State University.

Executive Summary

Attendees at the 2017 MDWTSG meeting were welcomed by Dr. Dale Garner, Division Administrator, Conservation and Recreation Division, Iowa Department of Natural Resources. Following the meeting introduction, there were seven presentations during the joint session, including the following topics:

- Resource selection function modeling
- Occupancy modeling
- Deer fawn space use in Iowa
- Deer fawn survival in the Northern Great Plains
- Bison and elk management at Neil Smith National Wildlife Refuge
- Deer population genetics in Iowa
- Deer antler characteristics in Iowa

The joint session continued with presentations and joint-group discussion on selected topics, including the following:

- Urban wildlife management
 - Iowa wildlife depredation program
- Disease
 - Iowa chronic wasting disease management
 - Avian influenza surveillance and emergency response
- Surveys
 - Declines in survey response rates and approaches for improvement
- Technology in natural resources
 - ESRI ArcCollector app on Android Devices
 - ESRI Survey 123 app for ArcGIS

On day two, the joint session continued with presentations and joint-group discussion on topics related to population management and dynamics, including the following:

- Female wild turkey habitat selection
- Deer reproduction and condition
- Estimating deer density and fecundity

- Survival and reproduction of wild turkey
- Implementing state-space and integrated population models

Subsequently, the deer and wild turkey break-out sessions occurred, including discussion on the following:

- Wild Turkey Study Group
 - Past, present, and future of the NWTF
 - Wild turkey impacts on other species
 - Midwest Wild Turkey Consortium research
 - Michigan State University will provide the consortium a proposal for updating state hunter harvest surveys to collect per-unit-effort data
 - Michigan State University will provide the consortium with a cost-benefit analysis for updating the wild turkey habitat analysis using a recently updated national land cover dataset
 - Standardizing state wild turkey brood surveys in the Midwest
 - The Group agreed to work towards standardizing wild turkey brood surveys across Midwestern states
 - Missouri will provide the group with protocols used to standardize brood surveys across Southeastern states
 - Missouri will compile current survey protocols for Midwestern states to evaluate methods for standardizing brood surveys
- Deer Study Group
 - Trends in buck harvest age structure
 - Wisconsin deer metric system
 - Data sharing with stakeholders
 - State approaches to feeding and baiting
 - Unusual deer behavior associated with Epizootic Hemorrhagic Disease in Kentucky
 - Regulating hunting licenses for guides and outfitters
 - Drivers and decision making processes for implementing deer management programs among states
 - Ohio will initiate contact with and compile information from MDWTSG state representatives

Business Meeting

The business meeting was conducted as a joint session involving both deer and wild turkey program leaders. The 2018 MDWTSG meeting will be hosted by the Minnesota Department of Natural Resources.

The group discussed the MDWTSG meeting guidelines as requested by Adam Murkowski, Minnesota Department of Natural Resources. A resolution was passed to allow A. Murkowski to explore possible changes to the guidelines as related to the ability of group members to openly disseminate information and facilitate open discussion during annual meetings. A. Murkowski agreed to revisit the guidelines of interest and provide the Study Group's deer and turkey program leaders with a list of potential edits and changes by March, 2018. The group will review the proposal at the 2018 MDWTSG meeting.

The Study Group discussed adding additional cervid species to the list of species under purview of the MDWTSG. Some Midwestern states currently have elk (*Cervus canadensis*) management programs which do not fall under the guidelines of the MDWTSG or other regional working group. The Midwest Association of Fish and Wildlife Agencies Director Liaison to the MDWTSG indicated that the Study Group does not need to change the Group's existing guidelines to discuss topics involving cervid species other than deer. The Study Group has authority under currently guidelines to decide whether other cervid species will be considered by the MDWTSG without submitting a formal resolution to the state Directors. The MDWTSG consensus was that the inclusion of cervid topics other than deer at any annual MDWTSG meeting should be left up to the hosting state and determined on a case-by-case basis. No formal proposal or resolution was submitted on this topic.

Table 1. List of participants: 2017 Midwest Deer & Wild Turkey Study Group meeting, Moravia, Iowa.

First Name	Last Name	Agency	Email	Phone
Luke	Garver	Illinois Department of Natural Resources	Luke.garver@illinois.gov	217-782-4377
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Table 1 (Continued). List of participants: 2017 Midwest Deer & Wild Turkey Study Group meeting, Moravia, Iowa.

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Table 2. Previous Midwest Deer & Wild Turkey Study Group meeting locations.

Year	State	Location	Date
1977	Missouri	Missouri Fountain Grove Wildlife Area	January 17-19
1978	Wisconsin	Wisconsin Wyalusing State Park	January 16-17
1979	Iowa	Iowa Rathburn Fish Hatchery	January 15-18
1980	Minnesota	Minnesota Whitewater State Park	January 21-24
1981	Indiana	Indiana Harrison-Crawford State Park	January 19-22
1982	Ohio	Ohio Lake Hope State Park	January 18-21
1983	Nebraska	Nebraska Louisville 4-H Camp	January 17-21
1984	Kansas	Kansas Camp Aldrich	January 16-19
1985	South	South Dakota Black Hills	May 7-10
1986	North	North Dakota Camp-of-the-Cross	January 20-23
1987	Michigan	Michigan Kellogg Biological Station	January 27-29
1988	Illinois	Illinois Touch of Nature	February 1-4
1989	Missouri	Missouri YMCA Camp of the Ozarks	January 23-26
1990	Wisconsin	Wisconsin Bethel Horizons Prairie Center	January 15-18
1991	Iowa	Iowa Conservation Education Center	January 14-17
1992	Minnesota	Minnesota Whitewater State Park	January 13-16
1993	Indiana	Indiana Harrison-Crawford State Park	January 11-14
1994	Ohio	Ohio Canter's Cave 4-H Park	January 30-February 2
1995	Nebraska	Nebraska Mahoney State Park	January 15-18
1996	Kansas	Kansas Camp Pecusa	January 14-16
1997	South	South Dakota Camp NeSoDak	August 24-27
1998	North	North Dakota Camp Grafton	August 9-12
1999	Ontario	Ontario Blue Springs Scout Reserve	August 15-18
2000	Michigan	Michigan Thunder Bay Resort	August 20-23
2001	Illinois	Illinois Dixon Springs Ag. Station	August 19-22
2002	Missouri	Missouri Conception Abbey	August 18-21
2003	Wisconsin	Wisconsin Bethel Horizons Prairie Center	August 24-27
2004	Iowa	Iowa Conservation Education Center	August 22-25
2005	Minnesota	Minnesota Eagle Bluff Envir. Learning Center	August 21-24
2006	Indiana	Indiana Camp Ransburg, BSA	August 20-23
2007	Ohio	Ohio Canter's Cave 4-H Park	August 19-22
2008	Nebraska	Nebraska Fort Robinson State Park	September 14-17
2009	Kansas	Kansas Rock Springs 4-H Camp	September 14-17
2010	North	North Dakota Camp Grafton	August 22-25
2011	Michigan	Michigan Ralph A. MacMullen Center	September 25-28
2012	South	South Dakota Custer State Park	October 16-19
2013	Illinois	Illinois Allerton Park	August 18-21
2014	Missouri	Missouri YMCA Camp of the Ozarks	September 9-12
2015	Wisconsin	Wisconsin Perlstein Conference Center	September 8-11
2016	Kentucky	General Butler State Resort Park	August 22-25
2017	Iowa	Honey Creek State Park Resort	August 28-31

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August 28–31, 2017

Honey Creek Resort at Lake Rathbun
12633 Resort Drive, Moravia, Iowa 52571

AGENDA

Monday – August 28, 2017

1:00-7:00 pm Registration (See Jim Coffey) Conference Room C

- Arrival (dinner on your own) and hotel check-in at lodge front desk
 - Evening social available at the Rathbun Lakeshore Grille Bar (cash bar and restaurant located inside the lodge)
-

Tuesday – August 29, 2017

Conference Room C (all day)

7:00-7:45 am Registration (see Chris Ensminger)
Breakfast (Included)
Speakers upload presentations (see Tyler Harms)

1.1. Joint Meeting and Presentations

- 8:00-8:10 am **Welcome and introduction**
Dale Garner, Division Administrator, Conservation and Recreation Division, Iowa Department of Natural Resources
- 8:10-8:20 am **Housekeeping items**
Jim Coffey, Iowa Department of Natural Resources
- 8:20-8:40 am **Evaluating Spring Spotlight Survey Data to Model Resource Selection for White-tailed Deer in Iowa**
Dan Kaminski, Iowa Department of Natural Resources
- 8:40-9:00 am **Wild Turkey Occupancy Dynamics using Multi-taxa Monitoring Data**
Kevin Murphy, Department of Natural Resource Ecology & Management, Iowa State University
- 9:00-9:20 am **White-tailed Deer Fawn Space Use in Central Iowa**
Patrick McGovern, Department of Natural Resource Ecology & Management, Iowa State University
-

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9:20-9:40 am **Weather and Landscape Factors Influence White-tailed Deer Fawn Survival in the Northern Great Plains**
Eric S. Michel, Department of Natural Resource Management, South Dakota State University

9:40-10:00 am Break

10:00-10:20 am **Bison and Elk Management in a Prairie Reconstruction at Neal Smith National Wildlife Refuge**
Karen Viste-Sparkman, U.S. Fish and Wildlife Service

10:20-10:40 am **Population Genetic Structure of White-tailed Deer in Iowa**
Julie Blanchong, Department of Natural Resource Ecology & Management, Iowa State University

10:40-11:00 am **Factors Associated with Variation in Antler Characteristics in Iowa Deer**
Dan Adams, Department of Natural Resource Ecology & Management, Iowa State University

1.2. Joint Meeting and Presentations

11:00-11:20 am **Iowa Depredation Program: Urban Perspective**
Bill Bunger, Iowa Department of Natural Resources

11:20-12:00 pm *Group discussion – Urban wildlife management*

12:00-1:00 pm Lunch Conference Room C

1.3. Joint Meeting and Presentations

1:00-1:20 pm **Iowa CWD Issues and Management: Deer and People**
Terry Haindfield, Iowa Department of Natural Resources

1:20-1:40 pm **Avian Influenza Surveillance and Emergency Response**
David Marks, USDA Wildlife Services

1:40-2:20 pm *Group discussion – Disease*

1.4. Joint Meeting and Presentations

2:20-2:40 pm **Survey Response Rate Decline and Possible Approaches for Improvement**
Steve Roberts & Jan Larson, Center for Survey Statistics and Methodology, Iowa State University

2:40-3:20 pm *Group discussion – Surveys and response rates*

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3:20-3:40 pm Break

1.5. Joint Meeting and Presentations

3:40-4:00 pm **Use of ESRI Arc Collector App on Android Devices for Wildlife Surveys**
Todd Bogenschutz, Iowa Department of Natural Resources

4:00-4:20 pm **A New Mobile App for Collecting Roadside Fawn: Doe Observation Data**
Dan Storm, Wisconsin Department of Natural Resources

4:20-5:00 pm *Group discussion – Technology*

6:30-7:30 pm Dinner Conference Room C

7:30-midnight Evening social Rathbun Lakeshore Grille Bar (in Honey Creek Resort)

Wednesday – August 30, 2017

7:00-7:45 am Breakfast (included) Conference Room C

2.1. Joint Meeting and Presentations Conference Room C

8:00-8:20 am **Female Wild Turkey Habitat Selection in Forest-Agricultural Landscapes of Wisconsin**
Chris Pollentier, Wisconsin Department of Natural Resources

8:20-8:40 am **Wisconsin Deer Reproduction and Condition Study**
Dan Storm, Wisconsin Department of Natural Resources

8:40-9:00 am **Estimating Density and Evaluating Fecundity of White-tailed Deer in Iowa**
Tyler Harms, Iowa Department of Natural Resources

9:00-9:20 am **Survival and Reproductive Ecology of Eastern Wild Turkeys in Northern Missouri**
Jason Isabelle, Missouri Department of Conservation

9:20-9:40am **A Framework for Implementing State-space and Integrated Population Models**
Andrew Norton, Minnesota Department of Natural Resources

9:40-10:00 am *Group discussion – population research and modeling*

10:00-10:15 am Break

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2.2. Joint Meeting and Presentations

Conference Room C

- 10:15-10:45am **From Coal Mines to Jack Pines, Wisconsin's Elk Reintroduction Program**
Kevin Wallenfang, Wisconsin Department of Natural Resources
- 10:45-11:00 am **Minnesota Deer Planning Process**
Adam Murkowski, Minnesota Department of Natural Resources
- 11:00-11:20 am **Wisconsin Buck-CWD-Predation Study**
Dan Storm, Wisconsin Department of Natural Resources
- 11:20-11:40 am **Influences of Translocation on Contemporary Patterns of Mitochondrial DNA Diversity and Distribution in White-tailed Deer Across Their Range**
Lynne Gardner, Department of Natural Resource Ecology & Management, Iowa State University
- 11:40-12:00 pm *Group discussion – regional research questions and ideas*
- 12:00-1:00 pm Lunch

Conference Room C

2.3. Break-out Meetings – White-tailed Deer (times flexible to ensure full discussion)

Conference Room C

- 1:00-1:40 pm **State of the White-tail: Trends in Buck Harvest Age Structure**
Kip Adams, Quality Deer Management Association
**Including time for additional discussion and Q&A*
- 1:40-2:00 pm **Show 'em What You've Got, Wisconsin's New Deer Metrics System**
Kevin Wallenfang, Wisconsin Department of Natural Resources
- 2:00-4:00 pm Roundtable discussion and state updates

2.4. Break-out Meetings – Wild Turkey (times flexible to ensure full discussion)

Conference Room E

- 1:00-1:30pm **Past, Present, & Future of the NWTF**
Jason Lupardus, National Wild Turkey Federation
**Including time for additional discussion and Q&A*
- 1:30-2:00 pm **Do Wild Turkeys Impact Other Game Birds?**
Rick Horton, National Wild Turkey Federation (lead discussion)

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2:00-2:30pm	Midwest Wild Turkey Consortium Research: Update and Plans for Future Research Joanne Crawford, Quantitative Wildlife Center, Michigan State University	
2:30-3:00 pm	Standardizing Wild Turkey Brood Surveys across the Southeastern United States Jason Isabelle, Missouri Department of Conservation (lead discussion)	
3:00-4:00 pm	Roundtable discussion and state updates	
Joint Business Meeting and Discussion		Conference Room C
4:00-4:10 pm	Short break/reconvene large group	
4:10-5:00 pm	Business Meeting <ul style="list-style-type: none">▪ MDWTSG guidelines – Adam Murkowski, Minnesota Department of Natural Resources▪ Additional roundtable discussion▪ Resolutions	
5:00-5:20 pm	Closing	
6:30-7:30 pm	Dinner	Conference Room C
7:30-midnight	Evening social	Rathbun Lakeshore Grille Bar (in Honey Creek Resort)

Thursday – August 31, 2017

- Departure
 - Breakfast on your own
-

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PRESENTATION ABSTRACTS

(*Denotes the speaker if multiple authors listed)

1.1.1 Evaluating Spring Spotlight Survey Data to Model Resource Selection for White-tailed Deer in Iowa

Dan Kaminski, Iowa Department of Natural Resources

Spotlight survey data are often used to develop long-term indices of wildlife populations at regional scales. However, fine-scale spatial data may be difficult to interpret as observations are typically collected opportunistically and locations may not accurately reflect habitat suitability for individuals moving between patches of suitable habitat. We evaluated the application of spring spotlight survey data for developing a spatially-explicit statewide relative probability of use (or habitat suitability) model for white-tailed deer using a resource selection function (RSF). Since 2006, the Iowa Department of Natural Resources has conducted annual nocturnal spotlight surveys from mid-March to mid-April along two east-west oriented rural road transects (\bar{x} =24.0 mi/transect, n =199) in each Iowa county. Using statewide spotlight data collected from 2012–2017, we fitted RSF models using 9 landscape covariates within a generalized linear model and selected top models using Akaike Information Criteria. To test whether observations were proportional to use both temporally and spatially, we withheld data by year and by 3 pooled ecoregions (for 2017 data) and modeled observed to expected proportions by 10 RSF bins using a k -fold cross-validation method and linear regression (R^2 =0.94–0.96). We further tested the RSF model using two independent statewide vehicle-deer incident spatial datasets collected by the Iowa Department of Transportation (roadkill deer; R^2 =0.94) and Iowa law enforcement (investigated animal crashes; R^2 =0.94). We evaluate the significance of model habitat covariates using a likelihood ratio test and evaluated overall model fit using the χ^2 goodness-of-fit test.

1.1.2 Wild Turkey Occupancy Dynamics using Multi-taxa Monitoring Data

Kevin Murphy^{*1}, Stephen Dinsmore¹, Karen Kinkead², and Paul Freese²

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²Iowa Department of Natural Resources

The Iowa Department of Natural Resources (DNR) and Iowa State University developed and implemented a cost-efficient program to inventory and monitor species of greatest conservation need (SGCN) across Iowa. The Multiple Species Inventory and Monitoring (MSIM) program conducts surveys for 9 taxonomic groups covered by the Iowa Wildlife Action Plan (birds, mammals, amphibians, reptiles, fish, mussels, crayfish, butterflies, and odonates). Although the main objective of the MSIM Program is to document SGCN, we record information on all species encountered, thereby leaving a standardized record of the occurrence of common species for future generations. These data also provide opportunities to supplement existing surveys and datasets via additional protocols or spatiotemporal coverage. We completed a Robust Design Occupancy analysis of 10 years of Wild Turkey occurrence data collected on multi-species MSIM bird point counts across Iowa. We detected Wild Turkeys on 95 of 1864 surveys across 364 sites between April 15 and June 15. Our top model included a positive effect of woodland within 1 km of a site on occupancy and a positive effect of grassland within 1 km of a site on extinction. Our estimates of occupancy probability (Ψ = 0.65) indicate that Wild Turkeys occupy a majority of Iowa's publicly-owned property. However, the probability of detecting a

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Wild Turkey given that it is present at a site ($p = 0.11$) is low and suggests that targeted survey efforts that begin earlier than our current survey season may be more appropriate for this species. This information illustrates how widespread the Wild Turkey is on protected lands in Iowa after being extirpated in the last century, and long-term monitoring data may provide additional insight into how landscape attributes and management actions impact its future status in Iowa.

1.1.3 White-tailed Deer Fawn Space Use in Central Iowa

Patrick McGovern*, Julie Blanchong, and Stephen Dinsmore, Department of Natural Resource Ecology & Management, Iowa State University

White-tailed deer (*Odocoileus virginianus*) are habitat generalists that thrive in the agricultural landscape of the Midwest where permanent cover is limited, but food is abundant. The value of agricultural habitat to deer, however, might be different for adult versus young animals. Specifically, while adults make use of crops as an abundant food source, young fawns rely on nursing and require cover to minimize their vulnerability to predation. We hypothesized that young fawns would avoid using agricultural habitat and instead spend the majority of their time in wooded habitat. To test our hypothesis, we estimated home range size and habitat composition for fawns in central Iowa during their first three months of life. We captured and radio-collared 36 white-tailed deer fawns in May-June 2015 - 2016 in Boone County, Iowa, USA. We located fawns ≥ 5 times a week through August and created 95% kernel density home ranges for fawns with >30 locations ($n=27$). Fawn home ranges at three months of age averaged 25.67 ha (SE=2.43) and were comprised primarily of woodland (61.66% [4.77]) and grassland (22.77% [3.18]) habitat. Home range size and habitat composition were not significantly different between years or sexes. Fawns displayed third-order habitat selection ($\lambda=0.07$, $P=0.002$), using significantly less agriculture and wetland habitat and fewer roads compared to their availability in their home ranges. Early in life, fawns avoid predation primarily by hiding. Early summer row-crop agricultural habitat is unlikely to provide sufficient cover for fawns. Our findings suggest that agricultural habitat is not of value to young fawns and that maintenance of woodland habitat in agriculturally dominated landscapes is important.

1.1.4 Weather and landscape factors influence white-tailed deer fawn survival in the Northern Great Plains

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Offspring survival is generally more variable than adult survival and may limit population growth. Although white-tailed deer (*Odocoileus virginianus*) fawn survival has been intensively investigated, recent work has emphasized how specific cover types influence fawn survival at local scales (single study area). These localized investigations have often led to inconsistencies within the literature. Developing specific hypotheses describing the relationships among weather, habitat, and landscape factors influencing fawn survival at regional scales may allow for detection of generalized patterns. Therefore, we developed 11 hypotheses representing the various effects of weather (e.g., winter and spring weather), habitat (e.g., hiding and escape cover types), and

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landscape factors (e.g., landscape configuration regardless of specific cover type available) on fawn survival at one- and three-months of age. At one-month, surviving fawns experienced a warmer lowest recorded June temperature and more June precipitation than those that perished. At three-months, patch connectance (percent of patches connected within a predefined distance) positively influenced survival. Our results are consistent with fawn ecology; increased spring temperature and precipitation are likely associated with a flush of nutritional resources available to the mother, promoting increased lactation efficiency and fawn growth early in life. In contrast, reduced spring temperature with increased precipitation place fawns at risk to hypothermia. Increased patch connectance likely reflects increased escape cover available within a neonate's home range after they are able to flee from predators. If suitable escape cover is available on the landscape, then managers could focus efforts towards manipulating landscape configuration (patch connectance) to promote increased fawn survival while monitoring spring weather to assess potential influences on current year fawn survival.

1.1.5 Bison and Elk Management in a Prairie Reconstruction at Neal Smith National Wildlife Refuge

Karen Viste-Sparkman, U.S. Fish and Wildlife Service

As part of its prairie reconstruction efforts, Neal Smith National Wildlife Refuge introduced bison and elk herds within an 800-acre fenced area in the 1990s. While treating these animals as wildlife as much as possible the confinement of these animals, their isolation from other herds, and the lack of large predators require specific management actions. The goal of management is to maintain healthy populations of bison and elk that contribute to ecological restoration of tallgrass prairie and oak savanna ecosystems. The bison are also managed to maintain genetic diversity within the herd and contribute to the genetic diversity of the species, while minimizing cattle introgression.

1.1.6. Population Genetic Structure of White-tailed Deer in Iowa

Julie Blanchong, Department of Natural Resource Ecology & Management, Iowa State University

Chronic wasting disease (CWD) was recently detected in Iowa's free-ranging white-tailed deer population. We genotyped deer sampled from 29 sites across Iowa to characterize population genetic structure and identify factors that might influence local transmission and spatial spread of CWD. Within sites, genetic structure increased as the amount of forest habitat increased and was greater in urban sites compared to rural sites. Among sites, there was weak genetic structure and no evidence for barriers to deer movement though genetic structure increased as the amount of forest separating sites increased. Our results suggest that local transmission of CWD may be greater in forested and urban habitats while spatial spread across Iowa is unlikely to be significantly impeded by any landscape features though it may spread more slowly through forested habitat compared to cropland.

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1.1.7 Factors Associated with Variation in Antler Characteristics in Iowa Deer

Dan Adams* and Julie Blanchong, Department of Natural Resource Ecology & Management, Iowa State University

Iowa is nationally renowned for having a high quality white-tailed deer herd. Antler characteristics are often considered to be an indicator of a deer's health and are the result of age, genetic background, and environment. We are measuring antlers of harvested deer across Iowa from 2016-2018 to quantify variation in antler characteristics across Iowa and identify if there are any ecological factors, such as land use, soil type, or climate, significantly associated with that variation. We hypothesize that the row crop agriculture found across the majority of the state provides deer populations sufficient access to quality nutrition such that age and genetics are the main factors responsible for variation in antler characteristics and that ecological factors will have minimal influence. At the conclusion of this research, we expect to have a better understanding of factors associated with variation in antler characteristics in Iowa deer. This is important because results and management recommendations from previous studies in different landscapes are not necessarily applicable to Iowa. These data will also contribute to ongoing efforts by our group, the Iowa Department of Natural Resources, and others to better understand the health of the Iowa deer herd.

1.2.1 Iowa Depredation Program: Urban Perspective

Bill Bunger, Iowa Department of Natural Resources

There are several success stories in modern day wildlife management. Some of these success stories have proven to bring with them challenges for dealing with 'too much' success. These same stories have even more complicated resolutions when compounded with urban environments. We're going to look at this depredation program's attempt at addressing wildlife concerns, particularly deer, in an urban environment.

1.3.1 Iowa CWD Issues and Management: Deer and People

Terry Haindfield, Iowa Department of Natural Resources

Iowa's first wild deer to test positive for CWD occurred in 2013. To date, there are 18 positives in extreme NE Iowa, with 17 being located in Allamakee County and 1 testing positive in Clayton County in 2016. Deer management and people management are both challenges being addressed by the Iowa Department of Natural Resources. Public outreach and cooperation is vital for successful strategies to slow the spread of CWD.

1.3.2 Avian Influenza Surveillance and Emergency Response

David Marks, USDA Wildlife Services

The United States of America has been implementing the largest wildlife disease surveillance strategy for many years now. The strategy has been designed as an early detection surveillance system for highly pathogenic avian influenza, to protect our nation's poultry industry. In 2015, highly pathogenic avian influenza was detected in both wild birds and domestic flocks in the US. In response to the outbreak, the wild

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bird surveillance program was modified, taking into account lessons learned. Since 2015, a few instances of wild birds and domestic flocks have occurred, and this has led to a better understanding of how the virus moves across the landscape over time.

1.4.1 Survey Response Rate Decline and Possible Approaches for Improvement

Steve Roberts & Jan Larson, Center for Survey Statistics and Methodology, Iowa State University

State wildlife agencies often rely on mail or telephone surveys to provide seasonal estimates of deer and turkey harvest. The Iowa DNR had a long history of using mail (postcard) surveys to estimate deer and turkey harvest until the 2006-07 hunting season when mandatory deer and turkey harvest reporting became mandatory in Iowa. Throughout this long history of postcard use, survey response rates declined from approximately 75-80% to approximately 50-60%. A comparison of response rates revealed annual variability, seasonal variability, and spatial variability within Iowa. Incentives such as a free bow, free shotgun, and a free muzzleloader were used for a brief period of time during 1995-2001, but were determined to have little, if any, positive effect on response rates. Several untested hypotheses were presented to explain the decline in response rates. Beyond the field of wildlife management, a decline in survey response rates has also been observed more universally in the field of survey science, due to a variety of factors. This has significant implications for data quality and raises the issue of non-response bias. Numerous approaches have been developed to address declining response rates in mail and telephone surveys with mixed results. There is no simple solution; but customized approaches, often involving mixed mode and non-response follow-up, seem to provide the best potential for maximizing response rates, minimizing non-response bias, and obtaining the highest quality data.

1.5.1 Use of ESRI Arc Collector App on Android Devices for Wildlife Surveys

Todd Bogenschutz, Iowa Department of Natural Resources

Presentation will overview the use of the Arc Collector app for the collection of August Roadside Survey data, bird point count data and vegetation sampling.

1.5.2 A New Mobile App for Collecting Roadside Fawn:Doe Observation Data

Dan Storm, Wisconsin Department of Natural Resources

In August 2017, WDNR released a mobile app for WDNR staff to enter summer fawn:doe observations, as part of annual deer recruitment monitoring. The app allows for georeferenced data collection and nearly real-time data summarization. Presentation will demonstrate the desktop version of the app and display to-date data collected.

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2.1.1 Female Wild Turkey Habitat Selection in Forest-Agricultural Landscapes of Wisconsin

Chris Pollentier, Wisconsin Department of Natural Resources

Gradual changes in agricultural and landscape management practices have led to growing uncertainty regarding eastern wild turkey habitat management in contemporary Midwestern landscapes. We evaluated spring habitat selection of radio-marked female wild turkeys in forest-dominated and agricultural landscapes in southwest and west-central Wisconsin, 2010-2011. We investigated habitat selection at 3 hierarchical spatial scales: study areas, within spring areas of use, and within 200 m of nest sites. Coarse measures of forest and open-agricultural cover were useful in identifying habitat selection trends by female turkeys across hierarchical scales. Female turkeys used habitat non-randomly and exhibited differential habitat selection amongst hierarchical scales and between landscape types. Our results suggest that proportion and configuration of forest and open-agricultural cover are essential components of female turkey habitat, and forest-field edge further plays an important role in nest site selection. We suggest conservation efforts focus on ensuring available usable space through maintaining upland deciduous woodlands or providing herbaceous fields in varying degrees of succession. Furthermore, inconsistency in habitat selection amongst spatial scales reinforces the importance of a multi-scale management approach, particularly in fragmented forest-agricultural landscapes where important habitat components may be limited for turkeys.

2.1.2 Wisconsin Deer Reproduction and Condition Study

Dan Storm, Wisconsin Department of Natural Resources

Beginning in 2014, WDNR has been conducting spring checks of roadkilled deer on a statewide basis for pregnancy and fat stores. In this presentation, we report methods, sample sizes and early results. Results include pregnancy rates by age, region, and year and patterns of fat mobilization relative to age, sex, region, year, and winter severity.

2.1.3 Estimating Density and Evaluating Fecundity of White-tailed Deer in Iowa

Tyler Harms, Iowa Department of Natural Resources

In Iowa, managers were in need of representative density estimates of white-tailed deer within management units across the state to target efforts such as disease surveillance and habitat management. Additionally, growing concerns exist throughout the Midwest regarding an observed decline in fawn fecundity rates of white-tailed deer. We embarked on two separate efforts to fill these information needs. First, we used distance sampling in conjunction with our annual spring spotlight survey to estimate density of white-tailed deer as a function of various habitat covariates within management units across Iowa from 2012-2016. We then extrapolated our density estimates to abundance estimates by unit and compared those abundance estimates to other population indices. We also collected information on body condition and pregnancy rates of roadkill white-tailed deer does from 2013-2016. For density, our results suggested extrapolated abundance estimates from distance sampling were slightly higher than estimates from other indices statewide. However, correlation of estimates from distance sampling to those obtained from other indices was highly variable

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across management units with high-density units typically showing higher correlation than low-density units. For fecundity, we collected pregnancy data on 303 does from 2013-2016. The average number of fetuses per pregnant doe ranged from 1.50 for fawns (≤ 6 months old) to 1.97 for does ≥ 2.5 years old. The overall pregnancy rate statewide was 47% with rates ranging from 4% for fawns to 65% for adult does. Our results suggest that distance sampling in conjunction with road-based spotlight surveys can be an effective method for estimating density of white-tailed deer, but further work is needed to evaluate reasons for high variability and lack of correlation with other population indices in some areas. Furthermore, our work evaluating fecundity of white-tailed deer shows pregnancy rates for fawns are much lower than reported in previous studies in Iowa.

2.1.4 Survival and Reproductive Ecology of Eastern Wild Turkeys in Northern Missouri

Jason Isabelle*¹, Joshua Millsaugh², Michael Clawson³, and John Skalski⁴

¹Missouri Department of Conservation

²Department of Fisheries and Wildlife Sciences, University of Missouri

³School of Environmental and Forest Services, University of Washington

⁴School of Aquatic and Fishery Sciences, University of Washington

Statistical population reconstruction (SPR) models provide a robust, quantitative means of understanding wildlife population status and trends. To allow development of SPR models for Missouri's Wild Turkey Management Program, we are conducting a banding and radio-tagging study to estimate turkey survival rates and harvest rates during spring and fall hunting seasons, as well as estimating reproductive parameters. During project years 1–3, annual survival rates of radio-tagged females have ranged 50–63%. Annual survival rates of adult and juvenile males have ranged 39–46% and 68–77%, respectively. Spring harvest rates of adult and juvenile males have ranged 15–31% and 0–6%, respectively. During fall hunting seasons, harvest rates of radio-tagged turkeys have been $\leq 2\%$ each year. Female success and poult survival have been low in most years, ranging 17–27% and 15–47%, respectively. Given the survival and harvest rates we have observed thus far, preliminary data suggest declines in turkey numbers can likely be attributed to low female success and poult survival. Upon completion of the project, SPR models will be developed to provide annual estimates of turkey abundance, harvest rates, survival rates, and recruitment.

2.1.5 A Framework for Implementing State-space and Integrated Population Models

Andrew Norton, Minnesota Department of Natural Resources

Recent efforts among state agencies have explored statistically-based population modeling approaches, using harvest or observation data. These approaches have been advocated because they provide more power or objectivity compared to traditional algebraic-type population models (e.g., reconstruction, projection, sex-age-kill). State-space models are particularly flexible and can accommodate harvest or observation data, in addition to a variety of auxiliary information and expert opinion. Models can be fit with very little empirical data because the user specifies varying degrees of prior information for parameters, functionally the same as user specified parameters for projection-type models. However, state-space models have seen limited implementation because of accessibility to approaches using typically available data. I developed and

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evaluated several state-space population models that accommodate population data commonly collected by state agencies. Specifically, I developed models for different types of data that index abundance, including: (1) harvest reported by sex for 2 age-classes; (2) harvest reported by group [e.g., antlered, antlerless] with a subset of harvest data that were aged; and (3) observed counts. These models were intended to provide users familiar with the R programming environment a framework for adapting models to accommodate different population processes and data types. In addition they illustrate the direct connection to traditional projection-type models (e.g., 2-sex Leslie matrix model).

2.2.1 From Coal Mines to Jack Pines, Wisconsin's Elk Reintroduction Program

Kevin Wallenfang, Wisconsin Department of Natural Resources

Wisconsin has undertaken a 4-5 year effort to restore elk to central Wisconsin, as well as supplement their current herd in the Northwoods. Kevin will share the outcomes of this exciting project.

2.2.2 Minnesota Deer Planning Process

Adam Murkowski, Minnesota Department of Natural Resources

Deer management is one of the most important projects administered by the Minnesota Department of Natural Resources (herein referred to as the DNR). Few Minnesotans have not had some level of contact with deer and even fewer are without an opinion as to how to manage them. In the winter of 2015 the DNR agreed to writing the state's first-ever deer management plan and in May of 2016 the Office of the Legislative Auditor (OLA) issued an evaluation on DNR's deer management program that recommended the DNR develop a long-range, strategic deer management plan. The OLA evaluation and the deer planning process resulted in internal DNR evaluations of programmatic efforts while simultaneously engaging a wider breadth of stakeholders and publics than are typical for deer management processes.

2.2.3 Wisconsin Buck-CWD-Predation Study

Dan Storm, Wisconsin Department of Natural Resources

During the winter of 2017, WDNR initiated a study of deer population dynamics in the CWD-endemic area of southwest Wisconsin. During winter of 2017, we placed GPS collars on 138 deer. We performed antemortem CWD tests on 130 deer at capture. Sampling yielded 122 usable samples, 12 of which tested CWD positive. During May-June, we collared 91 neonate deer. To date, we've GPS collared 7 bobcats and 7 coyotes. Presentation will focus on research goals and early research activities and findings.

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2.2.4 Influences of Translocation on Contemporary Patterns of Mitochondrial DNA Diversity and Distribution in White-tailed Deer Across Their Range

Lynne C. Gardner*, Jer Pin Chong, Kelly F. Schiro, Melissa A. Moy, Whitney N. Briggs, and Julie A. Blanchong
Department of Natural Resource Ecology & Management, Iowa State University

In the early 20th century, deer populations across the U.S. experienced near extirpation followed by rapid resurgence due, in part, to widespread translocation efforts. We examined the influence of translocation efforts on mitochondrial DNA (mtDNA) diversity and spatial structure in white tailed deer across North America. We tested two hypotheses: 1) that due to introduction of deer from multiple, oftentimes geographically disparate sources, mtDNA genetic diversity would be higher in deer populations where restoration was human-mediated compared to areas where deer populations recovered naturally; and 2) that human-mediated translocation of deer resulted in broad scale genetic similarity across their range different than would be expected based on deer ecology alone. We used data from 1,742 deer from 15 states and 2 Canadian provinces to characterize range-wide patterns of mtDNA sequence diversity and spatial structure. Our results supported both of our hypotheses and suggest that translocation efforts affected recipient populations by leading to higher levels of diversity over time and increased genetic similarity between geographically distant deer populations relative to populations that naturally restored. On average, most areas in the study exhibited high levels of mtDNA diversity despite severe reduction in population numbers prior to recovery. Therefore, high reproductive rates and mobility of deer may have reduced the long-term genetic effects of reduction of population numbers by leading to rapid recovery of populations.

2.3.1 State of the White-tail: Trends in Buck Harvest Age Structure

Kip Adams, Quality Deer Management Association

Harvest trends are valuable for assessing state and regional deer management programs. The percentage of 1.5-year-old bucks in the antlered buck harvest has dropped from 62 percent in 1989 to 34 percent in 2015. During 2001 to 2015, the percentage of 3.5-year-old and older bucks in the harvest climbed significantly from 21 to 35 percent. There are three primary reasons for this change in harvest age structure: antler restrictions, strong educational campaigns, and hunter desires. Each has played a critical role in changing herd demographics, and each will have a heightened role in the future given the continued spread of chronic wasting disease (CWD).

2.3.2 Show 'em What You've Got, Wisconsin's New Deer Metrics System

Kevin Wallenfang, Wisconsin Department of Natural Resources

Wisconsin has developed a deer data storage and presentation system that is getting used by County Deer Advisory Councils and the public, as well as state wildlife managers. Kevin will demonstrate its use.

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2.4.1 Past, Present, & Future of the NWTF

Jason Lupardus, National Wild Turkey Federation

The NWTF has been in the conservation arena for over 40 years working with partners across the nation to restore the wild turkey, conserve habitat, and preserve our hunting heritage. We just completed our 5th year of our successful initiative, *'Save the Habitat. Save the Hunt.'* Updates on where we are and how we will grow under our new CEO, Becky Humphries, shall provide us a framework for future conservation efforts.

2.4.2 Do Wild Turkeys Impact Other Game Birds?

Rick Horton, National Wild Turkey Federation

One of the most common and persistent wild turkey complaints since their restoration centers around turkeys leading to reduced bobwhite quail and ruffed grouse numbers. Scenarios range from a general observation of more turkeys and fewer grouse & quail, to “eyewitness reports” of turkeys destroying nests or eating young chicks. While it is possible for that to happen on occasion, the results of dozens of dietary studies suggest turkeys are not systematically preying upon other birds to the degree that it would impact populations. The other potential impact is from competition for resources. There doesn't appear to be any peer-reviewed research on this, but several other articles point out that there is little dietary overlap between turkeys and grouse or quail. Most (if not all) trained biologists agree that habitat changes have favored wild turkeys and negatively impacted grouse and quail. Does the MDWTSG feel more research is warranted, or that a formal statement would help address public concerns?

2.4.3 Midwest Wild Turkey Consortium Research: Update and Plans for Future Research

Joanne Crawford, Quantitative Wildlife Center, Michigan State University

The Midwest Wild Turkey Consortium was established to allow for collective evaluation of data on wild turkey population ecology at multiple scales across the Midwest. We provide an update on plans for research over the next year and the status of current data acquisition and analysis. Although our previous research indicates that wild turkey populations are stable throughout most of the Midwest, some states are experiencing declines. We present findings on land cover change in the Midwest between 2001 and 2011. Across all states, the proportion of agriculture on the landscape increased by 13.5%, with Michigan exhibiting the greatest increase. States lost an average of 1.3% forest cover, but gained an average of 6.9% grassland cover, with the greatest increase in Missouri. Ongoing analyses of landscape change will incorporate changes in early-successional forest cover and CRP since the beginning of the 21st century and the implications of such changes to wild turkey populations. To build on these findings and more fully elucidate causes of population changes, our current research objectives are to: 1) evaluate the risk associated with interpreting harvest data as a measure of population change, 2) develop our understanding of wild turkey-habitat relationships at large geographic scale; particularly as they relate to land use changes on agricultural and urban landscapes, and 3) evaluate how wild turkey-habitat relationships change across scales from management zones out to multistate

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regions. Currently, we are in the process of acquiring land cover and agricultural cover data to evaluate the influence of fine-scale land cover changes on wild turkey harvest trends.

2.4.4 Standardizing Wild Turkey Brood Surveys across the Southeastern United States

Jason Isabelle, Missouri Department of Conservation

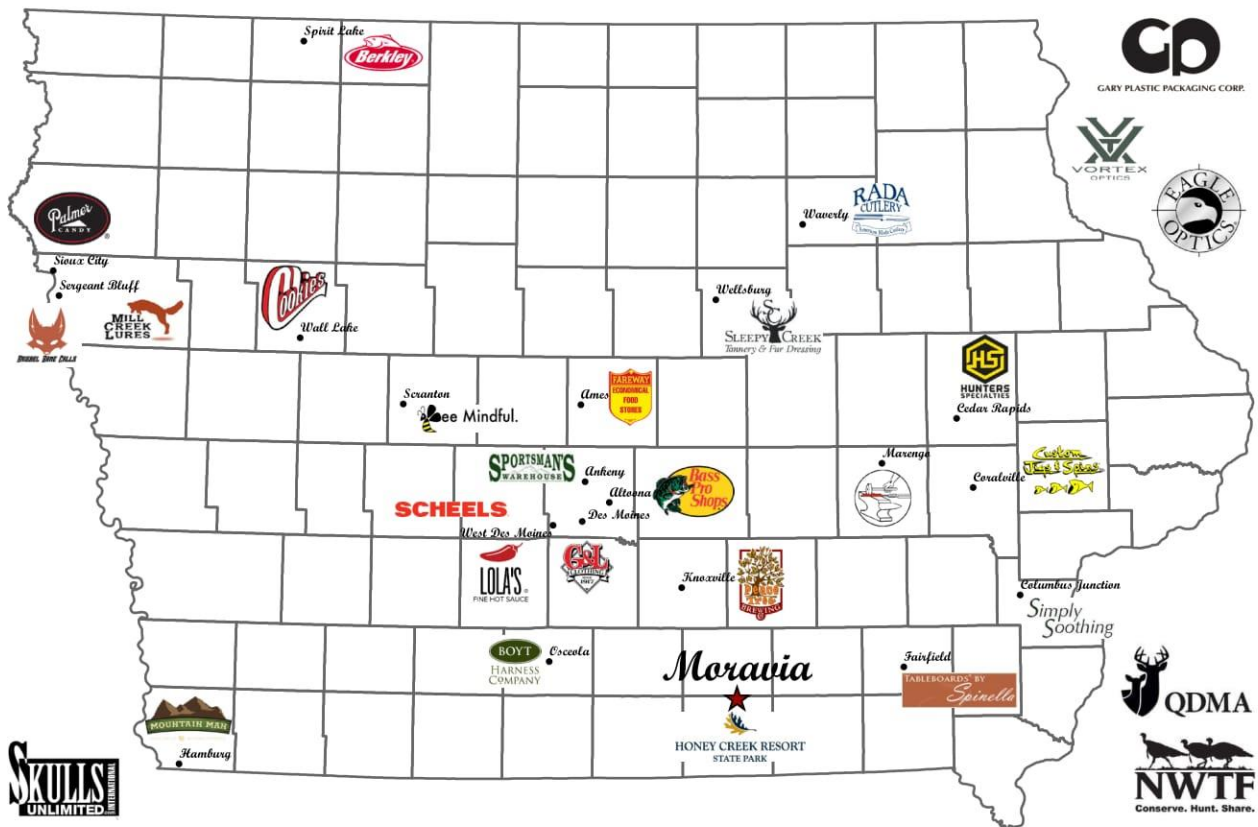
Many state wildlife agencies conduct brood surveys to assess productivity of wild turkey populations. Historically, most states in the Southeastern United States have conducted brood surveys although survey methodology has differed among states. Although brood surveys have provided long-term turkey productivity trends at the state-level, differences in survey methodology have made data comparisons among states less meaningful. To improve managers' ability to determine regional productivity trends, the Southeast Wild Turkey Working Group, comprised of state turkey program leaders, recently developed a common approach to conducting regional brood surveys. Participating states conduct surveys during the same timeframe, record observational data in the same manner, and employ a unified approach to data filtering and analysis. The current approach also allows states to maintain their long-term state-level databases. Given interest, it is possible this methodology could be applied in other regions, further improving our ability to understand trends in turkey productivity.

41st Annual

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August 28–31, 2017
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APPENDICES

2017

MIDWEST DEER & WILD TURKEY STUDY GROUP

STATE DEER REPORTS

APPENDIX A

ILLINOIS

2017 Illinois Deer Report MDWTSG

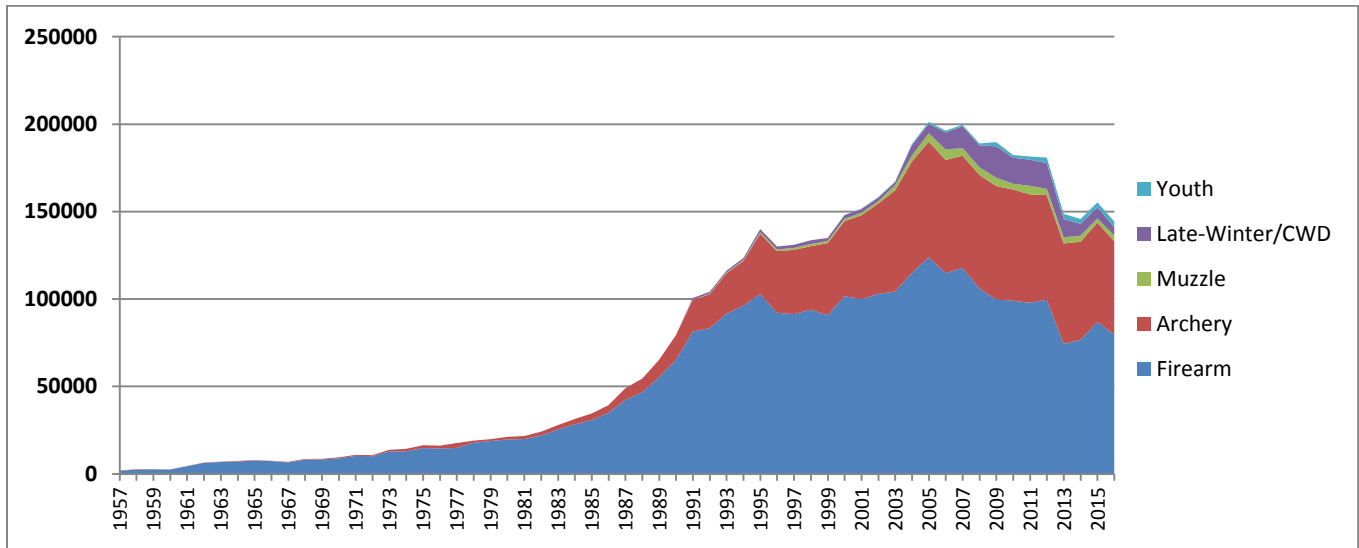
Current Harvest: All seasons deer harvest was 55.5% male: 44.5% female; 45.4% antlered: 54.6% antlerless.

Season	Antlered			Button Bucks			Does			Total		
	2015	2016	% Change	2015	2016	% Change	2015	2016	% Change	2015	2016	% Change
Archery	24860	25325	1.9	4706	4261	-9.5	27201	23882	-12.2	56767	53468	-6.3
Youth	1166	1357	16.4	264	275	-4.2	1420	1640	-15.5	2850	3272	14.8
Muzzle	809	1055	30.4	338	383	13.3	1256	1870	48.9	2403	3308	37.7
LWS	110	46	-58.2	794	581	-26.8	3633	2493	-31.4	4537	3120	-31.2
CWD	423	338	-20.1	291	269	-7.6	1111	969	-12.8	1825	1576	-13.6
Firearm	39825	37569	-5.7	9623	8577	-10.9	37398	33413	-10.7	86847	79559	-8.4
Total	67193	65690	-2.2	16016	14346	-10.4	72019	64267	-10.8	155229	144303	-7.0

NOTE: "Antlered" includes all males older than fawn with, or without antlers.

Factors contributing to recent harvest declines include: 1) the successful effort to reduce deer-vehicle accident (DVA) rates to goals established for each county; 2) closure of 3 more late-winter season (LWS) counties which met DVA rate goals; and, 3) more than 12,000 fewer permits allocated in 2016-17; down 2.1% from 2015-16.

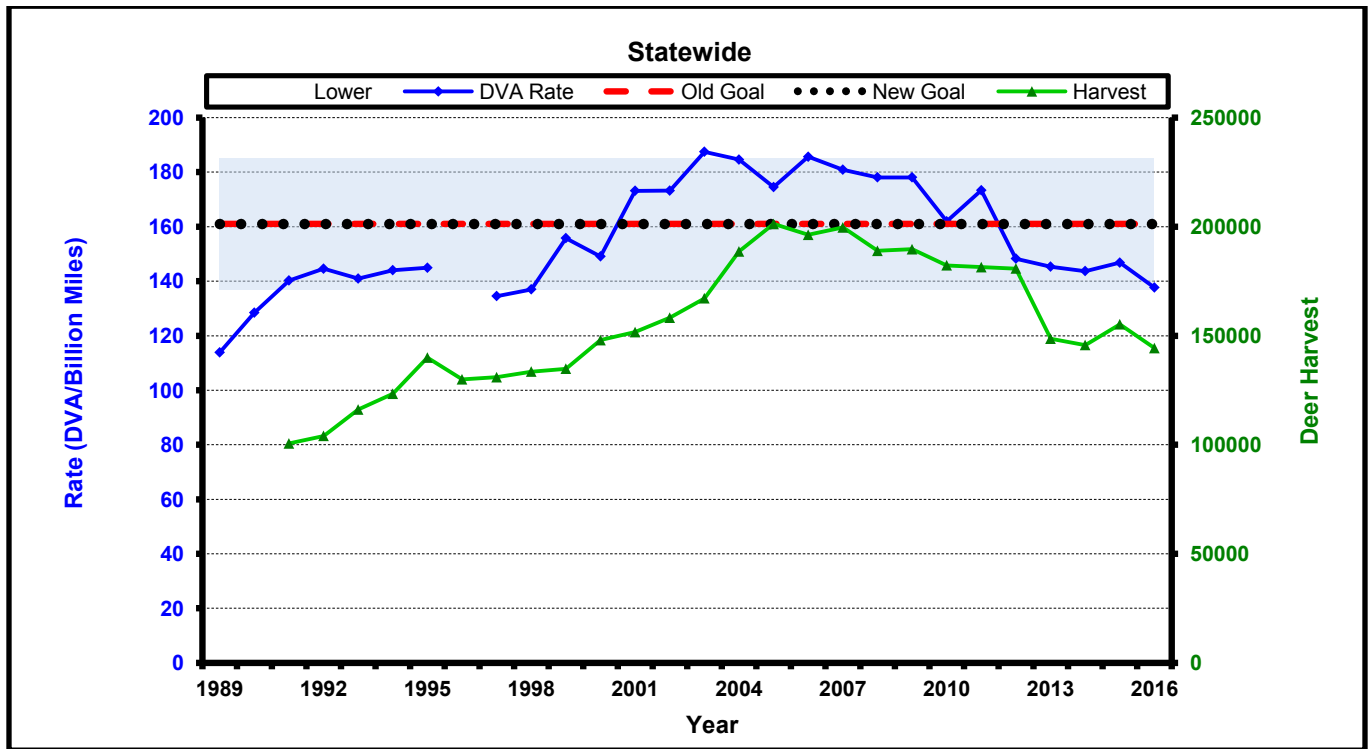
Historic Harvest:



Illinois deer harvest peaked at 201,209 in 2005. EHD outbreaks in 2012 & 2013 likely contributed to our reaching DVA rate goals in many of our counties, and the harvest declines witnessed in those years.

Population Estimate/Trend (see chart, below): Illinois harvest (green) and deer-vehicle accident rate (blue) trends may be seen below. We achieved the agreed upon goal for statewide DVA rate in 2012. The statewide goal remained unchanged while modifications (upward) were made to 40 or so county goals in early 2014. The discussion regarding the modification of DVA rate goals can be viewed here:

<http://www.dnr.illinois.gov/conservation/wildlife/Documents/RevisingIllinoisDeerManagementObjectives.pdf>



License and Season Information:

All Illinois deer hunters are required to obtain a deer permit prior to hunting. Resident landowners of 40 or more acres may obtain free “property only hunting” permits for archery and/or firearm deer hunting on their own property. Non-resident landowners pay reduced fees for “property only hunting” permits. Permit fee structure is found on page 7 of the annual hunting digest, and may be found at this location:

<https://www.dnr.illinois.gov/hunting/documents/HuntTrapDigest.pdf>

All deer “season dates” are found on page 1, and “permits issued” information by season and residency may be found on page 2 of our annual deer harvest reports. Annual deer harvest reports are found on our website at this location: <http://www.dnr.illinois.gov/hunting/deer/Pages/AnnualDeerharvestReports.aspx>

Management Zones:

Each Illinois County is treated as a separate deer management unit. All 102 counties are open to archery deer hunting, while 99 are open to firearm deer hunting. Only Cook, Du Page and Lake Counties are closed to firearm deer hunting.

There are separate quotas for “either sex” and “antlerless only” permit issuance for each open firearm and muzzleloader deer season county. Quotas are reviewed and adjusted as needed annually by staff from the Forest Wildlife Program. The deer-vehicle accident rate relative to the goal is the primary factor used to determine the amount of pressure to be exerted on antlerless deer, including whether a County is open for the late-winter antlerless only season (LWS). We also take into consideration trends in the number of nuisance deer removal permits issued when determining whether a County may be removed from the LWS, even though it

may be at, or below its goal rate. The goal and trends for DVA rates in each County can be found at this location: <https://deer.wildlifeillinois.org/visualization>

The presence of Chronic Wasting Disease removes DVAs as the guiding factor in herd management and herd reduction becomes the management objective.

A map of the Illinois late-winter/CWD season counties may be found here:

<https://www.dnr.illinois.gov/conservation/wildlife/Documents/LateWinterDeerSeasonMap.pdf>

2016 Regulation/legislation changes: A 2-tier cost for single over-the-counter (OTC) non-resident antlerless only archery deer permits was implemented. Those having previously obtained an either-sex archery permit may obtain additional single AO archery permits for \$25.50 (no change); while those without an either-sex permit may obtain the same permit at a cost of \$100 (plus issuing fee). The maximum age for “Youth” permits was increased from “under 16” to “under 18.”

Archery equipment was legal for use during our 7-day firearm deer season on private land provided the hunter had a valid Firearm Deer Permit.

We added three more mandatory firearm deer check stations (Kankakee, Kendall, and Livingston). A total of 13 check stations were operated for deer taken in 14 counties during our split 7-day firearm deer season. Kane County deer are checked in an adjacent county. Lake and Du Page counties are closed to gun deer hunting.

Four counties (Edwards, Marshall, Pike, Saline) were removed from, and one (Perry) was added to, the 2016-17 LWS. This left 24 (of 102) counties open to this “antlerless only” deer season.

Changes proposed for 2017-18 include legalization of crossbows for use during all hunting seasons for which archery equipment is legal (**pending Governor’s signature**); and the minimum archery draw weight was lowered from 40 to 30 pounds.

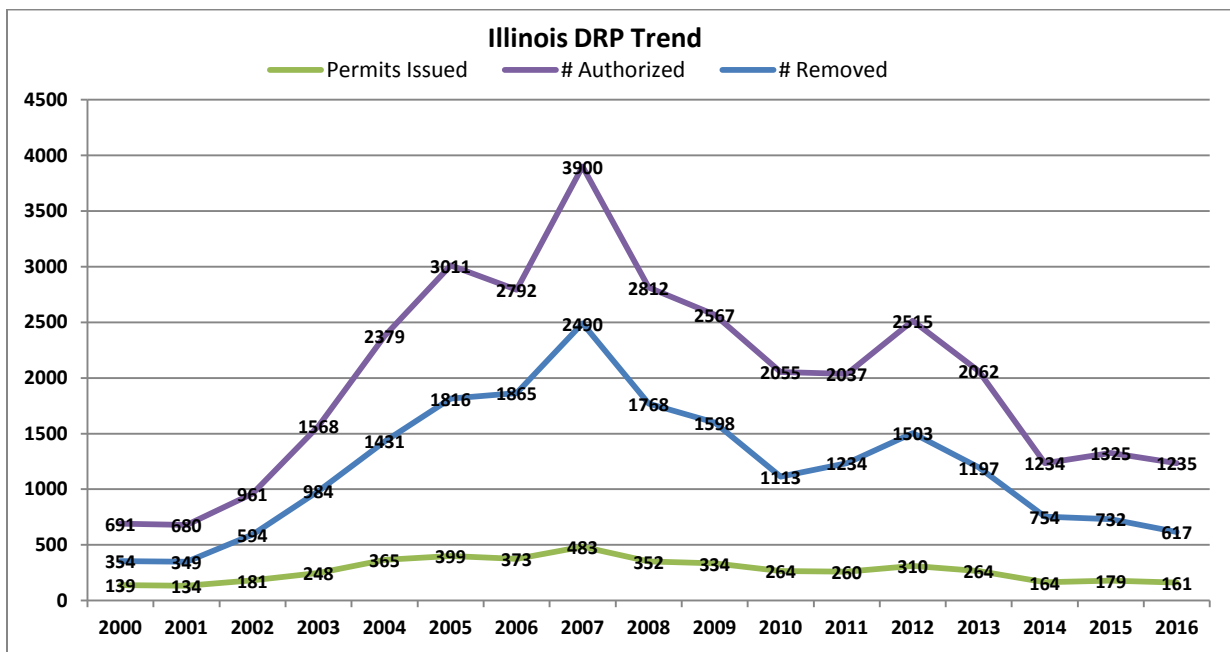
One new county (Carroll) will be added to the CWD season in 2017-18. Illinois has a total of 17 CWD-positive counties, two of which are represented by a single positive animal; and detected a total of 685 through 30 June 2017 from 105,836 sampled.

Although three counties (Clark, Hamilton, McLean) which were below their DVA rate goal in 2015 were also below goal in 2016, only Clark is proposed to be removed from the LWS for 2017-18. McLean has a confirmed CWD-positive animal 1 mile from its border in Livingston County. Hamilton has experienced rather large fluctuations in its DVA rate, so we will see what happens to DVA rates there in 2017. There will now be 23 open LWS counties.

Urban/Special Hunts: Forty **Deer Population Control Permits (DPCPs)** were issued to 11 municipalities and agencies in seven counties. There were 1,342 deer authorized and 1,105 (82.3%) were collected. Adult animals

taken on DPCPs from areas in or near where CWD has been documented (or is likely to be an infection route) are sampled for CWD. Two CWD-positive animals were detected during DPCP sampling in 2016-17. (Complete report available upon request)

Deer Management Assistance/Crop Damage: There were 161 **Deer Removal Permits (DRPs)** issued in 48 counties during 2016; compared to 179 issued in 48 counties during 2015. The 160 lethal removal permits authorized take of 1,235 deer (843 antlerless; 5 antlered; 387 either sex) and 617 (50%) were collected. Sixty-two percent of permits issued were for excessive damage to corn and/or soybeans; 63% of all permits were issued during the months of June and July. Thirty-five permits were issued for public safety at airports. (Complete report available upon request) Historic Illinois DRP activity is found in the chart below:



DISEASES: Ninety-six individuals from 34 counties reported 194 probable **EHD** deaths, statewide. Fulton County in west-central Illinois reported 50 dead; followed by Lake (34) and Cook (27) in the northeast. In 2015 there were 114 reports of 207 animals from 39 mostly western and southern Illinois counties. The 2012 EHD outbreak had the highest number of citizen reports (977); reported deaths (2,968); and affected counties (87).

Chronic Wasting Disease (CWD) management continued in Illinois. There were 7,839 animals tested (7,800 usable) statewide, with 75 positives (highest) identified in FY'17 (8,544 tested; 72 positives in FY'16). We had positive animals from 14 of our 17 counties this year. Between 15 January and 31 March, 2017, agency sharpshooters took 984 (24 positive) from 129 sections in 15 counties. This compares to 888 deer (26 positive) from 117 sections in 13 counties in FY'16. Additionally, Deer Population Control Permit holders tested 467 animals, 2 positive; and Deer Removal Permit holders tested another six, none positive. Prevalence rates (hunting): for all adult deer was at 1.17%; adult males, 1.60%; and adult females, 0.69%. We have now documented 685 positives from 105,836 animals tested to-date. (See complete report, in "Relevant Links" section.)

<https://www.dnr.illinois.gov/programs/CWD/Documents/CWDMap.pdf> (map of cumulative positive animal locations)

Research: The long awaited fecundity study has been published. Preliminary data was shared during the 2013 MDWTSG meeting held in Illinois.

From the Abstract: We estimated reproductive characteristics of female whitetailed deer in Illinois, including pregnancy rate, litter size, fetal growth and fetal sex ratio. We found maternal age to have an important influence on several reproductive factors. Approximately 66% of tested females (n = 3884) were pregnant and pregnancy rates increased with increasing maternal age, from 20.5% in fawns to 85.8% in adult deer. Litter size ranged from 1 to 5 fetuses per pregnant female. The average litter size was 1.9 ± 0.54 fetuses per pregnant female and also increased with age, from 1.2 in fawns to 2.0 in adults, respectively. Breeding season peaked in November with the mean estimated conception dates of fetuses varying with maternal age. Fawns conceived fetuses later in the breeding season (December 2) compared to yearlings and adults (November 11 and 8, respectively). We measured the body mass index (BMI) of all fetuses and found that litter size and female age influence fetal size. We found no bias in fetal sex ratio (average 1.0:1.0, male:female) but we observed a sex bias in fetal size (mean BMI male = 0.71, female 0.67) across all maternal age classes. A comparison of the current study and previous reports indicate that variation in maternal age within a population is an important driver of reproductive metrics, likely because maternal age and body size or condition are related. Furthermore, variation in resource availability will influence reproductive rates, especially among fawn females. © 2017 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND

The article is available online at: <http://www.sciencedirect.com/science/article/pii/S0093691X1730078X>

Current research projects include the effects of culling on social affinity of white-tailed deer and its potential to impact disease spread; deer dispersal patterns in highly fragmented environments; and effects of CWD on gene expression in deer.

Hot Topics: Ongoing budget issues are threatening PR/DJ funding.

Relevant Links: New deer website found at this location: <https://deer.wildlifeillinois.org/>

2017-18 Illinois Hunting Digest: <http://www.dnr.illinois.gov/hunting/Documents/HuntTrapDigest.pdf>

Annual Deer Harvest Summary - link to Illinois deer harvest reports (2005-2016) may be found at this location on our website: <http://www.dnr.illinois.gov/hunting/deer/Pages/AnnualDeerHarvestReports.aspx>

Chronic Wasting Disease Annual Report - link to all Illinois CWD information, including latest annual report, will be found at this location on our website: <http://www.dnr.illinois.gov/Programs/CWD/Pages/default.aspx>

Late-winter/CWD Season – 2017-18 map will be at this location on our website: <http://www.dnr.illinois.gov/conservation/wildlife/PublishingImages/LateWinterDeerSeasonMap.jpg>

Deer Removal Permit & Urban Deer Population Control Permit annual reports were available in meeting handouts and may be provided upon request. No link was available at the time of this report

APPENDIX B

INDIANA



Indiana White-tailed Deer Status Report



41st Midwest Deer and Wild Turkey Study Group Meeting
Honey Creek State Park Resort, Moravia, Iowa
August 28-31, 2017

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Division of Fish and Wildlife
Bloomington, IN 47401
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I. Current Harvest

A total of 119,477 deer were harvested during the 2016-17 hunting season (Table 1) which was 4% lower than the 2015-16 total of 124,769. The antlered deer harvest was 1% higher (51,783) than the previous year (51,176), making it the 5th highest antlered deer harvest since 1951.

Deer Harvested by Season

Season	2015-16	2016-17
Youth	2,470	1,580
Archery*	31,963	28,178
Firearms*	74,437	77,527
Muzzleloader	10,792	7,990
Special Antlerless	5,107	4,202
Total	124,769	119,477
Antlered	51,176	51,783
Antlerless	73,593	67,694

Table 1. Deer harvested by season during the 2015-2016 and 2016-2017 hunting season. *Includes archery or firearms harvest from the Deer Reduction Zones.

Deer Harvested by Type of Equipment Used

Equipment	2015-16	2016-17
Bow	20,320	17,014
Shotgun	43,612	29,227
Muzzleloader	24,770	16,689
Handgun	917	604
Rifle	23,306	44,673
Crossbow	11,844	11,270
Total	124,769	119,477

Table 2. Deer harvested by type of equipment used during the 2015-2016 and 2016-2017 hunting season.

II. License and Season Information

During the 2016-2017 deer hunting season, 191,382 in-state deer hunting licenses and 11,386 out-of-state deer hunting licenses were sold (Table 3). 69,018 bundle licenses were sold which allow individuals to take up to 3 deer. This resulted in 340,804 privileges to take deer during the 2016-2017 hunting season (Table 4), excluding exempt individuals and individuals possessing a valid lifetime licenses. Individuals exempt from license requirements in Indiana include:

- Resident owners of Indiana farmland or lessees who farm that land, along with their spouses and children, while hunting that farmland,
- Trustees and named trust beneficiaries comprised solely of the members of an immediate family when hunting on the trust property,
- Residents engaged in full-time military service and who are carrying leave orders and a valid IN driver's license, and
- Youth participating in free youth hunting weekends.

Indiana Deer Hunting Licenses

License	Resident	Nonresident
Res. Youth Consolidated Hunt/Trap	\$7	N/A
Nonres. Youth Deer Hunting	N/A	\$24
Nonres. Deer License Bundle (youth)	N/A	\$65
Deer Hunting	\$24	\$150
Deer License Bundle	\$65	\$295

Number of Licenses Sold

License	Number Sold
Res. Deer Hunting	89,397
Res. Deer License Bundle	69,018
Res. Youth	32,967
Nonresident	11,386
Total	202,768

Table 3. Indiana deer hunting licenses sold during the 2016-2017 hunting season.

2016-17 Deer Season Dates and Bag Limits

Reduction Zone*	Hunting Dates	Bag Limit
Youth	Sept. 15, 2016 – Jan. 31, 2017	1 antlered deer AND 9 antlerless deer OR 10 antlerless deer
Archery	Sept. 24 and 25, 2016	1 antlered AND the number of bonus antlerless deer per county quota
Firearms	Oct. 1, 2016 – Jan 1, 2017	2 antlerless deer OR 1 antlered and 1 antlerless deer (AND bonus antlerless county quota)
Muzzleloader	Nov. 12 – 27, 2016	1 antlered deer (AND bonus antlerless county quota)
Special Antlerless**	Dec. 3 – 18, 2016	1 antlered deer OR 1 antlerless deer (AND bonus antlerless county quota)
	Dec. 26, 2016 – Jan. 1, 2017	The number of bonus antlerless deer per county with a quota of 4 or more

*Designated counties or portions of counties

**Special Antlerless Season only in counties with a bonus antlerless quota of 4 or more

Table 4. Indiana 2016-2017 deer hunting seasons

III. Historical Harvest

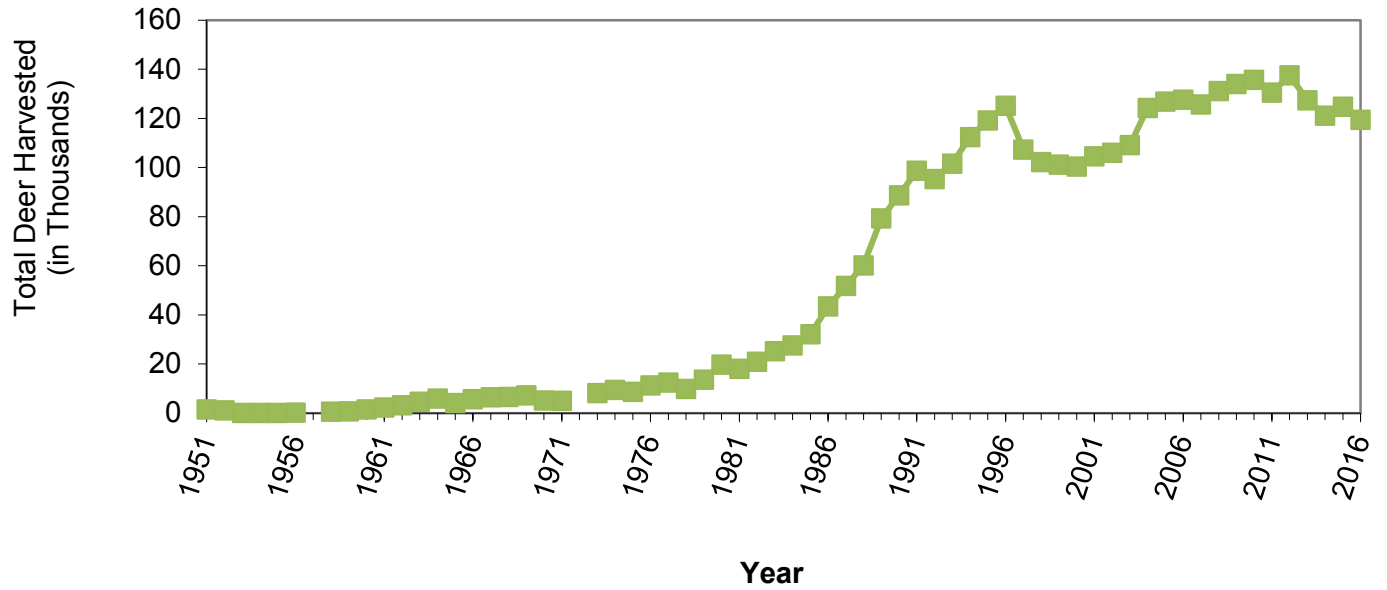


Figure 1. The total number of deer harvested in Indiana each year from 1951 to 2016 including state park hunts.

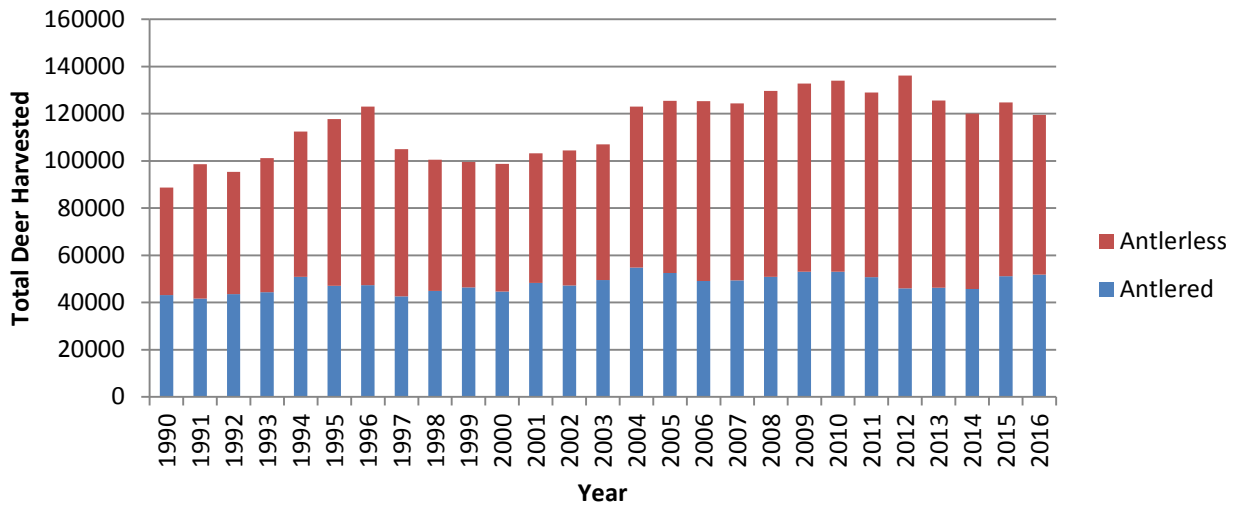


Figure 2. The proportions of yearly deer harvest totals that are antlered and antlerless since 1990.

IV. Population Trends

Indices for Indiana deer population density are currently being developed.

V. Management Units

Management units in Indiana are defined by counties. For example, the Bonus Antlerless deer quotas are set individually by county.

VI. Regulation/legislation Changes

Changes for the 2016-2017 deer season:

In early 2017, Indiana House Bill 1415 modified the rifle options first passed in House Enrolled Act 1231 in early 2016. The new bill expanded the legal rifle bullet size options from .243 inches or .308 inches only to bullets with a diameter of .243 inches or larger. The bill also set a maximum cartridge case length of 3 inches.

For the 2016-17 season, changes were made to the hunting regulations via Emergency Rule for three counties involved in bovine tuberculosis disease sampling. The Emergency Rule required deer harvested in Franklin County, Fayette County south of State Road 44, and Dearborn County north of State Road 48 to be checked-in within 12 hours of harvest. Additionally, deer harvested in Dearborn County north of State Road 48 on September 24 and 25, 2016 and from November 5 through 27, 2016 were required to be taken to a biological check station for bovine tuberculosis sampling. The Emergency Rule also outlined an incentive program in which hunters that harvested an antlered deer at least two years old in the disease sampling area and submitted it for testing were eligible to receive authorization to take an additional antlered deer at least two years old from the sampling area. The second antlered deer was required to be submitted for testing. The authorization to take an additional antlered deer was valid through December 11, 2016. Finally, the Emergency Rule established a ban on baiting and feeding deer or any other mammal in Franklin County and Fayette County south of State Road 44 from September 24, 2016 through September 23, 2017. This included the use of mineral and salt licks. Normal agricultural practices, including the use of food plots, were not prohibited.

VII. Urban/Special Hunts

In Indiana, there are two special hunts that aim to control deer populations and allow hunters to harvest deer in addition to the statewide bag limits. Hunters may participate in the Deer Reduction Zone (previously Urban Deer Zone) season or the Bonus Antlerless program. Deer Reduction Zones allow hunters to harvest up to 10 deer (10 antlerless, or 9 antlerless and 1 antlered) in defined urban areas. Participants aiming to satisfy the Reduction Zone bag limit must harvest an antlerless deer before harvesting an antlered deer. A Deer Reduction Zone license is required for each deer harvested. The Deer Reduction Zone season does not override any local ordinances that restrict shooting firearms and bows. Reduction Zones for the 2016-2017 Deer Reduction Zone season included Allen County (primarily Fort Wayne), Evansville, Indianapolis (all of Marion County and portions of Boone, Hamilton, Hendricks, and Johnson counties), Lafayette, and portions of Lake and Porter counties.

The Bonus Antlerless license allows hunters to harvest additional antlerless deer in any county during all hunting seasons. In 2016, county bag limits (quotas) ranged from A to 8, with "A" designated counties only allowing the harvest of one antlerless deer from November 24, 2016 to January 1, 2017. A license is required for each bonus antlerless deer, and a hunter may purchase an unlimited number of licenses as long as county quotas are observed. The Special Antlerless season allows hunters to harvest antlerless deer using firearms in counties with quotas of 4 or more.

This year, IDNR launched the Community Hunting Access Program (CHAP) which is designed to increase hunting opportunities for deer in urban environments and to help alleviate human-deer conflicts. The program provides partners with financial and technical assistance to administer hunting programs in their communities. Communities work closely with certified CHAP Hunt Coordinators who develop, implement, and manage hunts within the community.

VIII. Management Assistance/Crop Damage

Crop Damage

Deer depredation permits are issued when individuals, business, and/or agencies experience problems with deer. Permits are used to reduce conflict between landowners and deer in localized areas. They are not used as a form of population control, as demonstrated by the low take when compared with the number of deer harvested during the hunting season. Typical problems experienced in Indiana include browsing damage to crops, orchards, and plants used for landscaping. Permits are issued when landowners can demonstrate damage in excess of \$500. Permits may also be issued to address disease concerns, as was recently needed in parts of Franklin and Fayette counties to address issues with bovine tuberculosis.

A total of 311 depredation permits were issued statewide, with an average of 13.4 deer authorized per permit and an average of 4.7 deer taken per permit. Reported damaged ranged from \$400 to \$86,250. Average reported % of crop that was damaged was 25.4% (n=293; 95% CI = 0.28, -0.03). Soybeans were the most frequently reported crop damage (n=199) with corn being the second most reported damaged crop (n=188). To standardize damage values, we used the Indiana average values for soybean and corn production, which for 2015 was 50 bushels/acre and 150 bushels/acre, respectively (USDA NASS 2015 State Agricultural Overview). We also used a standardized price per unit for soybean and corn, which for 2015 was \$9.16 per bushel and \$3.92 per bushel, respectively (USDA NASS 2015 State Agricultural Overview). The damage to soybeans was an estimated 15,924 acres at a total estimated price of 7,293,068. The damage to corn was an estimated 13,930 acres at a total estimated price of \$8,190,547.

A total of 1,556 deer were taken statewide on deer damage permits, which represents 1.29% of the total number of deer taken on damage permits and harvested by hunters in 2016. Most of the deer taken on damage permits were does (n=1,249), which represents 1.81% of the total number of does taken and harvested in 2016. A much smaller number of bucks (n=281) were taken on damage permits, which represents 0.54% of the total number of bucks taken and harvested in 2016. The majority of deer (76%) taken on damage permits were either consumed or donated.

Deer Vehicle Collision

Deer-vehicle collisions are analyzed by standardizing across years and counties using statistics on the Daily Vehicle Miles Traveled (DVMT) provided by the Indiana Department of Transportation. This adjustment (collisions per billion miles traveled) accounts for changes in traffic volume between counties to allow for an unbiased comparison between counties and years. The total reported deer-vehicle collisions across the state were down from 15,357 in 2015 to 14,021 collisions in 2016. The number of deer-vehicle collisions per billion miles traveled in 2016 was 182 which was down from 202 collisions per billion miles traveled in 2015.

Counties with the highest number of deer-vehicle collisions per billion county miles traveled were Pulaski (1004), Ohio (892), St. Joseph (881), and Greene (803) (Figure 10). Three counties had 50 or fewer deer-

2016

Deer Vehicle
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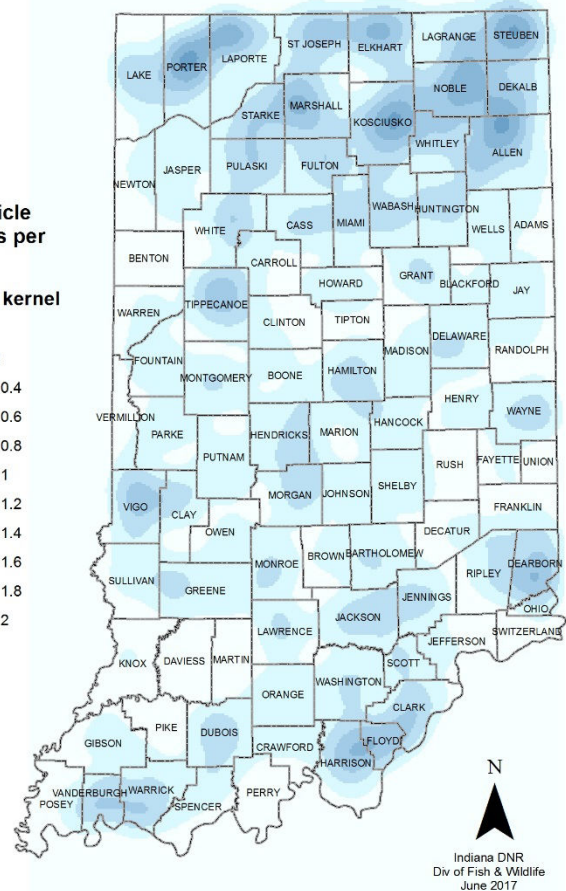
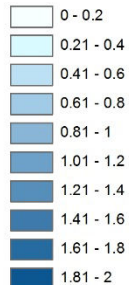


Figure 3. Deer vehicle collision density in Indiana.

vehicle collisions per billion county miles traveled: Marion (10), Lake (38), and Spencer (50) (Figure 3). Deer-vehicle collisions per billion miles traveled decreased in 64 counties, remained constant in 2 counties, and increased in 26 counties compared to 2015. Seven counties showed a greater than 15% increase in deer-vehicle collisions per billion miles traveled while 31 counties showed a greater than 15% decrease compared to 2015. Jennings County had a 95% increase in the number of deer-vehicle collisions per billion miles traveled. Most deer-vehicle collision in 2016 occurred on state roads (36%), county roads (28%), and US routes (17%). Nearly 45% of deer-vehicle collisions in 2016 occurred between October and December. The economic cost of deer-vehicle collision in 2016 was \$119 million based on the average estimated cost per collision.

IX. Disease Issues / Updates

Bovine tuberculosis (bTB) is caused by the bacterium *Mycobacterium bovis*, and often affects the respiratory system of mammals. Historically, it is a relatively rare disease that has affected white-tailed deer. Michigan has had bTB in white-tailed deer in both captive and wild cervids since 1994, and possibly as early as 1975 when a single deer was detected with the disease. No action was taken in 1975 because it was believed to be an isolated case. In general, the threat of humans contracting bTB from animals today is very remote.

In 2008, bTB was detected in a single cow in Franklin County. Several months later, bTB was detected in a captive cervid herd consisting of elk, red deer, fallow deer, and sika deer. A large proportion of animals on this farm were infected by the bTB bacteria and were depopulated. It was determined that the strain of bTB was the cervid strain, as opposed to the Michigan strain which is found in Michigan, or other bTB strains found in other parts of the country. Because bTB was detected in the captive cervid herd, in 2009 Indiana DNR along with the Indiana Board of Animal Health (BOAH) initiated a surveillance plan to examine hunter harvested deer for bTB through voluntary hunter-harvested surveillance. In 2011, a herd of cattle tested positive in Dearborn County for the same strain of bTB. As a result, surveillance was extended to include parts of Dearborn County in 2011. From 2009 until 2015, surveillance continued, in southern Fayette County, Franklin County, much of Dearborn County, and parts of Ripley County. During this period, 1,415 wild white-tailed deer were tested and found to be negative for bTB. In April 2016, another cattle operation consisting of two separate locations near Metamora, IN tested positive for bTB. In December 2016, a third location near Laurel, IN also tested positive. During routine wildlife testing procedures on the two locations of the infected farm, raccoons, opossums, woodchuck, and other species of medium size mammals were trapped and tested, along with 16 wild white-tailed deer. One of the wild white-tailed deer and one raccoon tested positive for bTB. In all cases it has been the cervid strain of bTB. Based on genetic testing using whole genome sequencing at the USDA National Veterinary Services Laboratory (NVSL), all of the bTB found in Indiana is closely related to each other, indicating a single source of the infection.

As a result of the positive wild white-tailed deer, IDNR with cooperation from BOAH and USDA APHIS Wildlife and Veterinary Services initiated a surveillance program during the 2016 hunting season. The goal was to test approximately 2,000 deer for bTB, with a large proportion of animals being bucks > 2.5 years old because of their higher value in disease surveillance. The objectives were to 1) determine the apparent prevalence rate of bovine tuberculosis in south Fayette and Franklin counties within a 10-mile radius of the 2016 affected farm where the first wild white-tailed deer tested positive, and to 2) detect the disease at a low prevalence level within a 10-mile radius of the 2011 affected farm in Dearborn County. At the end of the 2016 deer hunting season, 2,044 samples were submitted to the Animal Disease Diagnostic Lab at Purdue University and to the National Veterinary Services Lab (NVSL) in Ames, Iowa. All the hunter-harvested deer tested negative for bTB.

Because only a sample of the deer population in Franklin County were tested for bovine tuberculosis, we calculated the apparent prevalence rate of bovine tuberculosis for the surveillance zone, which is a best-estimate of the true prevalence (actual number of deer infected) of bovine tuberculosis in the wild deer population. True prevalence is only achieved by sampling every deer in the population, which is impossible in free-ranging white-tailed deer.

To calculate the apparent prevalence, we used the values determined by APHIS Wildlife and Veterinary Services scientists in Fort Collins, Colorado, for the Cervid Sample Size Calculator to “discount” deer based on their age and sex

(males and females less than 2 years old = 1/9 of bucks greater than 2 years old, females at least 2 years old = 1/3 of bucks at least 2 years old) and how the sample was collected (hunter harvested sample = 0.75; hunter harvested sample with a chest cavity inspection = 0.80; and a deer with a full necropsy = 0.85).

A total of 938 hunter-harvested deer and 16 targeted deer (taken in July 2016) were tested within a 10-mile radius of the location where the first infected wild white-tailed deer was found in Franklin County. Samples consisted of 241 deer less than 2 years old, 189 female deer at least 2 years old, and 524 male deer 2 years of age and older. Only one wild white-tailed deer, the wild white-tailed deer removed from the bovine tuberculosis affected farm in northern Franklin County, was positive for bovine tuberculosis.

Adjusting the number of deer using the Cervid Sample Size Calculator, we sampled an equivalent of 473 deer within the 10-mile radius, resulting in a bovine tuberculosis apparent prevalence rate of 0.21% with a 95% confidence interval (-0.51%, 0.93%) in 2016. Prevalence cannot be negative, so the range of possible rates is 0% to 0.93%, with 0.21% being the most likely. This is the best estimate of the true prevalence of bovine tuberculosis infected deer in the wild deer population in the south Fayette and Franklin counties 10-mile radius sampling area.

We can become more confident in our estimate of the true prevalence of bovine tuberculosis in the wild deer population and narrow the range of possible prevalence rates by sampling more deer in future years. The IDNR asks for continued support of hunters that hunt within 3 miles of the 2016 bovine tuberculosis affected farms to submit harvested deer for bovine tuberculosis testing in future deer seasons.

We tested 836 hunter-harvested deer within a 10-mile radius of the 2011 bTB positive farm in Dearborn County (Figure 4). The surveillance was comprised of 217 yearlings and fawns, 166 does that were at least 2 years old, and 453 bucks that were at least 2 years old. All deer sampled tested negative for bTB. Adjusting the number of hunter-harvested deer that were sampled using the Cervid Sample Size Calculator, we sampled the equivalent of 416 deer within the 10-mile radius. Given our sampling effort, the apparent prevalence rate of bovine tuberculosis was 0% with a 95% confidence interval (-0.67% to 0.67%) in 2016. Prevalence cannot be negative, so the true prevalence rate with a 95% confidence interval is between 0% and 0.67%, with a greater likelihood of the true prevalence being closer to apparent prevalence (0%) than at the far end of the range (0.67%) of the confidence interval.

During the 2016 bovine tuberculosis surveillance effort, IDNR offered an incentive for hunters to submit mature bucks for bovine tuberculosis testing. Hunters who harvested a buck at least 2 years old in the surveillance area and submitted it for bovine tuberculosis testing were eligible to receive an Authorization to Take an Additional Buck. The hunter's second buck also had to be at least 2 years old, taken from the surveillance area, and submitted for bovine tuberculosis

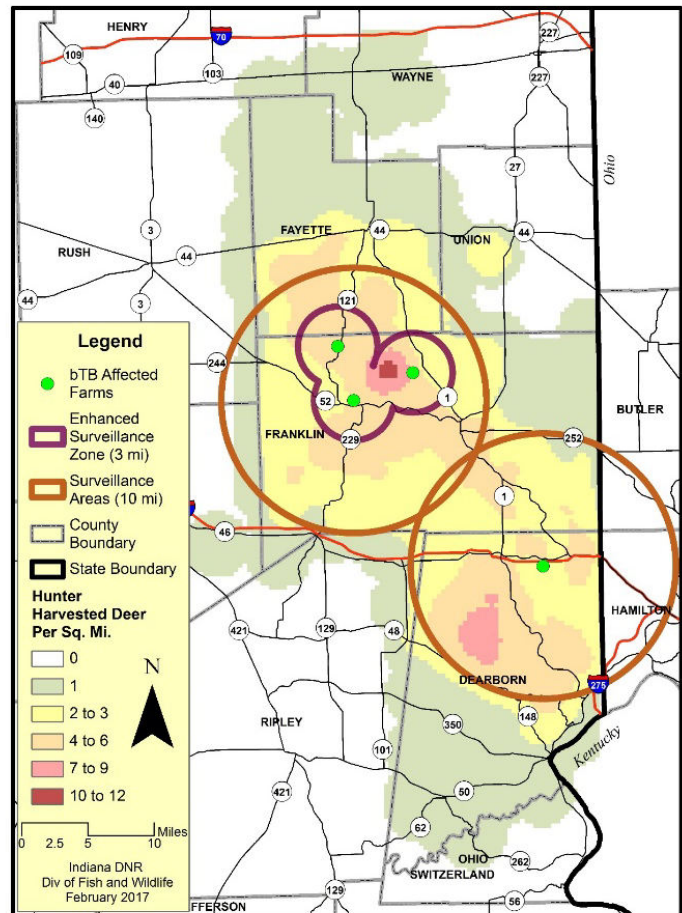


Figure 4. Hunter harvested deer tested (per square mile) for bovine tuberculosis (bTB) in Fayette, Franklin, and Dearborn counties during the 2016 deer hunting season. Sampling efforts were focused in surveillance areas within 10 miles of the 2011 bTB affected farm in Dearborn County and the 2016 bTB affected farm in Franklin County.

testing. IDNR issued 819 additional buck tags to hunters and 113 (13.8%) of these hunters were successful in harvesting a second mature buck.

The Authorizations to Take an Additional Buck had minimal impact on the deer harvest of Franklin, Fayette, and Dearborn counties. The number of bucks harvested in Franklin and Fayette counties increased by 85 antlered deer (7.7%) and 27 antlered deer (6%), respectively, from the number of bucks harvested in 2015 (Figure 5). The antlered harvest in Dearborn County increased by only 10 bucks (<1%). The 2016 antlerless harvest in Franklin County was down 266 (14.8%) deer from 2015. Also, 205 fewer antlerless deer (13.8%) were harvested in Dearborn County compared to 2015. Eighteen more antlerless deer (2.8%) were harvested in Fayette County in 2016 than in 2015. The total number of deer harvested in Franklin and Dearborn counties decreased by 181 deer (6.3%) and 195 (7.6%), respectively, from 2015 totals. The deer harvest in Fayette County increased by 45 deer (4.1%) from 2015.

As a result of the overwhelming success of the surveillance effort, the IDNR canceled previous plans to use sharpshooters to reduce the deer population throughout southern Fayette and Franklin counties in winter 2017. In its place, the IDNR used an integrated management plan that allowed landowners to remove a limited number of deer from their property using DNR-issued special disease control permits through March 31, 2017. Permits were issued only to landowners within the core surveillance area established in the 3-mile circles around the bovine tuberculosis-affected sites in Franklin County (Figure 13). Permits allowed for a limited, specified number of deer to be removed for the purposes of reducing disease risk to livestock. As part of the permit application, applicants needed to meet either one of the two conditions: 1) an economic loss of property of at least \$500 caused by deer, or 2) the need to protect livestock from the potential disease risk posed by wild white-tailed deer that may be infected with bovine tuberculosis.

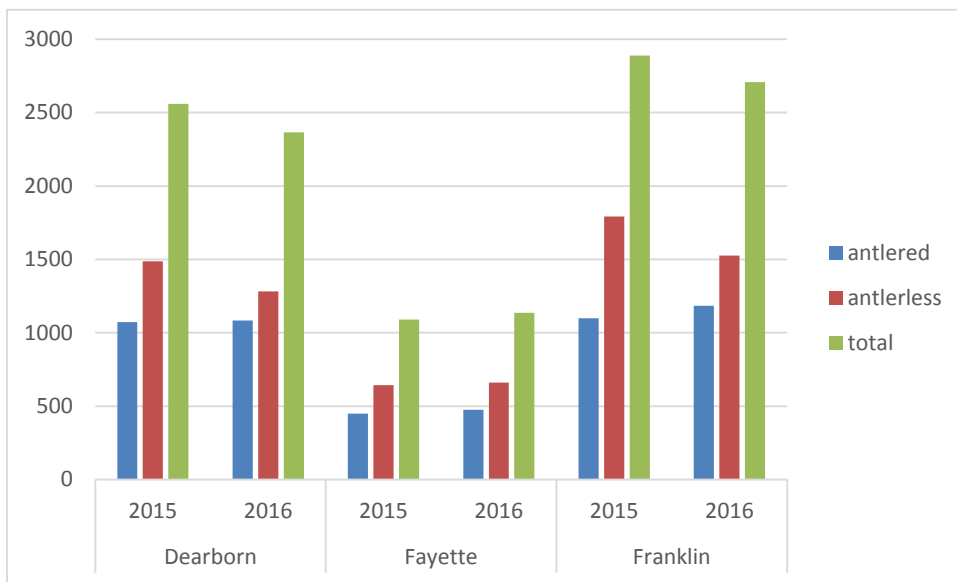


Figure 5. Number of antlered and antlerless deer harvested in Dearborn, Fayette, and Franklin counties during the 2015 and 2016 Indiana deer hunting seasons.

X. Research

In accordance with House Enrolled Act 1231 (the new rifle law), IDNR is required to analyze the effects the law change has on the deer population, harvest numbers, and public safety.

Of the hunters that used equipment types other than a rifle in the 2015 deer season, 8,399 used a rifle to harvest at least one deer in 2016. Specifically by equipment type, more than 20% of the hunters that used a bow, crossbow,

handgun, or muzzleloader in 2015 used a rifle in 2016 either in place of or in combination with non-rifle equipment. In 2016, approximately 3,000 hunters purchased a license for the first time and harvested at least one deer using a rifle.

The number of deer harvested in 2016 using rifles increased 92% from 2015. Hunters took 105% more antlered bucks with a rifle than in 2015. The shed buck, button buck, and doe harvests using a rifle also increased from 2015 by 49%, 76%, and 83%, respectively. However, the total number of antlered deer harvested across all equipment types was only 1% higher than 2015. Additionally, the 2016 total harvest was 4% lower than 2015 indicating a shift in equipment type used to harvest deer rather than the number of deer harvested. Harvests using muzzleloaders, shotguns, and handguns saw the largest declines.

The IDNR closely monitors hunting related incidents. During the 2016 deer hunting season, there were no confirmed reports of injury or damage to property as a result of high-powered rifles.

Rifle use in 2016 by non-rifle hunters in 2015

Equipment	2015 Hunters	Hunters	%
Bow	16,782	3,568	21.3%
Crossbow	9,683	2,403	24.8%
Handgun	775	254	32.8%
Muzzleloader	20,021	4,627	23.1%
Shotgun	35,499	5,618	15.8%

Table 5. Number of hunters that harvested a deer using non-rifle equipment types in 2015, and the number and percent of those hunters in each equipment type that used a rifle in 2016 to harvest at least one deer. For example, 16,782 hunters used a bow in 2015. Of those, 3,568 (21.3%) used a rifle in place of or in combination with a bow in 2016. Hunters that used more than one equipment type are counted multiple times.

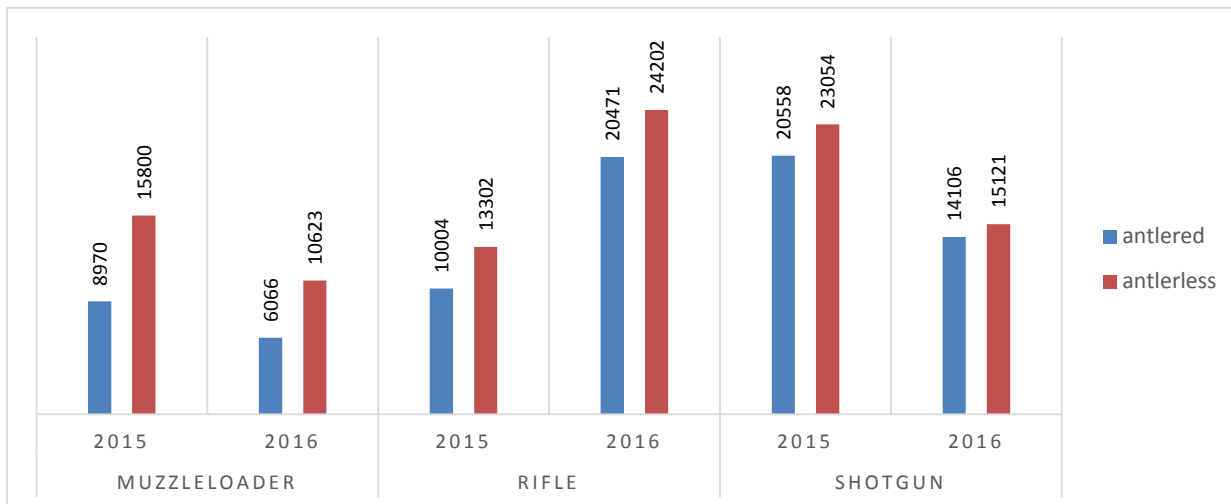


Figure 6. Number of antlered (antlered bucks and shed bucks) and antlerless (does and button bucks) deer harvested using muzzleloaders, rifles, and shotguns during the 2015 and 2016 deer hunting seasons.

XI. Hot Topics

Citizen Science Data Collection Project

IDNR is proposing a Citizen Science based research program that utilizes the public to collect data on Indiana's deer population. Interested individuals will be educated on deer biology and management through a series of computer based lectures and hands-on classes. After learning the importance and methods of managing for deer, participants will collect data and report information to IDNR in order to contribute to the understanding of population demographics and health. Data collection may include setting up trail cameras in semi-permanent locations to gather images over a period of time and providing information through biological surveys created in Qualtrics.

Biological data will be collected in an After Hunt Survey that participants will be directed to immediately after electronically checking in their deer. Hunters will report on the number of deer seen during their hunt for that particular deer, number of hours it took to kill that particular deer (for an estimate of hunter effort / kill), equipment type used to take their deer (as a correction factor for hunter effort), lactation, weight, age, sex, and other characteristics. They can also report their opinions about the quality of the deer seen, how they felt about the number of does and bucks seen, and their overall opinion of deer management in their county. Hunters can also submit photos of the deer, antlers, and jaws for verification. This program aims to collect statewide deer data while educating and building stronger relationships with the hunting public.

Benefit / Cost Evaluation of Methods for Obtaining Local Input on Deer Management Strategies

Administrators in Indiana DNR had been asked by a small number of hunters since early 2015 to obtain county-level input using the model of Wisconsin's County Deer Advisory Councils (CDAC). In 2016 due to external pressure IDNR agreed to a limited trial of CDACs in 5 counties. As a result, ten CDACs were formed through grassroots efforts within those counties and through the help of an internet-based deer interest group. Input into the creation and operation of the CDACs were limited to advertising their meetings and providing data from the deer management program as part of an informal agreement. These CDACs created surveys for their counties, held meetings, and presented recommendations for antlerless bonus antlerless quotas and deer reduction zones (where appropriate). To determine the feasibility of CDACs throughout the 92 counties in Indiana, we conducted a cost per effort for opinion data for several CDAC models with varying levels of input by the Indiana Division of Fish and Wildlife (DFW) including the creation of a program similar to Wisconsin with county-level input and oversight by DFW, a model based on regional-level input and oversight by DFW, a grassroots-based model with only limited input and oversight by DFW, and compared those with obtaining deer management opinion data collected by DFW using a new, internet-based survey system. Indiana DFW had been conducting paper-based hunter and landowner opinion surveys since the 1990's on a 3-year cycle. We were currently in the process of switching to an internet-based survey system every year, which would be essentially a cost neutral change for the Division with a significant increase in capability. Assuming an equal level of responses to CDAC meetings and survey methods, we found that compared with obtaining input using electronic surveys (\$47,660 annually), a county-level model would cost 18.6 times greater, a regional-level model would cost 6.9 times greater, and a grassroots based model would cost 5.5 times greater than the survey-based method. However, because properly applied surveys that are adjusted for representative response rates and monitored for bias are more likely to obtain a greater volume of data and data that better represents the opinions of both hunter and the general public, the value of the surveys is likely much greater than that obtained from public meetings.

XII. Relevant Links

Indiana Division of Fish and Wildlife homepage: <http://www.in.gov/dnr/fishwild/>

DNR: Indiana Deer Hunting, Biology, and Management: <http://www.in.gov/dnr/fishwild/8367.htm>

2016 Indiana White-tailed Deer Summary: http://www.in.gov/dnr/fishwild/files/fw-DeerSummaryReport_2016.pdf

Deer Reduction Zones: <http://www.in.gov/dnr/fishwild/8534.htm>

2016-2017 Bonus Antlerless Deer Map: http://www.in.gov/dnr/fishwild/files/fw-bonus_antlerless_deer_map.pdf

Wildlife Diseases including Bovine Tuberculosis: <http://www.in.gov/dnr/fishwild/5466.htm>

APPENDIX C

IOWA

I. Current Reported Harvest

Regulations and antlerless quotas were unchanged for the 2016 – 2017 season. The decrease in reported harvest was likely a combination of slightly fewer licenses sold during the 2016 – 2017 season and abnormally warm weather during the early seasons (youth, disabled, and early muzzleloader). There were 170,781 hunters (162,095 residents and 8,686 nonresidents) in 2016 – 2017, slightly down from last year and continuing a downward trend in hunter numbers.

Comparison of license sales and reported harvest by season for the previous 2 years.

Season	2015 - 2016		2016 - 2017		% Change	
	Licenses	Harvest	Licenses	Harvest	Licenses	Harvest
Youth	10,120	3,640	9,755	3,261	-4%	-10%
Disabled	449	157	429	127	-4%	-19%
Archery	89,652	22,489	89,745	22,389	0%	0%
Early Muzzleloader	11,803	4,042	11,574	3,450	-2%	-15%
Shotgun 1 (Paid) ¹	66,043	26,671	64,675	25,375	-2%	-5%
Shotgun 2 (Paid) ²	58,731	18,543	58,231	17,830	-1%	-4%
Shotgun LOT ³	41,624	11,041	41,135	10,358	-1%	-6%
Late Muzzleloader	38,517	9,604	39,477	9,560	2%	0%
Special Hunts	4,232	1,908	4,363	1,859	3%	-3%
Depredation	3,543	1,886	3,375	1,807	-5%	-4%
Nonresidents ⁴	14,652	5,420	14,760	5,311	1%	-2%
Total	339,366	105,401	337,669	101,397	-1%	-4%

¹ – 1st shotgun season (5-days beginning 1st weekend in Dec) for licenses not claiming landowner/tenant preference.

² – 2nd shotgun season (9-days beginning 2nd weekend in Dec) for licenses not claiming landowner/tenant preference.

³ – Both shotgun seasons (14-days) for landowner/tenants choosing the shotgun firearm season.

⁴ – Nonresident licenses for either shotgun 1, shotgun 2, archery, late muzzleloader, disabled hunter, or holiday antlerless-only season.

- Quota of 6,000 nonresident general deer/antlerless-only licenses, 35% of which can be archery licenses. An additional 4,500 antlerless-only licenses are available for either one of the shotgun seasons or the disabled hunter season.

License sales, hunters, reported harvest, and success rates by license type and season for 2016 – 2017.

Season	Group ¹	Type	Licenses	Hunters	Reported Harvest				Success Rate ²	Percent Does	
					Does	Antlered	Buttons	Sheds			Total
Youth	Paid	Either-sex	9,177	9,177	1,066	1,756	237	17	3,076	34%	35%
		Antlerless	428	378	131	2	16	0	149	35%	88%
	LOT	Either-Sex	78	78	6	11	2	0	19	24%	32%
		Antlerless	72	72	17	0	0	0	17	24%	100%
Total			9,755	3,375	1,220	1,769	255	17	3,261	33%	37%
Disabled	Paid	Either-sex	337	322	39	51	8	0	98	29%	40%
		Antlerless	58	42	19	0	3	0	22	38%	86%
	LOT	Either-Sex	21	21	2	2	0	0	4	19%	50%
		Antlerless	13	13	3	0	0	0	3	23%	100%
Total			429	429	63	53	11	0	127	30%	50%
Early Muzzleloader	Paid	Either-sex	7,496	7,496	565	1,571	120	1	2,257	30%	25%
		Antlerless	1,562	1,203	533	6	90	0	629	40%	85%
	LOT	Either-Sex	1,494	1,494	98	214	17	0	329	22%	30%
		Antlerless	1,022	956	205	6	24	0	235	23%	87%
Total			11,574	11,574	1,401	1,797	251	1	3,450	30%	41%
Shotgun 1	Paid	Either-sex	49,963	49,962	5,158	12,016	1,413	36	18,623	37%	28%
		Antlerless	14,712	9,514	5,588	93	1,055	16	6,752	46%	83%
Shotgun 2	Paid	Either-sex	44,312	44,312	4,600	6,636	1,301	85	12,622	28%	36%
		Antlerless	13,919	8,659	4,325	55	797	31	5,208	37%	83%
Shotgun 1 & 2	LOT	Either-Sex	22,882	22,882	1,439	3,369	360	15	5,183	23%	28%
		Antlerless	18,253	15,100	4,236	148	768	23	5,175	28%	82%
Total			164,041	47,634	25,346	22,317	5,694	206	53,563	33%	47%
Late Muzzleloader	Paid	Either-sex	21,837	21,837	1,621	3,065	287	148	5,121	23%	32%
		Antlerless	10,814	7,294	2,513	12	458	130	3,113	29%	81%
	LOT	Either-Sex	2,556	2,556	148	277	35	7	467	18%	32%
		Antlerless	4,270	3,840	718	10	96	35	859	20%	84%
Total			39,477	39,477	5,000	3,364	876	320	9,560	24%	52%

License sales, hunters, reported harvest, and success rates by license type and season for 2016 – 2017.

Season	Group ¹	Type	Licenses	Hunters	Reported Harvest				Success Rate ²	Percent Does	
					Does	Antlered	Buttons	Sheds			Total
Archery	Paid	Either-sex	56,526	56,526	1,185	11,825	295	34	13,339	24%	9%
		Antlerless	22,548	15,647	5,368	57	870	19	6,314	28%	85%
	LOT	Either-Sex	5,246	5,246	171	1,237	38	5	1,451	28%	12%
		Antlerless	5,155	4,457	1,075	17	128	5	1,225	24%	88%
Total			89,475	60,054	7,799	13,136	1,331	63	22,329	25%	35%
Senior											
Crossbow	Paid	Antlerless	270	270	50	0	10	0	60	22%	83%
Special Hunts		Antlerless	4,363	1,911	1,554	4	277	24	1,859	43%	84%
Depredation		Antlerless	3,375	1,441	1,585	11	195	16	1,807	54%	88%
Nonresidents ³	Paid	Either-sex	6,073	6,073	113	2,697	13	1	2,824	47%	4%
		Antlerless	8,687	8,686	2,056	167	236	28	2,487	29%	83%
Total			337,669	170,781	46,191	45,379	9,151	676	101,397	30%	46%

¹ – LOT = landowner/tenant licenses; Paid = non-landowner/tenant licenses.

² – Percent of licenses that reported harvested deer.

³ – Nonresident licenses for either shotgun 1, shotgun 2, archery, late muzzleloader, disabled hunter, or holiday antlerless-only season.

- Quota of 6,000 nonresident general deer/antlerless-only licenses, 35% of which can be archery licenses. An additional 4,500 antlerless-only licenses are available for either one of the shotgun seasons or the disabled hunter season.

Iowa White-tailed Deer Report

2016 - 2017

II. Historical Harvest

Year	Regular Gun			Muzzleloader			Archery	Grand Total ¹
	Paid	Landowner	Total	Early	Late	Total		
1953	2,401	1,606	4,007				1	4,008
1954	1,827	586	2,413				10	2,423
1955	2,438	568	3,006				58	3,064
1956	2,000	561	2,561				117	2,678
1957	2,187	480	2,667				138	2,805
1958	2,141	588	2,729				162	2,891
1959	1,935	541	2,476				255	2,731
1960	3,188	804	3,992				277	4,269
1961	4,033	964	4,997				367	5,364
1962	4,281	1,018	5,299				404	5,703
1963	5,595	1,017	6,612				538	7,151
1964	7,274	1,750	9,024				670	9,694
1965	6,588	1,322	7,910				710	8,620
1966	9,070	1,672	10,742				579	11,321
1967	7,628	2,764	10,392				791	11,183
1968	9,051	3,890	12,941				830	13,771
1969	6,952	3,779	10,731				851	11,582
1970	8,398	4,345	12,743				1,037	13,780
1971	7,779	2,680	10,459				1,232	11,691
1972	7,747	2,738	10,485				1,328	11,813
1973	10,017	2,191	12,208				1,822	14,030
1974	11,720	4,097	15,817				2,173	17,990
1975	15,293	3,655	18,948				2,219	21,167
1976	11,728	2,529	14,257				2,350	16,607
1977	10,737	2,051	12,788				2,400	15,188
1978	12,815	2,353	15,168				2,957	18,125
1979	14,178	1,971	16,149				3,305	19,454
1980	16,511	2,346	18,857				3,803	22,660
1981	19,224	2,354	21,578				4,368	25,946
1982	19,269	2,472	21,741				4,720	26,461
1983	27,078	3,297	30,375				5,244	35,619
1984	29,912	3,537	33,449		307	307	5,599	39,355
1985	32,613	5,344	37,957		457	457	5,805	44,219
1986	41,352	10,378	51,730	349	728	1,077	9,895	62,702
1987	53,230	10,270	63,500	1,509	1,027	2,536	9,722	75,758
1988	66,757	13,298	80,055	1,835	1,294	3,129	9,897	93,756
1989	67,606	12,963	80,569	2,619	3,715	6,334	11,857	99,712
1990	69,101	9,095	78,196	2,819	5,884	8,703	10,146	98,002
1991	56,811	11,575	68,386	3,120	2,766	5,886	8,807	83,635
1992	50,822	10,453	61,275	3,316	3,231	6,564	8,814	77,684
1993	52,624	8,354	60,978	2,219	2,883	5,102	9,291	76,430
1994	59,054	8,735	67,789	2,610	3,196	5,806	12,040	87,231
1995	65,206	7,917	73,123	2,831	3,408	6,363	13,372	97,256

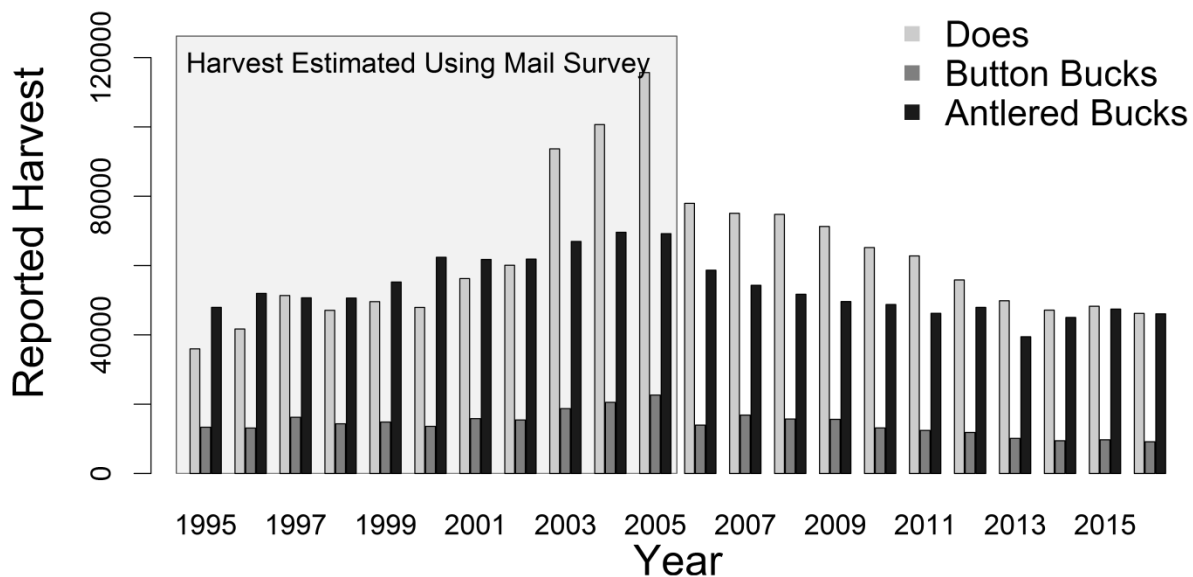
Iowa White-tailed Deer Report

2016 - 2017

Historical Harvest Continued

Year	Regular Gun			Muzzleloader			Archery	Grand Total ¹
	Paid	Landowner	Total	Early	Late	Total		
1996	71,577	10,896	82,473	2,895	4,558	7,453	12,314	107,632
1997	77,169	10,588	87,757	4,062	5,508	9,570	14,313	118,404
1998	73,165	9,989	83,154	4,448	5,343	9,791	12,302	112,608
1999	74,362	12,966	87,328	5,277	5,329	10,606	15,266	121,635
2000	77,743	13,189	90,932	4,585	5,936	10,521	17,727	126,535
2001	82,721	14,801	97,522	4,593	7,320	11,913	18,798	136,655
2002	77,940	18,932	96,872	5,091	7,772	12,863	20,703	140,490
2003	96,757	25,353	122,110	6,155	12,049	18,204	26,486	182,856
2004	97,830	26,333	124,163	6,818	13,550	20,368	30,025	194,512
2005	96,110	27,988	124,098	7,209	13,930	21,139	32,986	211,451
2006	76,218	14,956	91,174	5,431	8,698	14,129	22,008	150,552
2007	67,175	13,862	81,037	4,462	10,530	14,992	22,240	146,214
2008	63,330	12,762	76,092	4,342	10,254	14,596	21,793	142,194
2009	58,801	12,630	71,431	4,495	9,482	13,977	23,172	136,504
2010	56,511	11,455	67,966	4,026	8,838	12,864	21,154	127,094
2011	52,130	11,009	63,139	4,427	8,165	12,592	21,983	121,407
2012	49,110	10,931	60,041	3,896	10,823	14,719	21,981	115,608
2013	42,442	9,271	51,713	4,027	6,828	10,855	20,319	99,414
2014	44,910	10,701	55,611	3,700	8,793	12,493	21,128	101,595
2015	45,214	11,041	56,253	4,042	9,604	13,646	22,489	105,401
2016	43,205	10,358	53,563	3,450	9,560	13,010	22,389	101,397

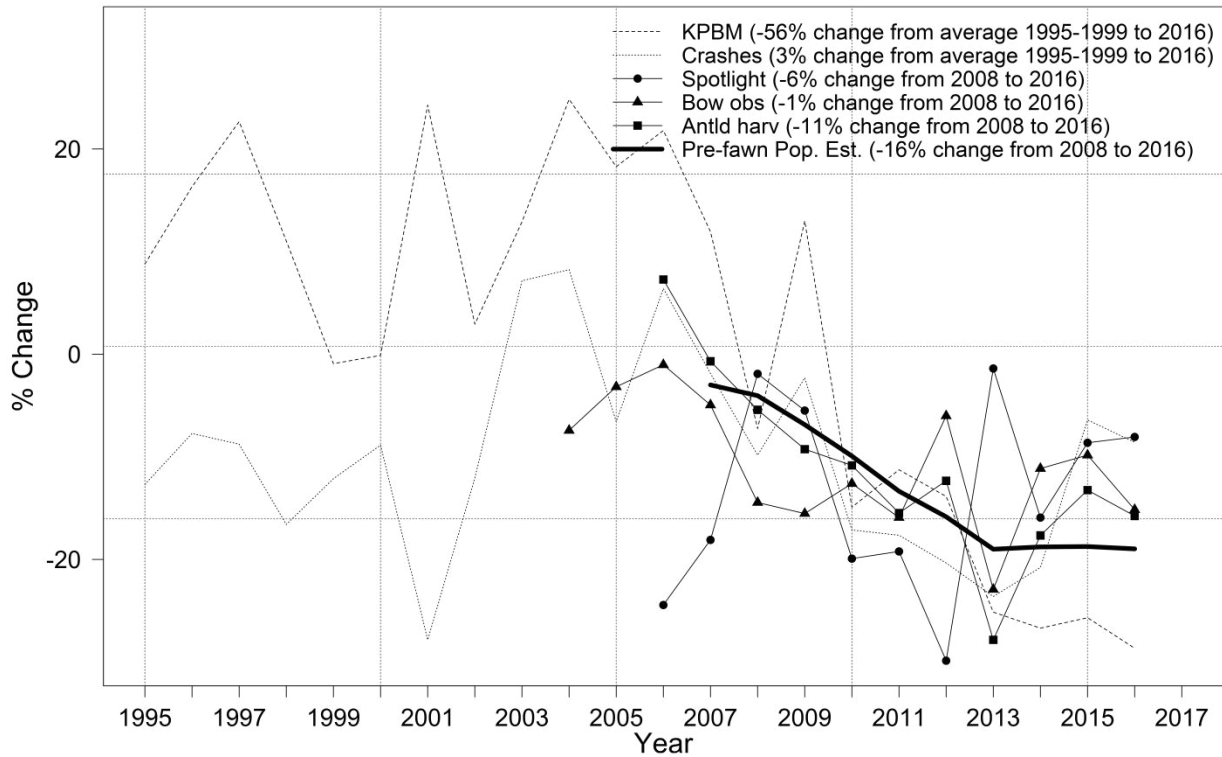
¹ - Grand Total includes IAAP harvest, special management unit hunts, nonresidents and youth. Harvest estimates from 2005 and prior are not comparable to subsequent years.



* Harvest was estimated using mail postcard survey from 1995 to 2005 (electronic reported harvest since 2006).

III. Population Trends

Iowa deer populations peaked in the early to mid-2000's, and liberalized resident county antlerless quotas from 2006 to 2013 reduced populations throughout much of the state. Resident antlerless quotas were reduced in 2014, and have remained unchanged which has resulted in a stabilized to slightly increasing population.



* KPBM = recovered deer-vehicle collisions (IADOT and Salvage Tags) divided by billion miles driven on secondary highways (IADOT estimate).

* Crashes = animal-related crashes reported to IADOT.

* Bow obs = bow hunter observation survey from start of archery season through Friday before 1st weekend in December.

* Antld harv = reported antlered deer harvest.

* Pre-fawn Pop. Est. = pre-fawning (~end-May) population index from deterministic 2-sex, 10-age class accounting model.

IV. License and Season Information

County resident antlerless quotas will be changed in 22 counties, with half increasing and half decreasing, for a total of 72,150 licenses available during the 2017-2018 season. The nonresident quota of 6,000 general deer/antlerless-only licenses, 35% of which can be archery licenses, distributed among 10 zones remains the same. An additional 4,500 antlerless-only licenses are available for nonresidents. Regulations also changed to allow centerfire, straight-walled cartridge rifles during the Youth, Disabled, and Shotgun seasons. See regulations below for information on the changes.

Fees: Landowner/Tenant: \$2.00 (Either-sex [farm unit])
 \$2.00 - General Deer ¹

¹ - Hunting License and Habitat Fee not required

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Resident: \$60.50 (Either-sex [statewide] or Antlerless-only [county])
\$19.00 – Hunting License (≥ 16 years)
\$13.00 – Habitat Fee (16 to 64 years old)
\$28.50 – General Deer or Antlerless-only Tag

Nonresident: \$551.00 (Either-sex and Mandatory Antlerless-only [zone])
\$112.00 – Hunting License (≥ 18 years old; \$32 <18 years old)
\$13.00 – Habitat Fee (16 to 64 years old)
\$426.00 – General Deer and Antlerless-only Tag

\$353.00 (Optional Antlerless-only [county])
\$112.00 – Hunting License (≥ 18 years old; \$32 <18 years old)
\$13.00 – Habitat Fee (16 to 64 years old)
\$228.00 – Optional Antlerless-only Tag^{1,2}
¹ - do not have nonresident deer tag
² – nonresident landowner preference

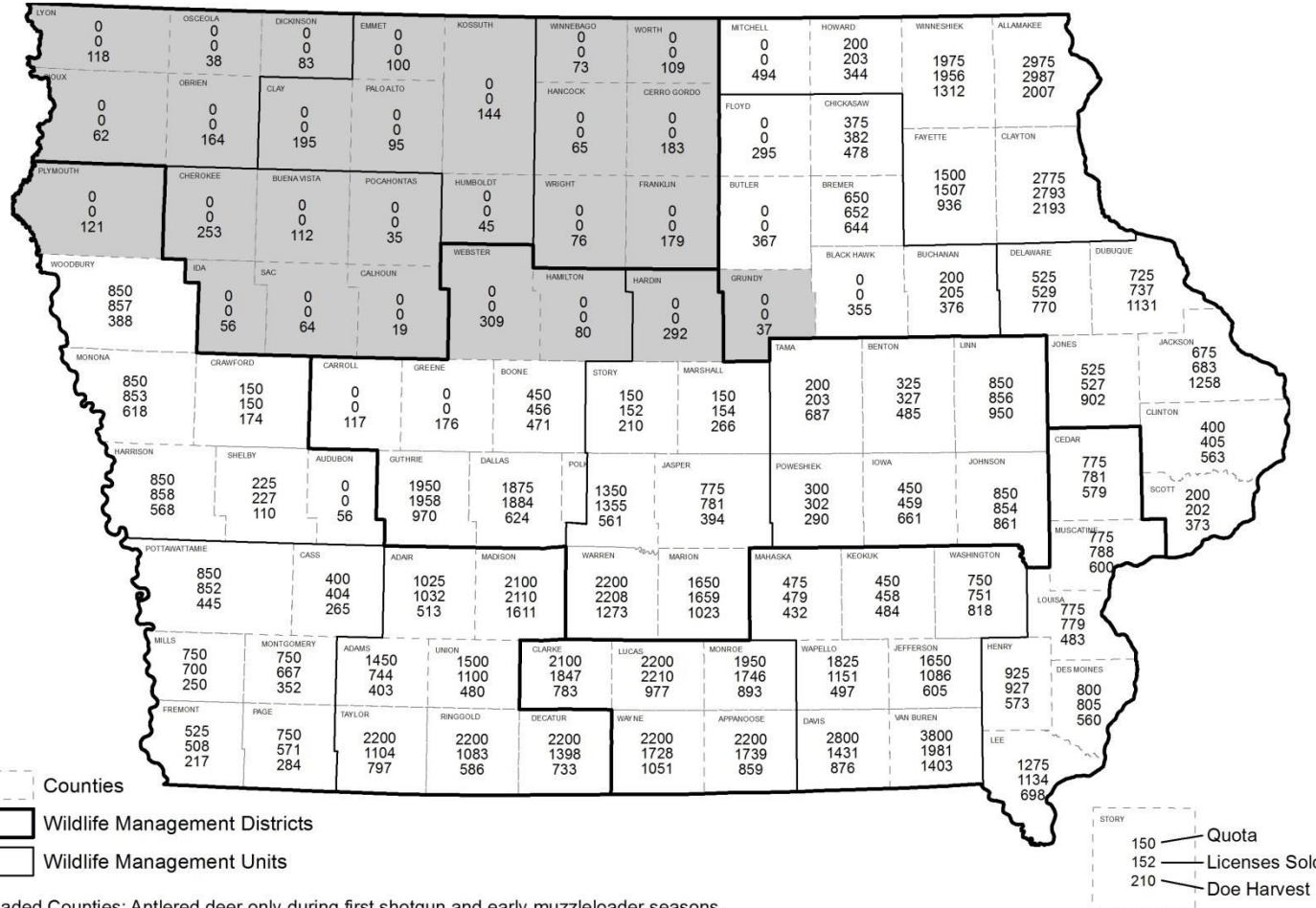
\$203.00 (Holiday Antlerless-only [county])
\$112.00 – Hunting License (≥ 18 years old; \$32 <18 years old)
\$13.00 – Habitat Fee (16 to 64 years old)
\$78.00 – Holiday Deer Antlerless-only Tag^{1,2}
¹ - do not have nonresident deer tag
² - if leftover Optional Antlerless-only Tags

Minimum Age: None. Must be 12 years old with Hunter Safety to hunt without direct supervision

Season Dates: Archery: Oct. 1 - Dec. 2 & Dec. 19 – Jan. 10
Early Muzzleloader: Oct. 15 – Oct. 23.
Late Muzzleloader: Dec. 19 – Jan. 10
Shotgun 1: Dec. 3 – Dec. 7
Shotgun 2: Dec. 10 – Dec. 18
Youth/Disabled: Sep. 17 – Oct. 2
Holiday Antlerless: Dec. 24 – Jan. 2 (leftover nonresident tags, only nonresidents)
Special Mgmt. Hunts: Season dates vary depending on management unit.

V. Deer Management Units

Antlerless Deer Quota, Antlerless-only Deer Licenses Sold, and Total Doe Deer Harvest by Iowa County, 2016



- Counties
- Wildlife Management Districts
- Wildlife Management Units

- Quota
- Licenses Sold
- Doe Harvest

Shaded Counties: Antlered deer only during first shotgun and early muzzleloader seasons.

Licenses sold may exceed quota in some counties.

Updated 2/14/17

VI. Regulation/Legislative Changes

Legislation was passed during the 2017 Legislative Session adding certain centerfire rifles to the list of allowable firearms legally used for harvesting deer during the Youth, Disabled, and Shotgun seasons in 2017 – 2018. These rifles must meet the following criteria outlined in the 2017-2018 Iowa Hunting Regulations Booklet:

- Center-fired, straight-walled, rimless cartridges chambered for handgun use with bullets ranging from 0.357” to 0.500” diameter and a case length from 0.850” to 1.800”.
- Center-fired, straight-walled, rimmed cartridges chambered for handgun use with bullets ranging from 0.357” to 0.500” and a case length from 1.285” to 1.800”.

Additional centerfire rifles not meeting the above criteria are also allowed. See the 2017-2018 Iowa Hunting Regulations Booklet for the list of additional allowable centerfire rifles.

VII. Special Management Hunts

Area	Type	Licenses Available	Licenses Sold	Reported Harvest
AMANA COLONIES ZONE	Archery & Firearm	250	138	63
AMES (CITY)	Archery	50	23	12
AMES (PERIMETER)	Archery & Firearm	50	36	11
BETTENDORF & RIVERDALE	Archery	125	102	44
CEDAR RAPIDS (CITY)	Archery	400	225	150
CLINTON (CITY)	Archery	75	58	26
CORALVILLE (CITY)	Archery	200	140	56
COUNCIL BLUFFS (CITY)	Archery	300	125	69
DAVENPORT (CITY)	Archery	250	255	86
DE SOTO NWR	Muzzleloader Oct. 22 - 23	100	22	2
DE SOTO NWR	Muzzleloader Dec. 17 - 18	100	17	0
DENISON (CITY)	Archery	50	22	9
DUBUQUE (CITY)	Archery	250	230	95
DUBUQUE COUNTY	Archery & Firearm	250	103	35
ELDORA (CITY)	Archery	50	25	15
ELK ROCK STATE PARK	Muzzleloader	25	25	11
GREEN VALLEY STATE PARK	Muzzleloader	30	30	22
IAAP	Archery & Firearm	1200	499	260
IOWA FALLS (CITY)	Archery	50	50	24
IOWA FALLS (PERIMETER)	Archery & Firearm	30	20	12
JEFFERSON COUNTY PARK	Archery	25	12	4
JOHNSON COUNTY	Archery & Firearm	500	500	146
KENT PARK (ARCHERY)	Archery	100	34	13
KEOKUK (CITY)	Archery	50	20	9
KNOXVILLE (CITY)	Archery	25	2	0
LAKE AHQUABI STATE PARK	Archery	30	18	9
LAKE AHQUABI STATE PARK	Mentor	15	7	3
LAKE IOWA COUNTY PARK	Archery	50	27	14
LAKE IOWA COUNTY PARK	Muzzleloader	75	24	11
LAKE MACBRIDE STATE PARK	Archery	50	33	7
LEDGES STATE PARK	Archery	30	29	16

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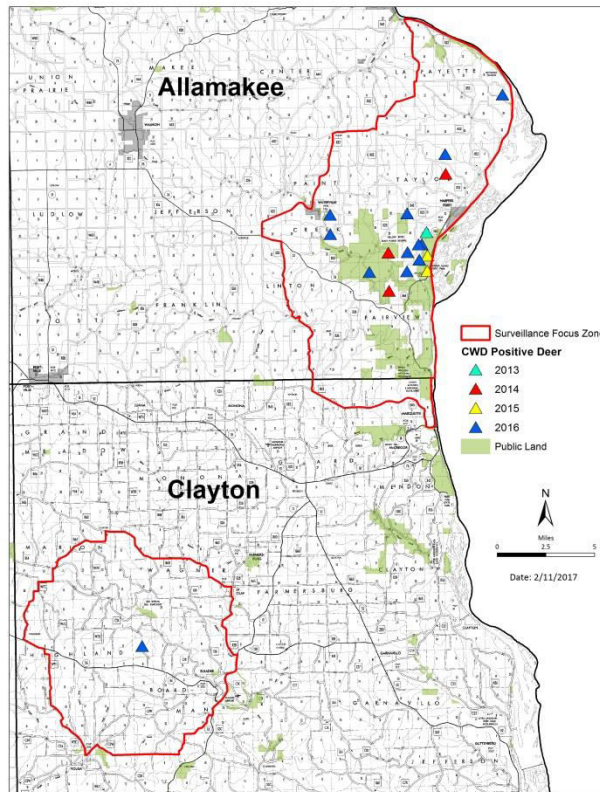
2016 - 2017

Area	Type	Licenses Available	Licenses Sold	Reported Harvest
LINN COUNTY	Archery & Firearm	400	205	62
MAQUOKETA CAVES STATE PARK	Archery	30	22	12
MARSHALLTOWN (CITY)	Archery	60	42	15
MARSHALLTOWN (PERIMETER)	Archery & Firearm	40	23	4
MASON CITY	Archery	50	50	20
MOUNT PLEASANT (CITY)	Archery	50	12	4
MUSCATINE (CITY)	Archery	150	118	57
OSKALOOSA (CITY)	Archery	100	50	21
OTTUMWA (CITY)	Archery	125	87	38
PINE LAKE STATE PARK	Archery	30	22	11
POLK-DALLAS ARCHERY ONLY	Archery	1000	715	357
POLK-DALLAS RURAL ZONE	Archery & Firearm	75	27	7
REICHELTA AREA	Muzzleloader	30	25	6
RIVERSIDE PK CARROLL CCB	Archery	40	10	6
SCOTT COUNTY PARK	Archery	50	43	11
SMITH WILDLIFE AREA	Firearm Dec. 3 - 7	3	2	1
SMITH WILDLIFE AREA	Firearm Dec. 10 - 18	3	3	1
SMITH WILDLIFE AREA	Firearm Dec. 19 - Jan 10.	3	0	0
SPRINGBROOK STATE PARK	Archery & Firearm	30	20	8
SQUAW CREEK PARK	Archery	100	47	20
STONE STATE PARK	Archery	50	40	14
WAPSI ENVIRONMENTAL CENTER	Mentor	4	0	0
WATERLOO & CEDAR FALLS	Archery	290	238	86
Totals		7498	4652	1995

IX. Diseases

CWD – Since the fall of 2013, 18 wild deer have tested positive for presence of PrP protein in northeast Iowa. In 2017, we implemented a special collection season in the CWD focus zones of Allamakee and Clayton Counties to increase surveillance in these areas. A total of 421 deer were harvested among both counties during these seasons, one of which tested positive for CWD. Eleven other deer tested positive during the 2016-2017 hunting season. We continue statewide monitoring with more intensive surveillance in northeast and southcentral Iowa. A total of 62,506 wild deer have been tested since 2002.

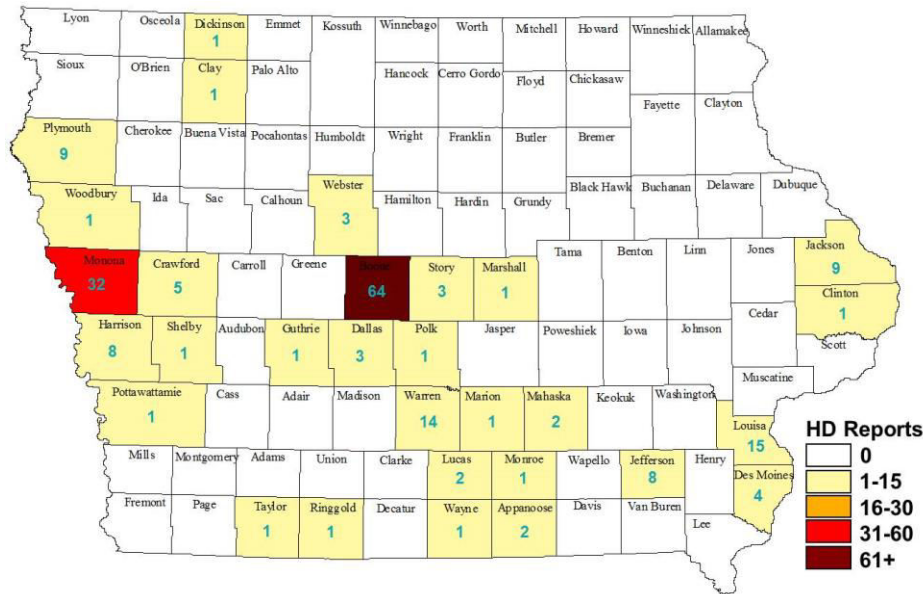
CWD positive wild deer in Allamakee County, 2013 - 2016



EHD - In 2016, we received 197 reported cases of suspected hemorrhagic disease in 30 counties.

Iowa White-tailed Deer Report

2016 - 2017



X. Research

Iowa DNR research projects include a continuing evaluation of distance sampling methods using 10 years of spotlight data conducted on 199, 25-mile transects each year in March or April. We initiated a pilot study in 2017 evaluating the efficacy of our spotlight survey which included repeated visits to 20 selected spotlight survey routes throughout the state. With this effort we hope to evaluate alternative methods for estimating density and abundance, assess temporal variation in spotlight survey data, and determine whether different survey strategies can be employed (e.g., shorter routes). With the spotlight survey data, we're also developing a habitat suitability map for using resource selection functions that compare used (i.e., occupied) and available habitats statewide. Lastly, we have been conducting a fecundity and deer condition study since 2013. Last winter we expanded the survey in attempts of collecting additional data across the entire state. Preliminary results suggest pregnancy rates range from less than 10% for fawns to approximately 65% for adult deer (≥ 2.5 years old).

Iowa State University (P.I. Dr. Julie Blanchong) is continuing two deer related projects in 2016. The first was designed to evaluate fawn survival and resource selection using radio collared neonatal deer. A total of 48 fawns have been collared in three years in central Iowa with 20 mortalities recorded. Preliminary analyses suggest an average annual fawn survival of approximately 47% over three years. The second study is evaluating the relationship of antler characteristics across Iowa. In the first year of data collection, 452 antlered deer were sampled throughout the state. Data collection will continue during the 2017-2018 hunting season.

XI. Hot Topics

Chronic Wasting Disease and management strategies in regards to mitigating prevalence rates in Iowa continue to be the most important priority for both the IA DNR and many Iowa residents. There has also been discussion and bills proposed in regards to baiting and feeding rules.

XII. Links

None.

APPENDIX D

KANSAS



Kansas Deer Report

2016-17 Seasons

I. Current Harvest

Hunter harvest of deer during the 2016-17 seasons was estimated to be 86,140, a 10.1% decrease from 2015-16 when 95,813 deer were taken (see table below for breakdown and figure for the distribution of harvest from 2016-17). The Kansas Outdoor Automated Licensing System data showed 115,635 people purchased 186,296 permits for the 2015-16 seasons, down 3.7% and 8.9% respectively from values in 2014-15. Most of these declines were in resident hunters and permits. The largest decline in permit sales were in resident white-tail antlerless only permits with 12,240 fewer permits purchased for the 2016-17 season (21.1% decline). Non-residents comprise 23% of the deer hunters in Kansas and purchased 26% of the total permits sold in Kansas for the 2016-17 season. In 2016-17 no either species antlerless only permits were allocated due to concerns about the range and population of mule deer. The estimated harvest of 232 antlerless mule deer by hunters in 2016 was the lowest since 1983 (84) and the lowest estimate of overall harvest of mule deer (2,115) since 2005 (2,064).

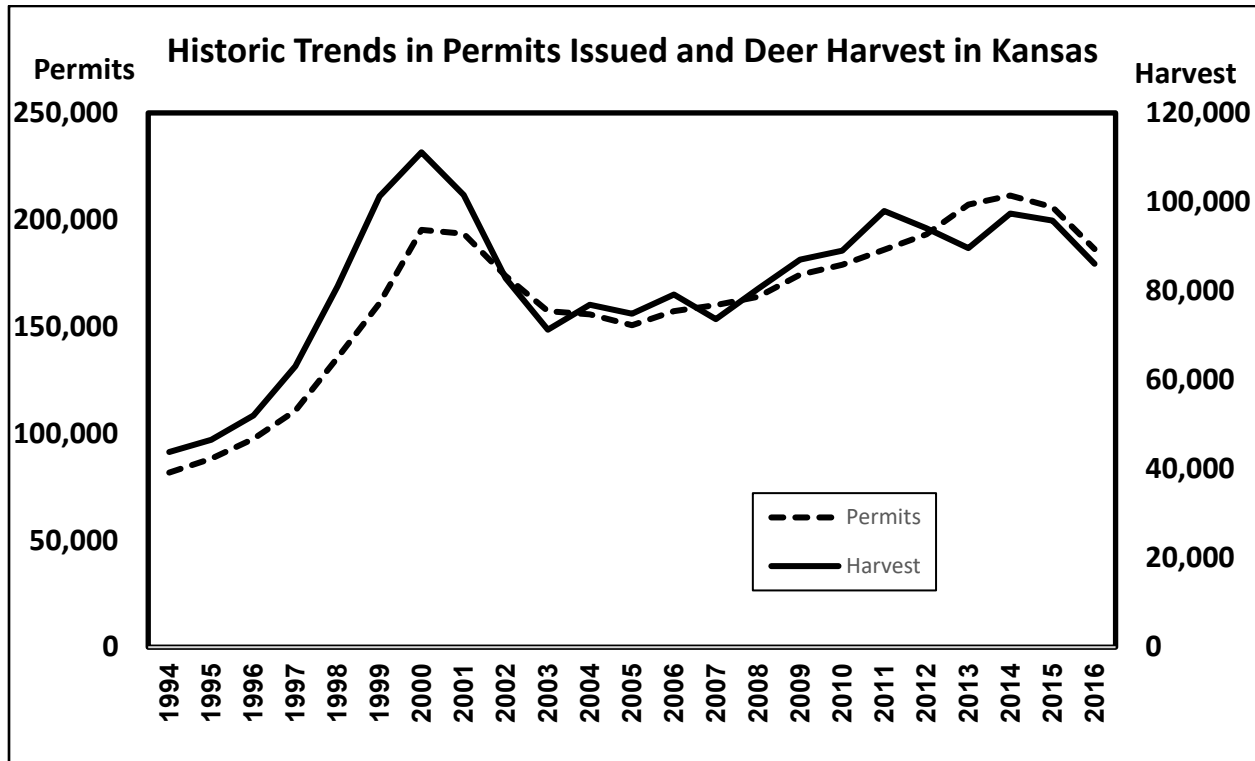
Harvest Age Structure*						
	Antlered Ad Bucks	Male Fawns	Adult Does	Female Fawns	Ad Buck Shed Antler	Total
White-tailed Deer	42,287	3,022	35,635	2,322	759	84,025
Mule Deer	1,882	4	202	9	17	2,115
By Residents	32,936	2,707	28,818	2,088	559	67,109
By Non-Residents	11,234	319	7,018	243	217	19,031
Total	44,170	3,026	35,837	2,331	776	86,140

Harvest By Equipment*				
	Compound Bow	Recurve / Long Bow	Crossbow	Total
Archery	23,879	580	7,725	32,185
	In-Line MZ	Traditional MZ	Total	
Muzzleloader	2,239	220	2,460	
	Centerfire Rifle	Shotgun and Slug	Pistol	Total
Firearms	51,105	277	113	51,496

*All estimates are rounded to nearest whole number. Sub-totals may not add exactly.

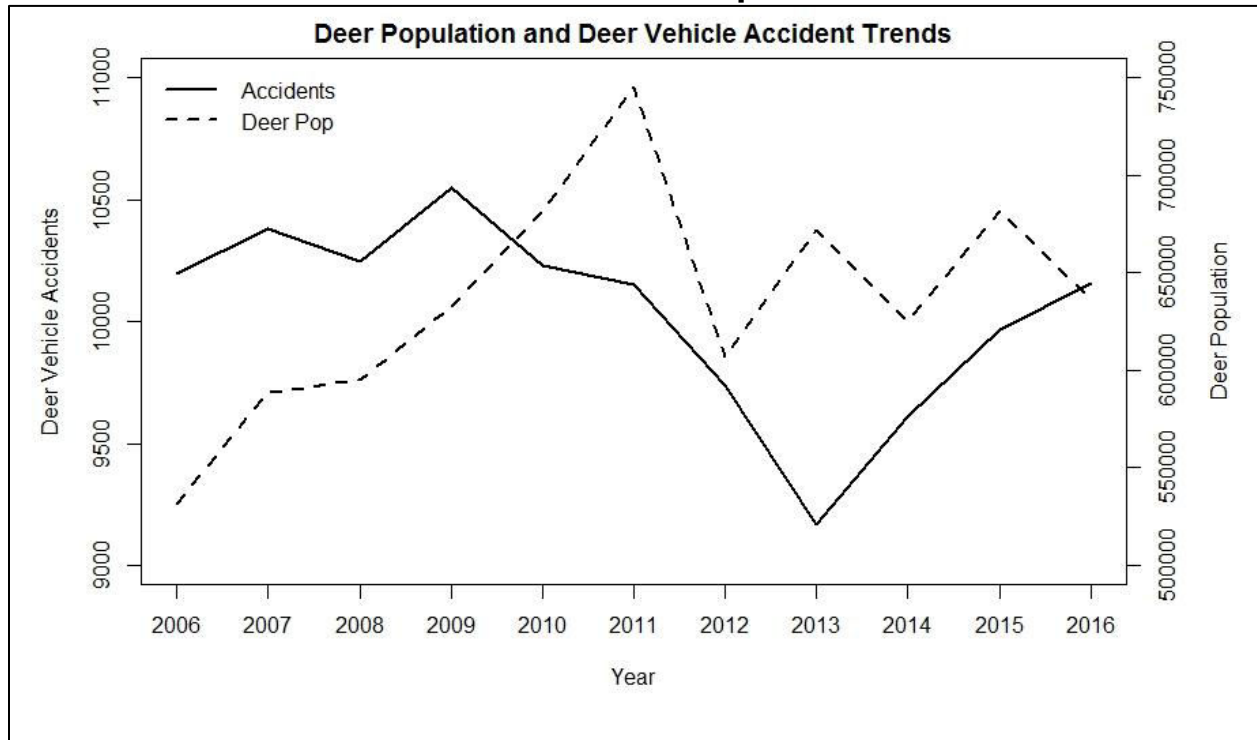
II. Historical Harvest

The trends in the number of deer permits and hunter harvest since 1994 are presented below.

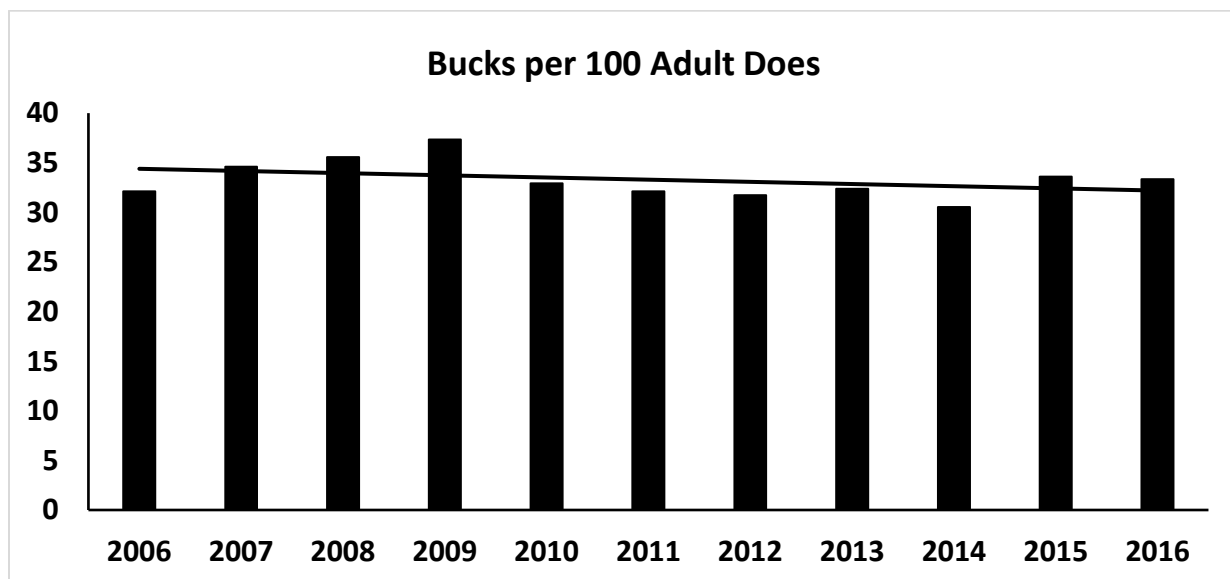


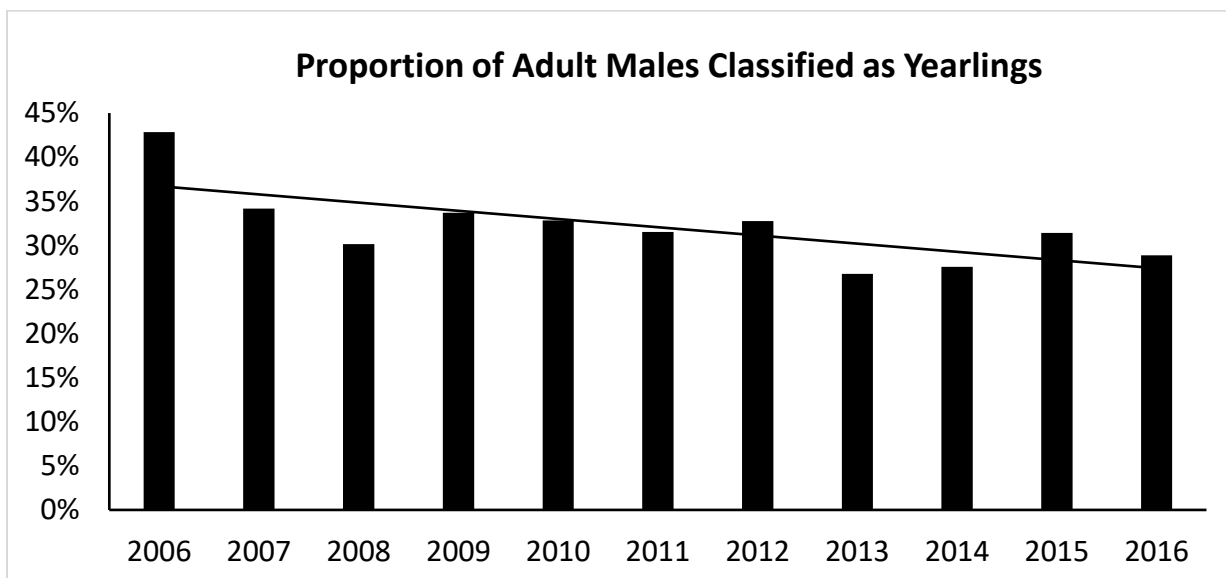
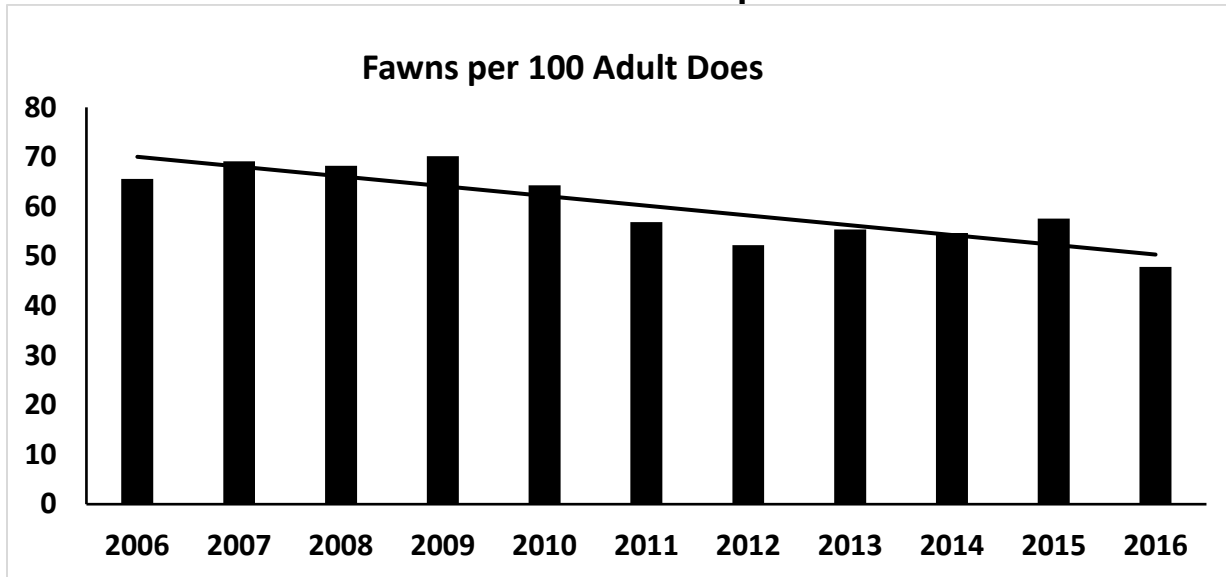
III. Population Estimate/Trends

Population – Deer related vehicle accidents have provided a long term deer population trend indicator in Kansas. In the early 2000s we initiated line transect and distance sampling procedures to assist in the monitoring of population trend (see below).



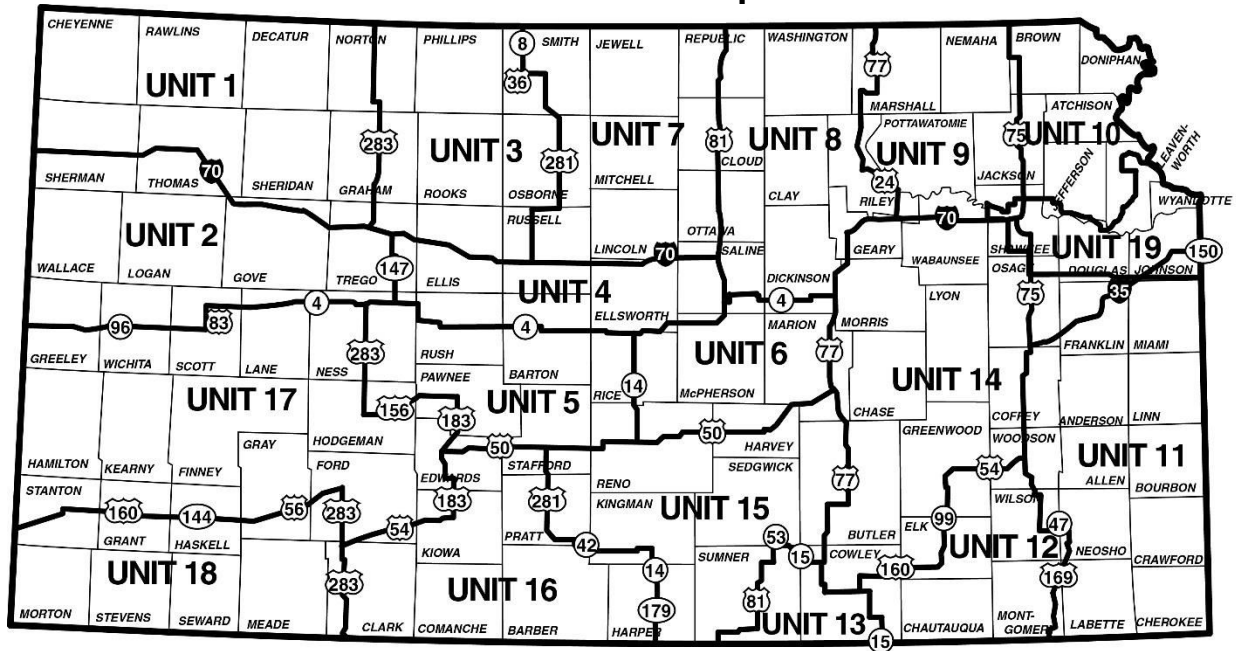
Demographics – Since 2006 we have classified about 5,900 deer per year during the spotlight / distance survey. Over the past 11 years there has been average observations of approximately 33 antlered bucks per 100 adult does and 59 fawns per 100 adult does. Bucks per 100 does has been stable at 33 since 2015. Approximately a third of the antlered deer have been estimated to be yearlings, however the proportion of yearlings in the populations appears to be declining through the years.





IV. Deer Management Units:

The Kansas Department of Wildlife Parks and Tourism (KDWPT) manages deer at the level of Deer Management Units (DMU). Population trends, harvest and human dimensions aspects to deer management are summarized by these units. Boundaries are established by major state and federal highways easily identified and located by hunters, while the shapes are intended to capture areas of similar physiographic and ecological values. Long term maintenance of unit boundaries is desired for trend analysis.



V. Regulation/legislation

2016-2017 Season

In 2016-17, Either Species Antlerless Only permits were no longer offered due to a declining trend in mule deer populations. Hunters are limited to one permit per year that allows them to take an antlered deer. Quotas are set on the number of non-resident hunters in a DMU, however, hunters may select the type of equipment /season they wish to hunt (i.e., archery, muzzleloader or firearms). Hunters are allowed to purchase an additional 5 white-tailed antlerless-only permits, however, the number of permits that may be used in a DMU varies from 0 to 5. Hunters were allowed to take a mule deer on only 17,134 either species, either sex permits, which was 9.2% of all deer permits sold in 2016. Landowners obtained 52.5% of the either species, either sex deer permits.

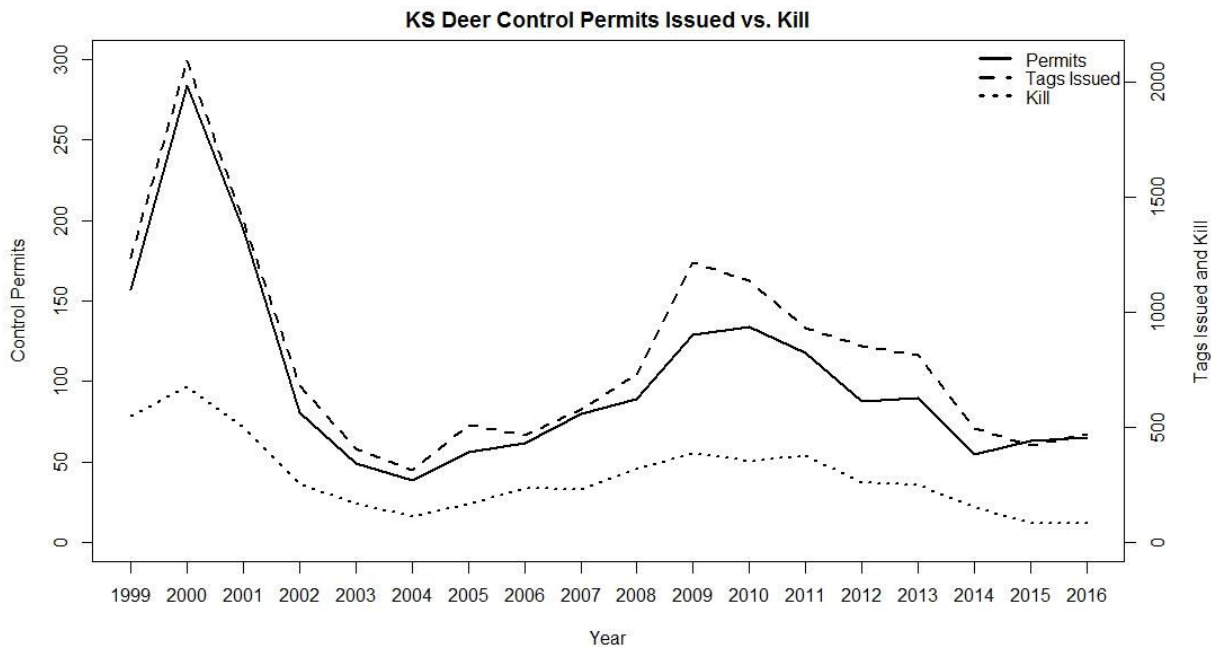
VI. Urban/Special Hunts

Special permits have been issued to municipalities (including parks in suburban areas and airports) to allow culling in areas where local deer abundance created safety or public intolerance of the deer and traditional hunting by citizens had been prohibited by local ordinances. KDWPT continues to create and expand special hunts to encourage the harvest of deer or to provide special access for youth, veterans and individuals with disabilities. Special hunts are used in some areas to create low hunter densities to emphasize quality experiences. They are also used in areas where additional antlerless deer need to be taken. In 2017 there will be 214 special hunts for deer. That included 49 hunts for youth, 29 hunts with mentors, 2 hunts for people with disabilities and 134 hunts that will be open to anybody. The drawings for special hunts award permits to access specific properties to successful applicants but applicants must still possess a hunting licenses and appropriate deer permits. The special hunts in 2017 will provide 410

access permits that permit access for 1-2 hunters each.

VII. Deer Management Assistance/Crop Damage

KDWPT District Wildlife Biologists, Public Land Manager and Natural Resource Officers have been authorized since 1999 to issue Deer Control Permits (DCP) to landowners suffering from damage caused by deer. DCP allow landowners and up to two resident agents to kill deer outside the dates of traditional hunting seasons. They allow the use of techniques typically not allowed where fair chase is a goal. All control permits become invalid when a regular hunting season is open. The issuing employee reviews each site and confirms damage caused by deer. They specify conditions and times when the permit may be used.

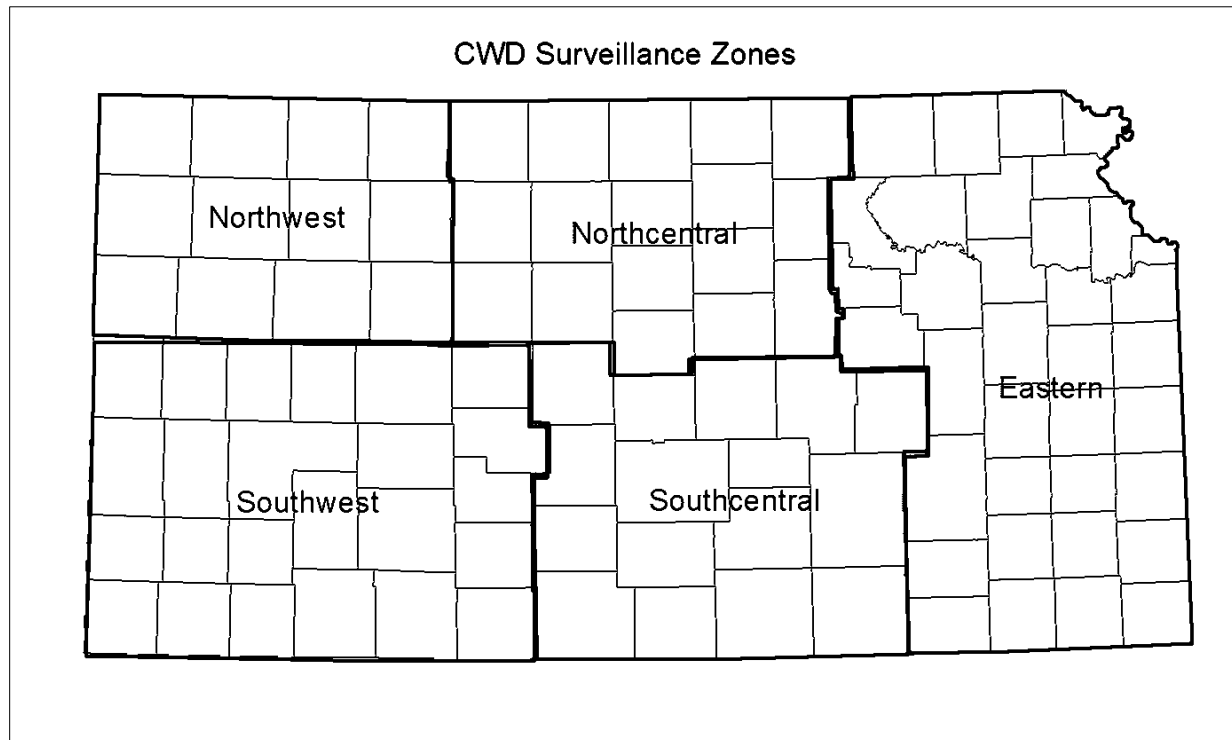


VIII. Diseases

Following two years with unusually high number of reported cases of EHD (2011 and 2012) we initiated a program to encourage the public to assist KDWPT field employees in detecting sick or recently dead deer. The system allows people to report sightings of sick or dead deer at our website. This was done to promote the collection of samples for viral isolation testing. Viral isolation was conducted at SCWDS on nine deer with EHDV-2 being identified in three of the submitted deer in 2016. Positive deer were detected in the following counties; Lyon, Osage, and Cloud.

Monitoring deer populations for chronic wasting disease was funded through Pittman/Robertson Act (W39 R022 Subproject 8115). The level of funding is less than from 2003-2011 under USDA grants. Sampling rotates to a different region each year. In 2016 we focused CWD sampling in the eastern zone.

In addition to the hunter harvested deer we collected samples from selected vehicle killed deer, and all elk killed in the state. The sampling protocol included testing of all suspect deer. We also collected information on deer from hunters who paid for private testing.



KDWPT collected samples from 533 cervids 2016. Samples were collected from 474 white-tail deer, 10 mule deer, 6 elk, 35 unknown animals from private submission, and 8 captive elk. One mule deer sample submitted in Kansas for testing was harvested in Wyoming, results for it were "CWD not detected". There were 10 positive cases of CWD identified from sampling in the 2016-17 season.

We continue to see few private submissions (~10 per year) of samples from free-range deer. This may be due to cost, but also could be due to convenience or lack of understanding or concern about the disease or a combination of the above. KDWPT will pay for testing of samples from hunter harvested deer, if the deer was harvested within the current year's sampling zone and if the desired number of samples has not been exceeded. Hunters who desire to have their kill tested after the desired number of samples has been achieved, or whose kill was from outside the sampling area, would need to cover the cost themselves. The current cost for a private submission for CWD testing to the Kansas State Veterinary Diagnostic Lab is \$48.50 (\$13.50 per sampling kit, \$7.00 UPS shipping, and \$28.00 per test).

IX. Research

No research projects emphasizing deer management were conducted in 2016. However, funding was secured to begin study of mule deer and whitetail deer interactions, habitat use, and demographics in the fall of 2017. For each of three years of the study, we plan to use GPS collars to track individuals in

each of four groups: male mule deer, female mule deer, male white-tail deer and female white-tail deer. Does will also be fitted with vaginal implant transmitters so fawns can be fitted with expandable collars.

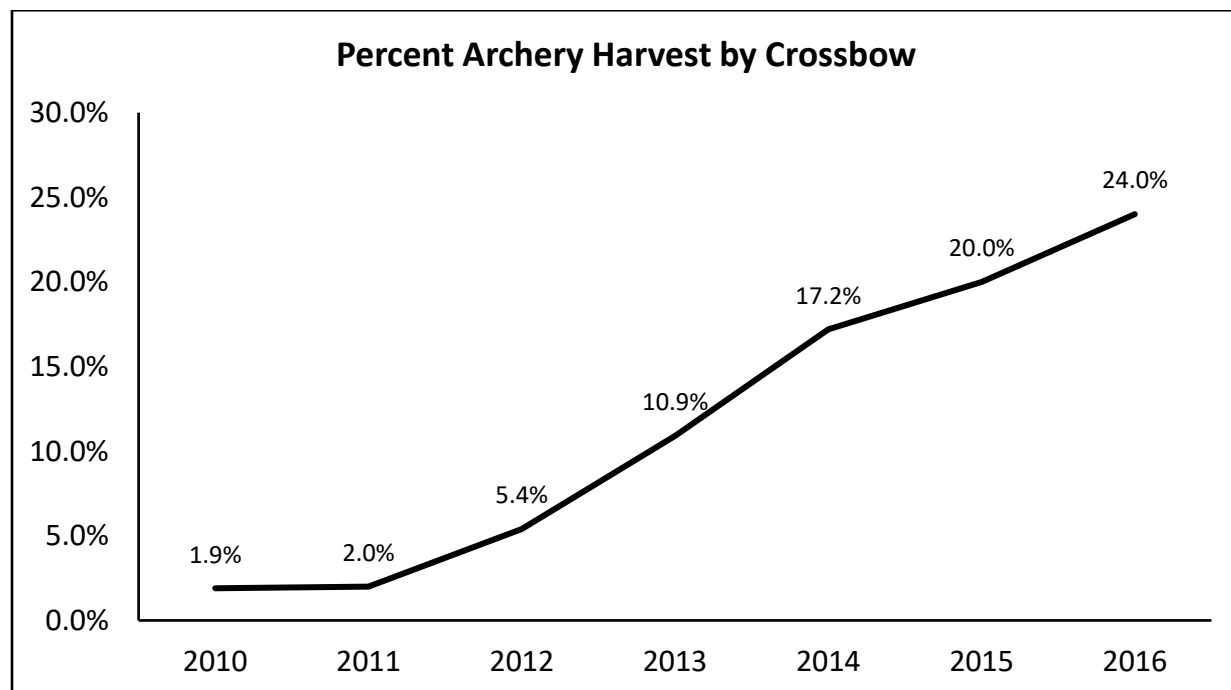
X. Hot Topics

Walk In Hunting Areas

Kansas is primarily made up of private lands with very little (1.9%) public land available to deer hunters. To provide greater access to private land for hunters, in 1995 Kansas began the Walk-in Hunting Access (WIHA) program which provides landowners with a modest payment for allowing public hunting access. In 2016 it continues to provide quality hunting opportunities. According to the 2016 WIHA survey, deer hunting was the second most popular activity on WIHA properties (26.0% of respondents) after pheasant hunting (55.5% of respondents). Our survey indicated that the average deer hunter utilizing WIHA properties would spend 14.2 days hunting on WIHA properties and that 63.2% indicated that having WIHA properties increased the number of days they would spend hunting deer.

Equipment

Crossbows continue to increase in popularity in Kansas. We estimated that crossbows were used to harvest 7,725 deer in 2016-17. The portion of the harvest during the archery season that is taken with crossbows has increased from approximately 2% when that equipment was allowed for just people with disabilities to 24% when allowed for any person. The total harvest, and proportion of the total harvest, taken using archery equipment has increased from 20,291 (22.8% of total deer harvest) in 2010 to 32,185 (37.4% of total deer harvest) in 2016. We estimate that crossbow harvest accounted for 27.7% of resident archery deer harvest while only 15.6% of deer harvested by non-residents using archery methods are taken with crossbows in 2016.

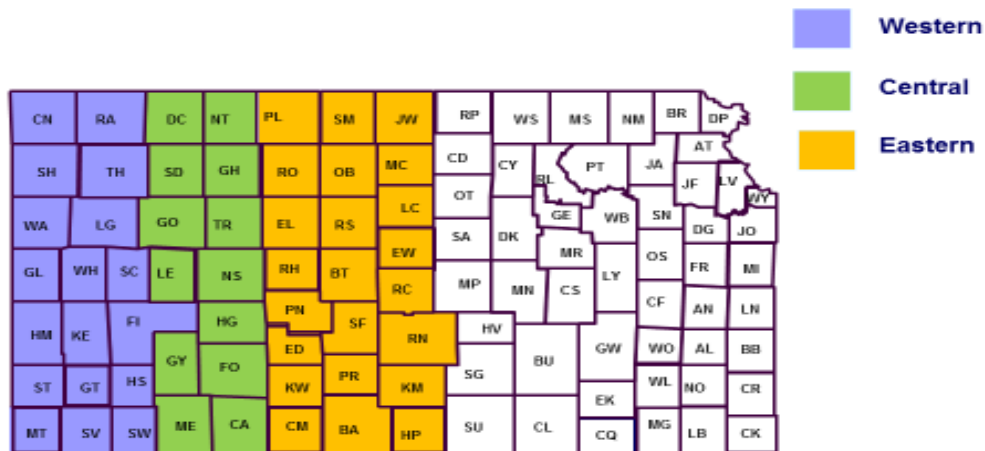


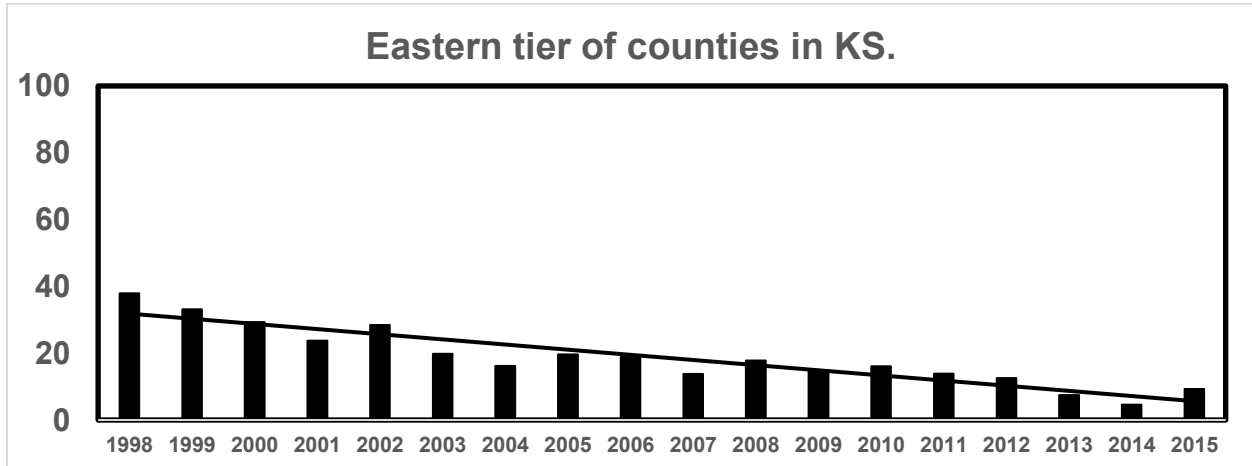
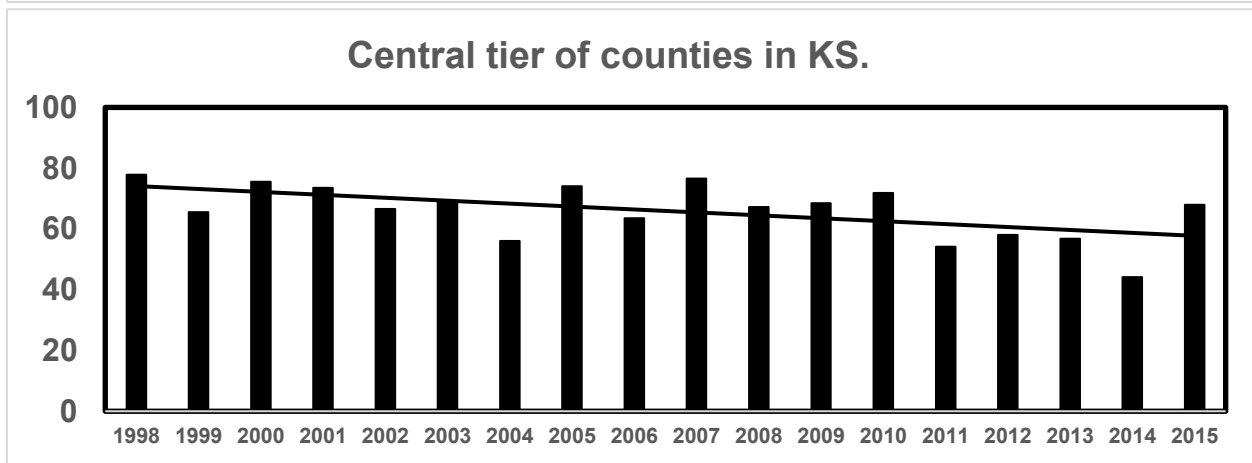
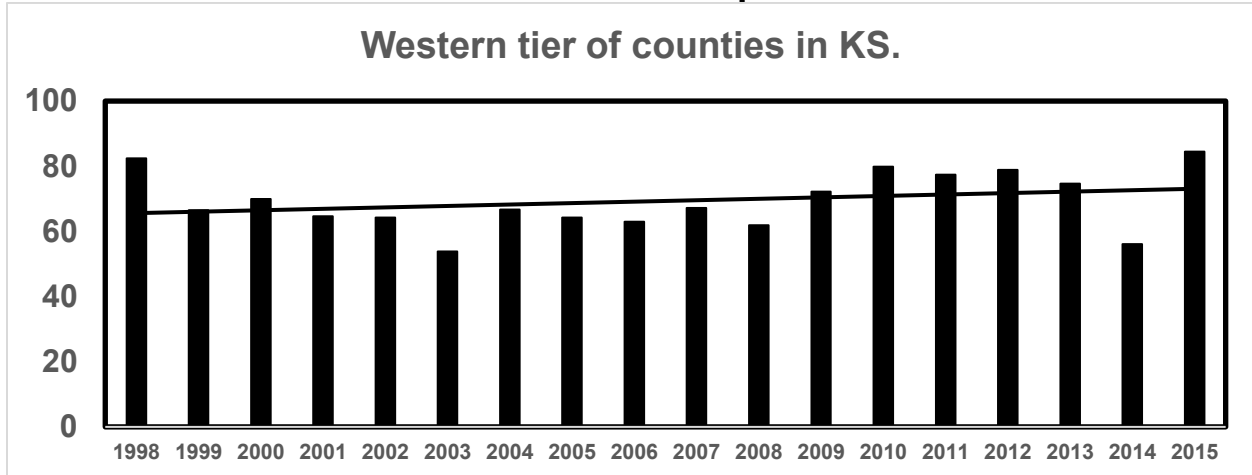
Mule Deer Management

The distribution of mule deer in Kansas appears to be shifting westward. Overall the statewide harvest and our estimate of total population of mule deer had remained constant until a population decline was observed from the 2016 spotlight survey. Recently, fewer mule deer have been seen by hunters in counties along the former eastern boundary of their distribution in the state than were reported historically.

Trends in the distribution of mule deer have been examined using both harvest information and population indices. Below is a map of Kansas divided into west to east tiers.

Tiers of Counties Used In Mule Deer Trends





Percent of Kansas bow hunters reporting that they saw mule deer while hunting in a county.

Both hunters and KDWP employees are concerned about this change. The number of permits issued in Kansas where either species of deer might be taken has decrease in recent years. Also the recommendation for the 2016-17 seasons that eliminated all of the either species antlerless-only permits will continue for 2017-18. White-tailed deer antlerless-only permits remain readily available and



Kansas Deer Report

2016-17 Seasons

hunters are allowed to purchase and use as many as 5 of those permits throughout much of the mule deer range.

XI. Relevant Links

KDWPT Regulations are available on-line at:

<http://kdwpt.state.ks.us/news/Hunting/Hunting-Regulations>

General information on deer management may be located at:

<http://kdwpt.state.ks.us/news/Hunting/Big-Game-Information>

Chronic wasting disease information and maps may be found at:

<http://kdwpt.state.ks.us/news/Hunting/Big-Game-Information/Chronic-Wasting-Disease>

APPENDIX E

KENTUCKY

2016-17 Kentucky Deer Program Report



Gabe Jenkins, David Yancy and Kyle Sams



I. Current Harvest

139,429 deer were harvested during the 2016-17 deer season, which is the third highest harvest on record. Only the 2013-14 season (144,409) and the 2015-16 season (155,730) were higher. We observed a 12% decrease from the 2015-16 season (155,730) and a <1% increase from 2014-15 season (138,899). In years with lower acorn production, deer tend to travel more in search of food resulting in more deer sightings and higher harvest. The 2016-17 mast crop production was slightly above average and was an increase when compared to the 2015-16 mast production. The mast production from 2016-17 was contributing factor to the decrease in harvest from 2015-16 to 2016-17. In addition, there were optimal hunting weather conditions during the major hunting timeframes, which also contributed to the harvest.

Deer Season Harvest Comparison: 2015-16 v 2016-17

Weapon/Sex	2015-16	2016-17	% Difference
Archery	23,323	19,567	-16.1%
Modern Gun	109,179	104,213	-4.5%
Muzzleloader	18,663	11,660	-37.5%
Crossbow	4,565	3,989	-12.6%
Total	155,730	139,429	-10.5%
Females	70,259	60,533	-13.8%
Male Visible	75,720	71,041	-6.2%
Male Not Visible	9,749	7,861	-19.4%
Total	155,730	139,429	-10.5%

2016-17 Hunter Success Rates

Successful hunters	# deer killed	% of successful hunters
80,622	1	76.8%
18,188	2	17.4%
3,932	3	3.8%
2,209	4+	2.1%
Total successful hunters	104,951	
Average Hunter Harvests:	1.33	

II. License and Season Information

License and Permit Fees

License	Resident	Nonresident
Annual Hunting License	\$20	\$140
Senior/Disabled License	\$5	N/A
Sportsman's License	\$95	N/A
Youth Sportsman's License	\$30	N/A
Statewide Deer Permit	\$35	\$120
Bonus Antlerless Permit	\$15	\$15
Youth Deer Permit	\$10	\$15

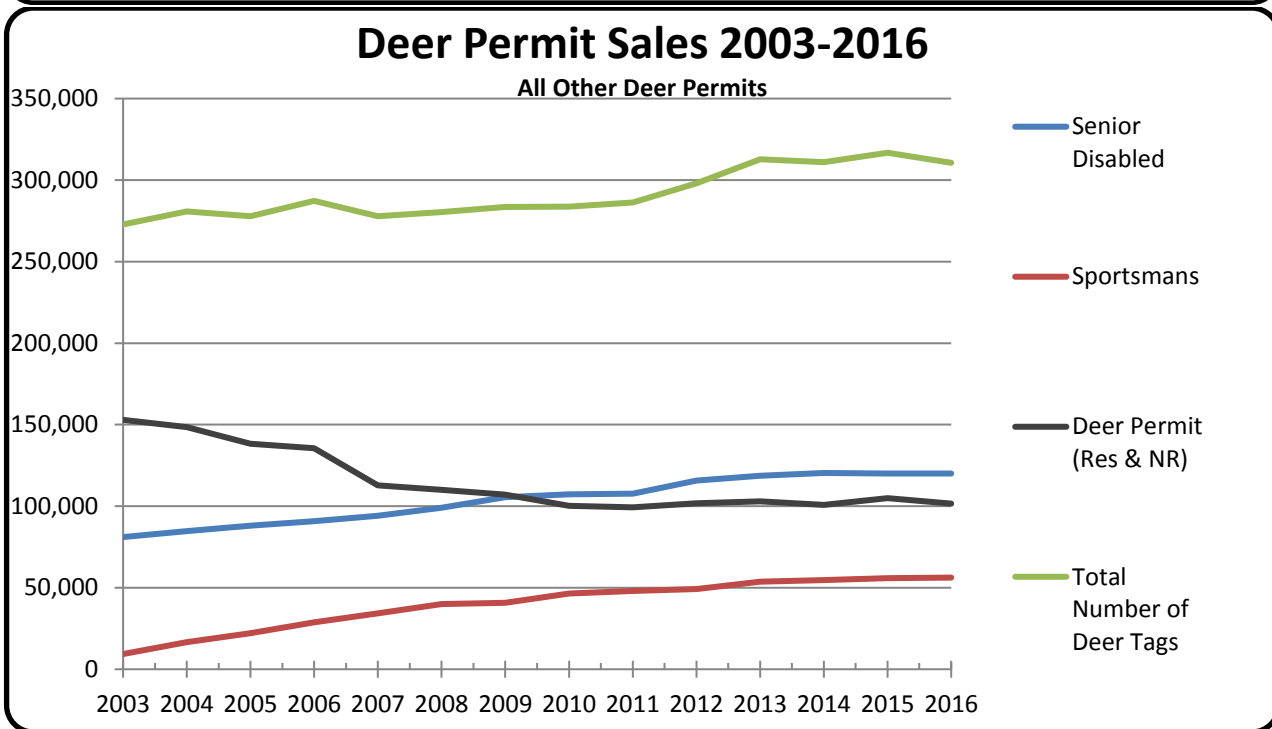
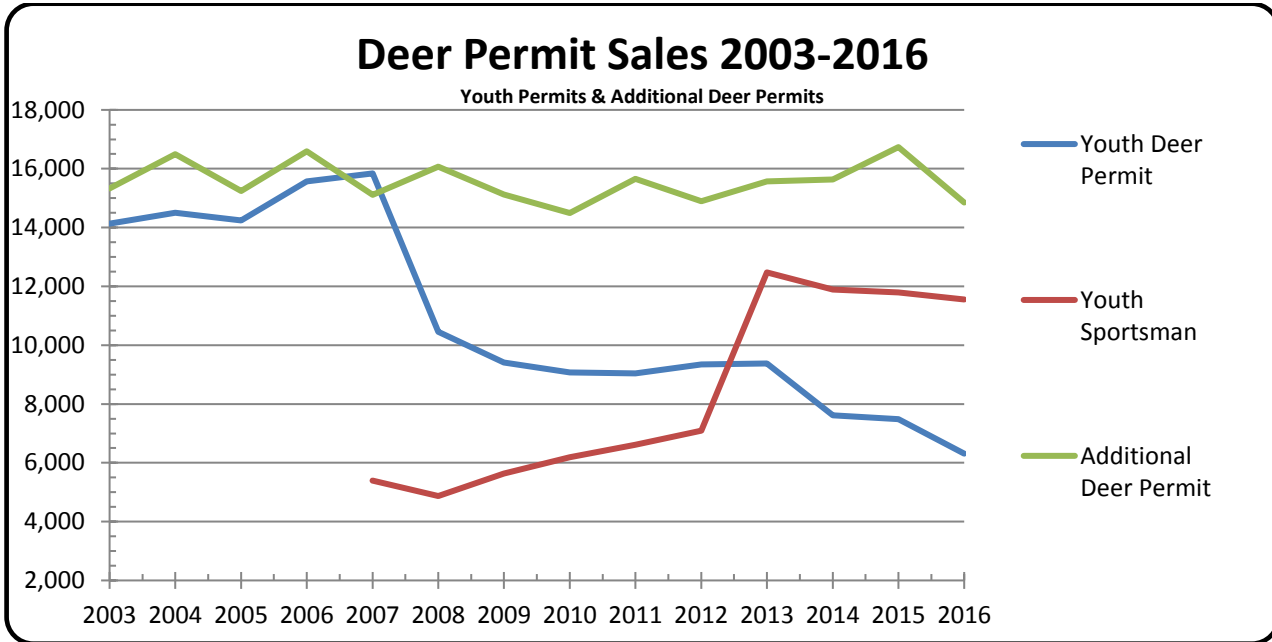
Season Dates and Bag Limits

	Statewide	Zone 1	Zone 2	Zone 3	Zone 4
Modern Firearm		Nov 12-27	Nov 12-27	Nov 12-21	Nov 12-21
Archery		Sept 3- Jan 16	Sept 3- Jan 16	Sept 3- Jan 16	Sept 3- Jan 16
Early Crossbow		Oct 1-16	Oct 1-16	Oct 1-16	Oct 1-16
Late Crossbow		Nov 12-Dec 31	Nov 12-Dec 31	Nov 12-Dec 31	Nov 12-Dec 31
Early Muzzleloader		Oct 15-16	Oct 15-16	Oct 15-16	Oct 15-16
Late Muzzleloader		Dec 10-18	Dec 10-18	Dec 10-18	Dec 10-18
Youth-Only Firearms	Oct 8-9				
Free Youth Weekend	Dec 31-Jan 1				
Antlered Bag Limit	1				
Antlerless Bag Limit	Based upon zone	Unlimited	Up to 4	Up to 4, only 2 deer with a firearm	Up to 4. Only 2 deer with a firearm, antlerless deer can only be killed with a firearm during the last 3 days of the late muzzleloader

*Resident Landowners, spouse, and dependent children are not required to purchase a hunting license or deer permit.

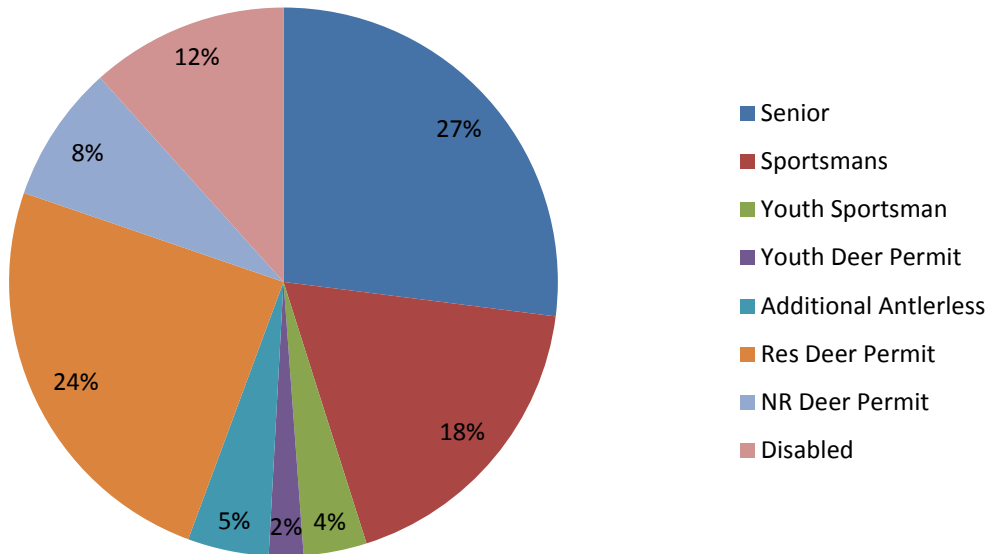
License Sales

In recent years the number of deer permits sold has remained stable. When including the license bundles (Sportsman's, Jr. Sportsman's, Jr. Deer Permit, Resident and Non-Resident Deer Permit, and Bonus Antlerless Permit) in the total deer permit numbers, there was a slight decrease in license sales compared to the 2015-16 season (316,756). However, deer permit sales have been relatively stable over the past three years.



Upon further examination of license sales, the majority of deer permits are purchased by senior/disabled hunters (27%), followed closely by resident deer hunters (24%), and Sportsman License (18%) buyers. Over the last few years there was a steady increase in the number of senior licenses sold and a slow decrease in resident deer permit sales. The overall number of deer hunters is stable to slightly increasing. However, the number of senior licenses is increasing, indicating that a majority of Kentucky deer hunters are reaching the age of 65 (i.e., the age at which you can purchase as Senior License).

2016-17 Deer Permit Breakdown



III. Historical Harvest

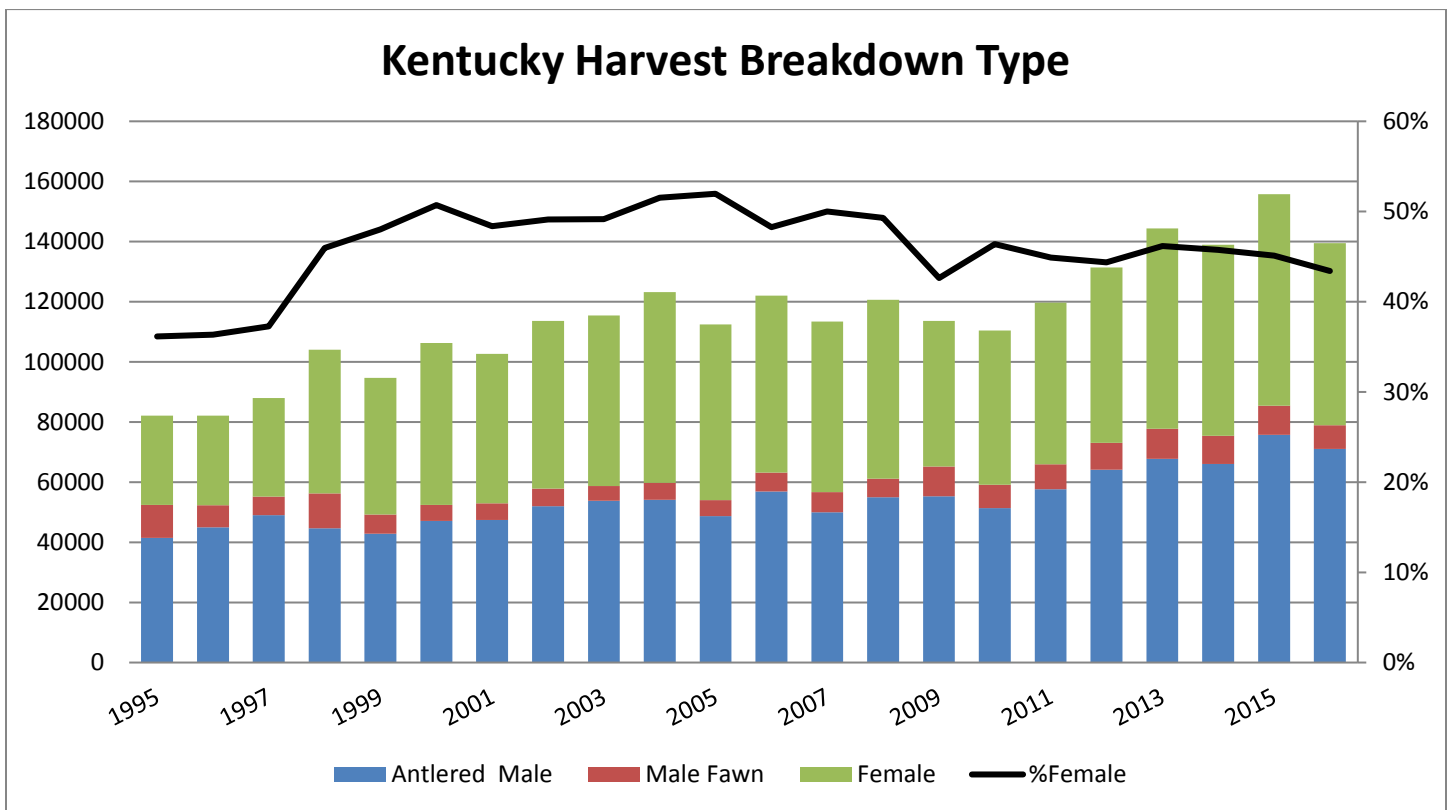
		Firearms *				Archery* *			Grand Total	
Year	Males	Females	Total	% of Grand Total	Males	Females	Total	% of Grand Total	Total	Change
1976	3,042	434	3,476	100%					3,476	
1977	5,257	425	5,682	100%					5,682	63%
1978	5,633	379	6,012	93%	265	156	421		6,433	13%
1979	6,864	578	7,442	92%	426	194	620	8%	8,062	25%
1980	7,323	665	7,988	82%	1,004	710	1,714	18%	9,702	20%
1981	12,079	1,055	13,134	88%	1,145	704	1,849	12%	14,983	54%
1982	13,908	1,896	15,804	88%	1,308	857	2,165	12%	17,969	20%
1983	14,383	1,644	16,027	86%	1,607	1,098	2,705	14%	18,732	4%
1984	17,174	3,170	20,344	88%	1,650	1,018	2,668	12%	23,012	23%
1985	21,551	4,473	26,024	87%	2,724	1,327	4,051	13%	30,075	31%
1986	27,773	6,884	34,657	88%	3,144	1,719	4,863	12%	39,520	31%
1987	37,790	16,582	54,372	90%	3,831	2,169	6,000	10%	60,372	53%
1988	38,528	19,025	57,553	90%	4,444	2,263	6,707	10%	64,260	6%
1989	39,564	23,103	62,667	89%	4,887	2,595	7,482	11%	70,149	9%
1990	42,863	23,288	66,151	89%	4,798	2,969	7,767	11%	73,918	5%
1991	48,881	36,037	84,918	91%	3,979	4,037	8,016	9%	92,934	26%
1992	45,108	28,556	73,664	90%	4,243	4,031	8,274	10%	81,938	-12%
1993	41,809	19,738	61,547	89%	4,148	3,829	7,977	11%	69,524	-15%
1994	47,310	22,387	69,697	88%	4,427	4,665	9,092	12%	78,789	13%
1995	47,854	25,336	73,190	89%	4,591	4,359	8,950	11%	82,140	4%
1996	48,538	25,161	73,699	90%	3,760	4,696	8,456	10%	82,155	0%
1997	51,820	28,996	80,816	92%	3,350	3,776	7,126	8%	87,942	7%
1998	52,125	42,174	94,299	91%	4,115	5,656	9,771	9%	104,070	18%
1999	45,040	38,267	83,307	87%	4,396	7,524	11,920	13%	95,227	-8%
2000	48,212	45,572	93,784	88%	4,175	8,303	12,478	12%	106,262	12%
2001	48,747	41,233	89,980	88%	4,263	8,463	12,726	12%	102,706	-3%
2002	53,972	48,157	102,129	90%	3,837	7,686	11,523	10%	113,652	11%
2003	54,745	49,282	104,027	90%	3,943	7,487	11,430	10%	115,457	2%
2004	55,518	55,083	110,601	89%	4,754	9,247	14,001	11%	124,602	8%
2005	49,670	50,558	100,228	89%	4,322	7,864	12,186	11%	112,414	10%
2006	57,630	49,055	106,685	87%	5,537	9,850	15,387	13%	122,072	9%
2007	51,368	46,780	98,148	87%	5,343	9,945	15,288	13%	113,436	-7%

2008	55,733	49,375	105,108	87%	5,431	10,071	15,502	13%	120,610	6%
2009	58,387	39,135	97,522	86%	6,757	9,305	16,062	14%	113,584	-6%
2010	52,254	39,951	92,205	84%	6,916	11,255	18,171	16%	110,376	-3%
2011	58,159	41,358	99,517	83%	7,765	12,371	20,136	17%	119,653	8%
2012	64,665	45,530	110,195	84%	8,429	12,765	21,194	16%	131,389	10%
2013	68,703	51,559	120,262	83%	9,018	15,128	24,146	17%	144,409	10%
2014	67,221	50,346	117,567	85%	8,157	13,173	21,330	15%	138,897	-4%
2015	74,544	53,302	127,846	82%	9,191	14,132	23,323	15%	155,730	12%
2016	64,287	39,926	104,213	75%	8,355	11,212	19,567	14%	139,429	-10%

* Includes muzzleloader and modern firearms.

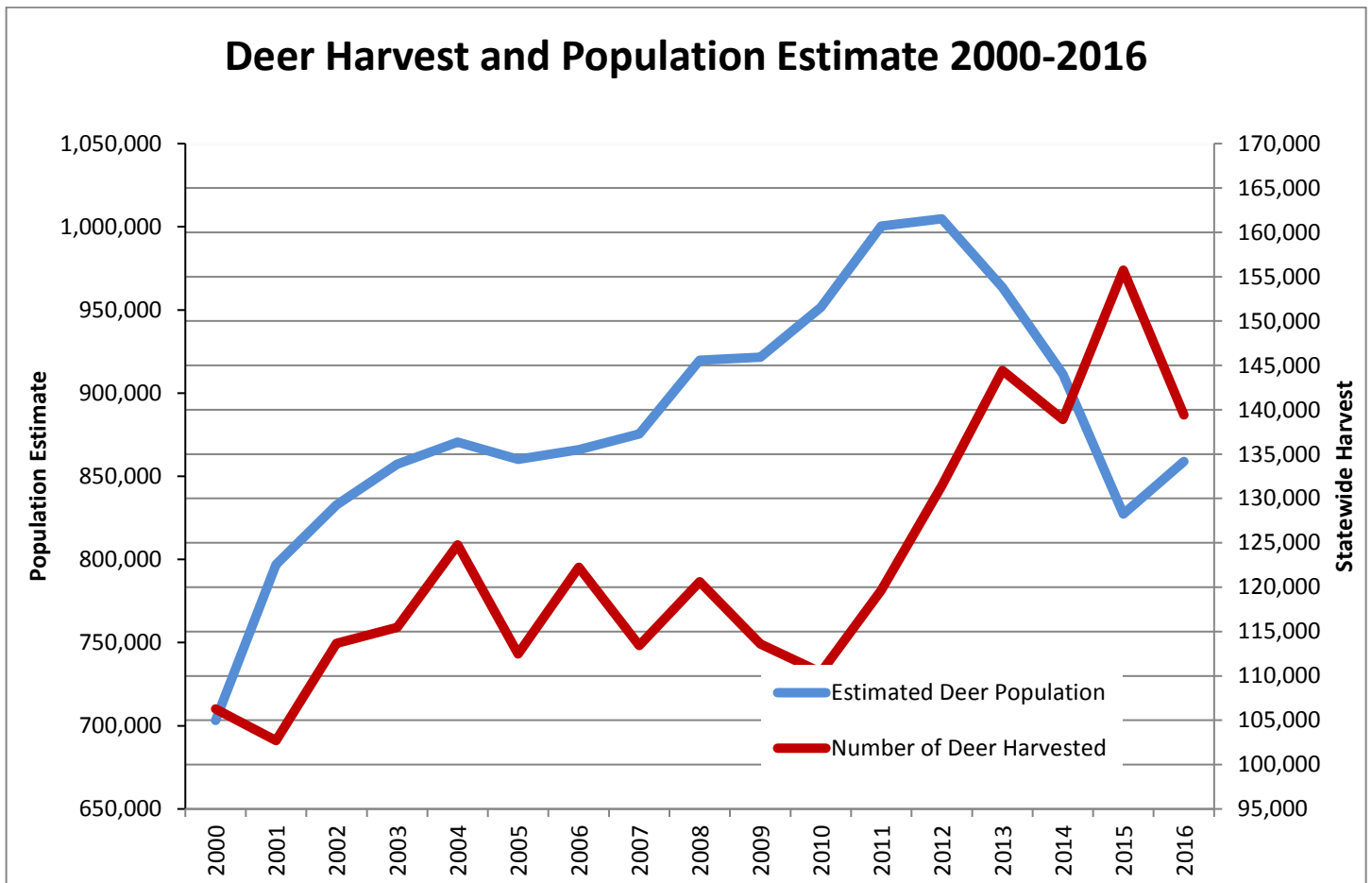
** Records of archery harvest began in 1978. Includes crossbow harvest.

III. Historical Harvest (Continued)



IV. Population Trends

The overall herd estimate shows a stable to slightly increasing trend. The current statewide estimate for the 2017-18 hunting season is 858,876 deer statewide, which is a 4% increase from 2016-17. This estimate is generated from harvest and age structure data, which is collected through telecheck and by KDFWR staff.



V. Deer Management Zones

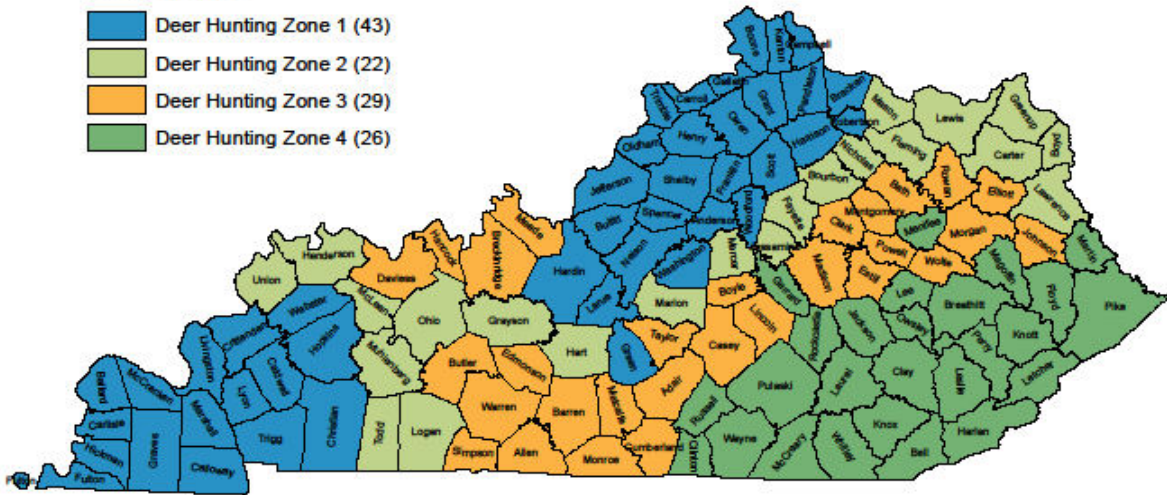
Each of Kentucky's 120 counties serves as an individual management zone. There are currently 4 different zones that are used to influence the herd: Zone 1 being the most liberal and zone 4 being the most restrictive on antlerless harvest. All zones allow for only one antlered deer per person per season. In Zone 1 counties, hunters may take either sex with no season limit on antlerless deer using all weapon types. In Zones 2, 3, and 4 counties, hunters may take a total of 4 deer (1 antlered & 3 antlerless or 4 antlerless). Zone 2 hunters may use all weapon types to harvest the 4 deer limit. Zone 3 hunters may only harvest 2 deer with a firearm. Zone 4 hunters may take no more than 2 deer with a firearm (1 with a modern firearm and one with a muzzleloader, or both with a muzzleloader). Antlerless deer in a zone 4 county may only be taken with a firearm during the last 3 days of the late muzzleloader season.

Deer Hunting Zones For 2016-17



Deer Zones

- Deer Hunting Zone 1 (43)
- Deer Hunting Zone 2 (22)
- Deer Hunting Zone 3 (29)
- Deer Hunting Zone 4 (26)



VI. Regulation/Legislation Changes

Regulation changes for the upcoming 2017-18 season:

- Hunters may remove the hide or head of a harvested deer prior to telechecking it but must retain proof of sex of the animal. In such cases, it is still necessary to fill out the harvest log immediately after harvest and telecheck the animal before midnight on the day the deer is harvested or recovered.
- Air guns of .35 caliber or larger charged by an external tank, shooting single projectile ammunition designed to expand upon impact are legal modern gun equipment for deer.

PUBLIC LANDS

- Rolling Fork River WMA in LaRue and Nelson Counties is open under statewide regulations for all species in accordance with the counties in which it is located. Stephens Creek WMA in Gallatin County and Meadow Creek WMA in Wayne County are open to public hunting with some restrictions.

- Whenever gun deer hunting is allowed on a wildlife management area, state park, or the Otter Creek Outdoor Recreation Area, a person who will be hunting from inside a ground blind must first attach a hat or vest made of solid, unbroken hunter orange material to the blind so it is visible from all sides.
- County zone deer bag limits apply to all quota hunts and open WMAs unless otherwise noted.
- The December muzzleloader deer season is open under statewide regulations on Curtis Gates Lloyd WMA, Dewey Lake WMA, Dr. James R. Rich WMA, Fishtrap Lake WMA, Griffith Woods WMA, John A. Kleber WMA, John C. Williams WMA, Kentucky River WMA, Knobs State Forest, Mullins WMA, Paintsville Lake WMA, Ping-Sinking Valley WMA, T.N. Sullivan WMA, Taylorsville Lake WMA, Twin Eagle WMA, Veterans Memorial WMA and Yellowbank WMA.
- The youth gun deer season and free youth weekend are open under statewide regulations on Beaver Creek WMA, Dennis-Gray WMA, Green River Lake WMA, Mill Creek WMA, Mullins WMA, Redbird WMA, T.N. Sullivan WMA and Twin Eagle WMA.
- The 15-inch minimum outside antler spread restriction for deer has been removed on Ballard WMA, Dennis-Gray WMA, Dewey Lake WMA, Green River Lake WMA, Paintsville Lake WMA, Pennyryle State Forest, Tradewater WMA, West Kentucky WMA, Green River Lake State Park and Jenny Wiley State Resort Park.
- Open deer hunts are offered on the following state parks on the following dates. Contact the host state park for complete details, including the number of available slots, equipment restrictions, bag limits and check-in and check-out procedures.
 - Blue Licks Battlefield State Resort Park (859-289-5507): Starting the first Saturday in January for two consecutive days.
 - Carter Caves State Resort Park (606-286-4411): Antlerless deer only, starting the first Monday in December for seven consecutive days.
 - John James Audubon State Park (270-826-2247): Starting the first Friday in December for three consecutive days.
 - My Old Kentucky Home State Park (502-348-3502): Starting the second Thursday in December for four consecutive days.
- An open youth hunt is held at Taylorsville Lake State Park on the second Saturday in October for two consecutive days and is limited to youths ages 15 and younger. Contact the state park at 502-477-8713 for complete details, including the number of available slots, equipment restrictions, bag limits and check-in and check-out procedures.
- On Mill Creek WMA, the quota deer hunt has been eliminated in favor of opening the modern gun deer season for two consecutive days starting the second Saturday in November.
- Seven new quota hunts will be held on four different state parks (Dale Hollow Lake State Resort Park, Greenbo Lake State Resort Park, Kenlake State Resort Park, Kincaid Lake State Park).
- On West Kentucky WMA, the quota deer hunt is scheduled for four consecutive days starting the Saturday before Thanksgiving. A youth mentor shotgun-only quota deer hunt on the "A" tracts of the WMA is scheduled for four consecutive days starting the Saturday before Thanksgiving.
- On Taylorsville Lake WMA, the January quota deer hunts have been eliminated. Drawn hunters may harvest either-sex deer in the remaining quota deer hunts. Preference points no longer will be awarded for female deer harvested in the November quota hunts.

- Participants in the Lake Barkley State Resort Park and Greenbo Lake State Resort Park quota deer hunts must check in and check out at the unmanned check station at the park headquarters.

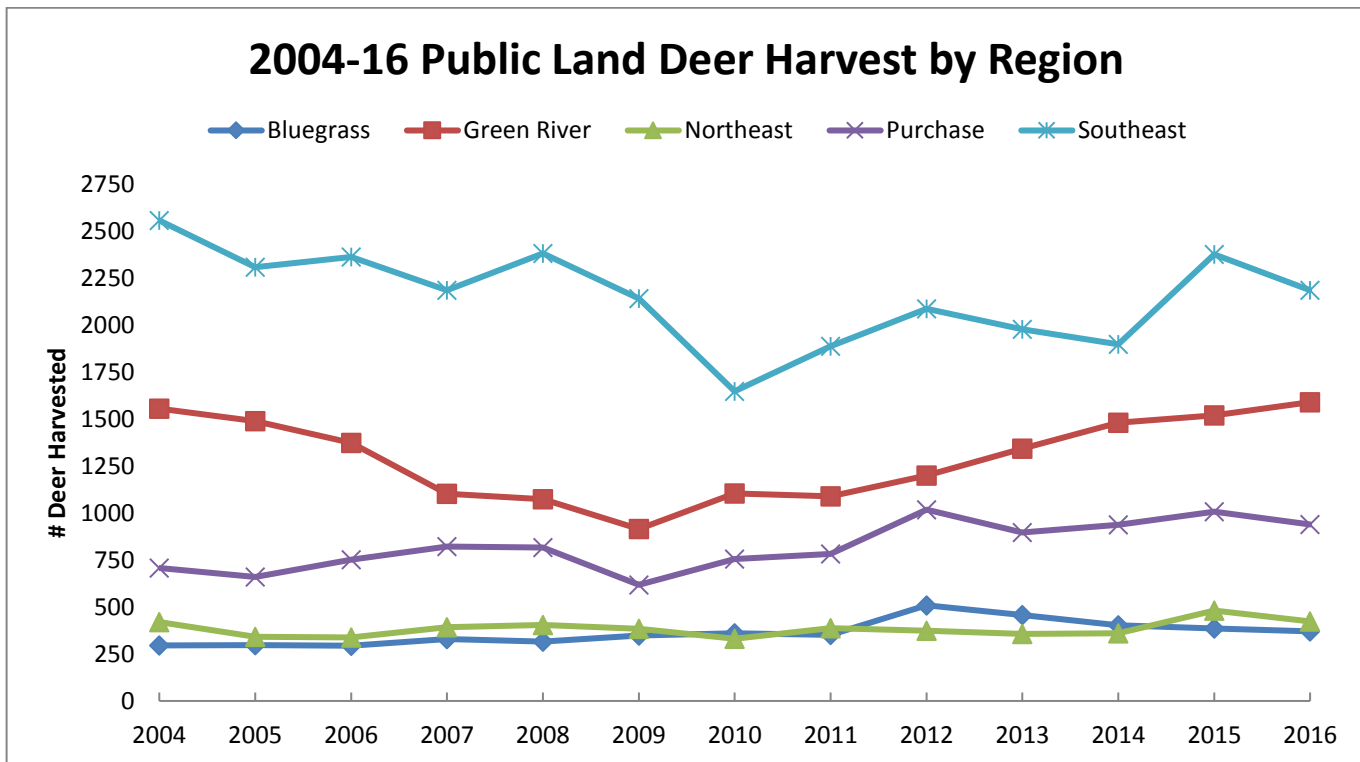
VII. Urban/Special Hunts

Public Land/Quota Hunts

KDFWR owns, leases, or manages more than 80 Wildlife Management Area's (WMA) across the state for public use. On some areas, users must purchase a user permit. The rest are open to hunting through quota hunts or statewide regulations. The WMA's are separated between five wildlife regions and are managed by regional staff. The number of WMA's per region differs from region to region. The number of WMA's per region are: Purchase Region (16), Green River Region (14), Bluegrass Region (15), Northeast Region (13), Southeast Region (39).

KDFWR offers 30 quota hunts on Kentucky WMA's along with three quota hunts on military installations (Ft. Knox, Bluegrass Army Depot, and Ft. Campbell). Any resident or nonresident hunter may apply for a deer quota hunt in Kentucky, but only the persons successfully drawn for quota hunts may hunt. The application period for KDFWR deer quota hunts is the month of September. Applicants can apply online at fw.ky.gov or call 1-877-598-2401. Applicants will be given the option to pick a first and second hunt choice, but may be drawn to participate in only one quota hunt. The non-refundable fee is \$3 per hunter to apply. Each hunter who applies correctly, but is not selected, will receive a preference point that increases the odds of being drawn the next year. Unselected hunters who do not apply the following year will lose all previously credited preference points. Applicants are selected based on individual preference points. Up to five people can apply together with one call. If any one of the group's Social Security numbers is drawn, the others in the group are automatically drawn, too.

For the 30 KDFWR quota hunts held in the 2016-17 season, 7,607 people applied for 4,427 spots across the state. There are quota hunts for general hunters (i.e., residents or non-residents with statewide license), mobility impaired hunters, archery/crossbow hunters, and youth hunters. Some quota hunts are for antlerless deer, some areas have a 15 inch minimum spread restriction on bucks, and some quota hunts only allow one deer to be taken per hunt. Each of the five wildlife regions across the state have deer quotas.



VIII. Deer Management Assistance/Crop Damage

Currently, aside from using the hunting season as a control method, Kentucky has two additional ways to help alleviate damage issues: 1) Deer Control Tags (in-season), are issued to landowners who need additional deer tags during the hunting season and are for antlerless deer only. Each control tag issued has a unique identifying number that is used to report a single harvested deer via telecheck. During the 2016-17 season, 4,632 deer control tags were issued to landowners, in which only 44% were reported via telechecked. 2) Deer Destruction Permits (out-of-season), are issued to landowners during the growing season to reduce the herd and diminish damage. These tags can be for either sex, but require landowners to relinquish any antlers to KDFWR. Additionally, KRS 150.170(7) states, "Landowners, their spouses or dependent children, or their designee who must be approved by the commissioner, who kill or trap on their lands any wildlife causing damage to the lands or any personal property situated thereon shall not be required to have a hunting or trapping license and may do so during periods other than the open season for the particular species without a tag and dispose of the carcass onsite. Tenants, their spouses, their dependent children, or other persons approved by the commissioner, shall also have the same privilege."

This program is currently being reviewed and revised to improve reporting and consistency across the state.

Deer Control Tag Issuance

Zone	DCT Issued 2014	Used 2014	DCT Issued 2015	Used 2015	DCT Issued 2016	Used 2016	% Used
1	2721	1052	1781	725	1616	557	34.5%
2	1361	488	1386	647	1451	435	30.0%
3	407	188	851	394	755	259	34.3%
4	603	166	614	293	777	265	34.1%
Statewide	5092	1894	4632	2059	4599	1516	33.0%

Out of Season Destruction Permit Issuance

Year	Reported	Property Owners Not Issued Tags	Total Destruction Permits Issued	Used	Total Complaints
2013	18	114	5		
2014	30	128	18		
2015	60	31	323		537
2016	60	31	688	339	620

IX. Diseases Issues

EHD

HD is reported in deer from at least a few counties nearly every year in Kentucky, although outbreaks can be considerably large and widespread. The 2007 outbreak of HD in wild deer was the most widespread outbreak reported in the past 30 years. Over 4,000 suspected cases were reported in Kentucky. When possible, KDFWR will test animals that have died of apparent EHD. Although there were reports of deer exhibiting symptoms of EHD, none were clinically diagnosed with the disease during 2016.

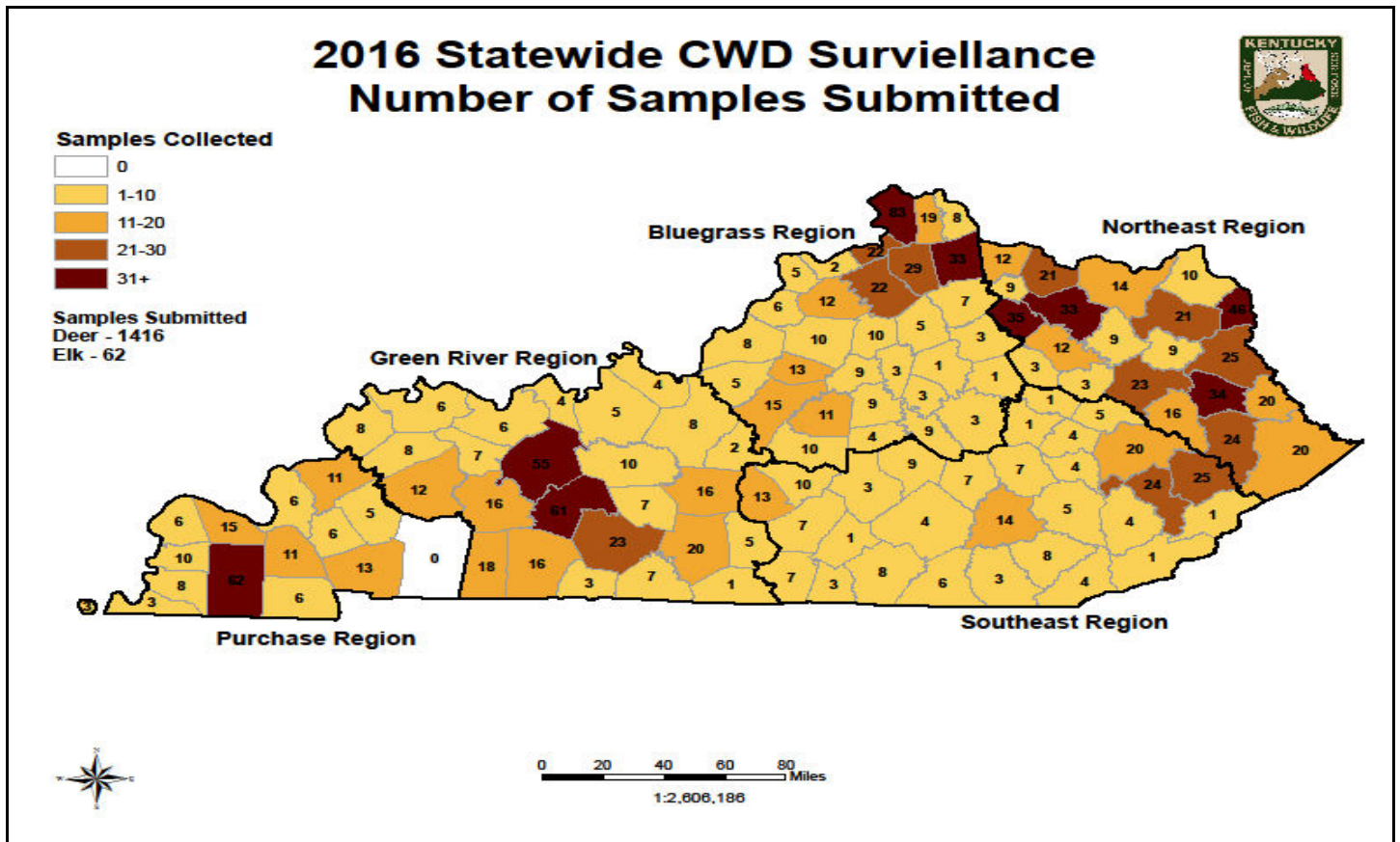
CWD

To detect CWD should it arrive in Kentucky, KDFWR adopted a CWD monitoring plan in 2002. That plan is a four part monitoring program to test: 1) a random sampling of hunter-harvested deer, 2) target or suspect animals (i.e., animals that appear ill), 3) a random sample of roadkill deer, and 4) all captive deer mortalities. In 2006, KDFWR adopted a contingency plan to deal with CWD if it was ever found in Kentucky. Since 2002, approximately 27,000 deer samples have been tested. 1,416 deer were submitted for CWD testing in 2016-2017, and all samples have tested negative for the disease.

Risk Assessment Strategy for CWD sampling.

- Due to loss of USDA funding and the increase cost of sample testing at SCWDS, a new CWD protocol has been developed. The new strategy will target more “higher risk” animals and focus less on hunter harvested animals.

Assessment is based upon captive cervid locations, number of cervid transportation permits per facility, wild deer density estimates and proximity to CWD + areas.



X. Research

No current or ongoing research

XI. Hot Topics

Telecheck antler measurement requirement

Added the requirement to report the number of antler points equal to or greater than 1in on both antlers. Additionally, asked if the outside antler spread was less than 11in or equal to or greater than 11in.

Antler spread information gave us age at harvest (1.5 of 2.5+) data on all antlered males based off of a 11 inch outside spread. Male fawns were already being tracked. Prior to the spread question implementation age at harvest data was collected from our field biologist at taxidermist/processors. Data in year 1 suggest there is no real difference between biologist collected data and telecheck data.

Fully concurrent crossbow\archery season

Deer Permits

Increase deer permit from \$35 to 40. Change statewide permit from 2 to follow zone bag limit. Abolish the additional deer permit. No longer issue deer control tags to landowners in zone 1.

Zone Changes

Zone 1 – unlimited antlerless take, establish an antlerless only season during the last weekend in September.

Zone 2 – No Change.

Zone 3 – 4 deer bag limit (no change), only 1 antlerless deer may be taken with a firearm, 16 day either sex modern firearm season (increase of 6 days)

Zone 4 – zone bag limit of 2; 1 antlered and 1 antlerless, 1 antlerless may be taken during archery\xbow, both muzzleloaders or both youth, antlered deer only during entire 16 day modern firearm season (increase of 6 days)

Urban Deer/Special Deer Hunt

Urban/sub-urban Deer Populations – Management in development.

XII. Relevant Links

KDFWR Home Webpage – <http://fw.ky.gov/Pages/default.aspx>

KDFWR Deer Regulation Webpage – <http://fw.ky.gov/Hunt/Pages/Deer-Hunting-Regs.aspx>

KDFWR Diseases & Wildlife Health Webpage – <http://fw.ky.gov/Wildlife/Pages/Diseases-and-Wildlife-Health.aspx>

APPENDIX F

MICHIGAN



Michigan White-tailed Deer Report | 2016-17

I. Current Harvest

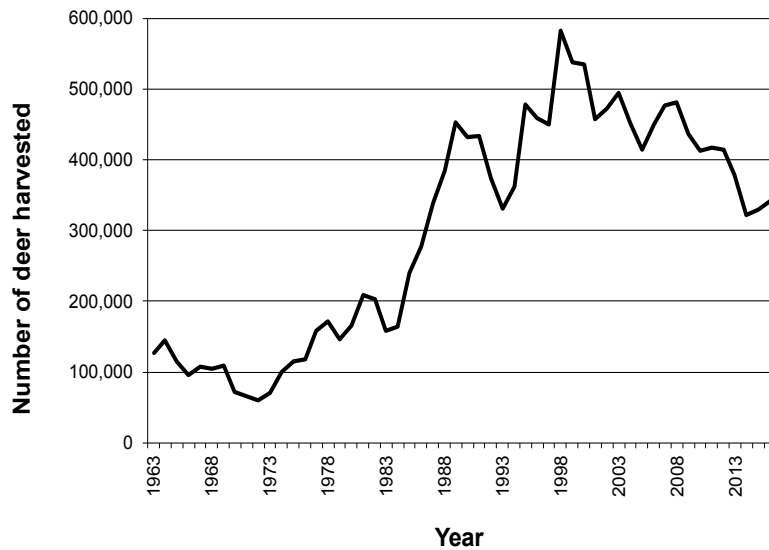
The 2016-17 total deer harvest was estimated to be 341,288; up by 3.8% from 2015-16. The increase was likely due to slightly better hunting conditions in 2016-2017 than in 2015-2016. Of particular note, the buck harvest in Michigan's Upper Peninsula (UP) was up 17.3% from the previous year. This is likely due to the slow recovery from the effects of several severe winters that had a dramatic effect on the UP deer herd in 2013 and 2014.

	Bucks		Does		Buttons		Total		Change (%)
	2016	2015	2016	2015	2016	2015	2016	2015	
Firearms	107,329	110,721	57,513	64,553	N/A	N/A	164,843	175,274	-6.0
Archery									
Crossbow	43,986	39,884	30,143	26,242	N/A	N/A	74,130	66,126	12.1
Vertical Bow	31,452	29,040	19,960	16,402	N/A	N/A	51,412	45,442	13.1
Total	75,438	68,924	50,103	42,644	N/A	N/A	125,541	111,568	12.5
Muzzleloader	9,083	6,594	14,195	11,959	N/A	N/A	23,278	18,553	25.5
Antlerless									
Early Antlerless	N/A	N/A	2,840	3,428	N/A	N/A	2,840	3,428	-17.2
Late Antlerless	N/A	N/A	18,035	12,266	N/A	N/A	18,035	12,266	47.0
Total	N/A	N/A	20,875	15,694	N/A	N/A	20,875	15,694	33.0
Youth	4,113	5,163	2,118	2,118	N/A	N/A	6,339	7,281	-12.9
Total*	196,233	191,608	145,054	137,073	N/A	N/A	341,288	328,681	3.8

*Totals include additional disability hunts not previously recorded. An additional 6,934 deer were taken on DMAP permits that are not included in this total.



II. Historical Harvest



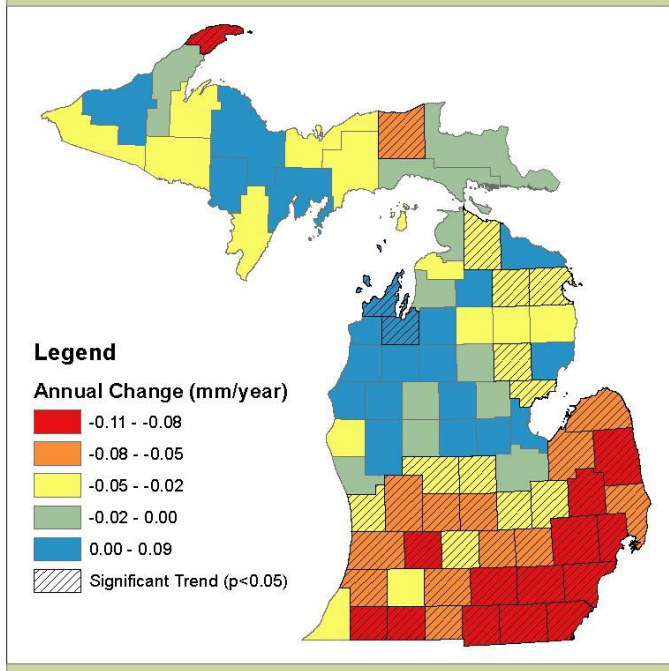
III. Population Estimate/Trends

Michigan DNR no longer conducts population estimates.

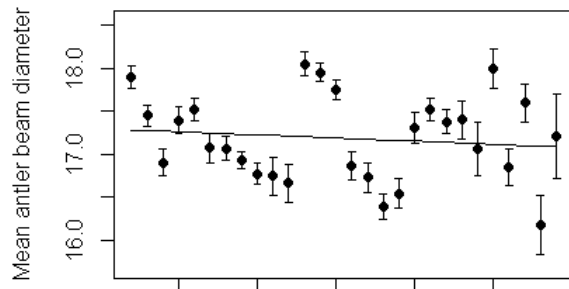
There has been a decline in yearling antler beam diameter over the past ~30 years, with the most notable declines occurring in the southern part of the state. This is occurring in spite of having reduced deer numbers from a peak in the late 1990's.



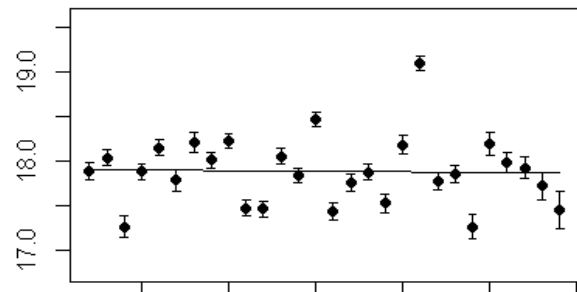
Annual Antler Beam Trends 1987 - 2014

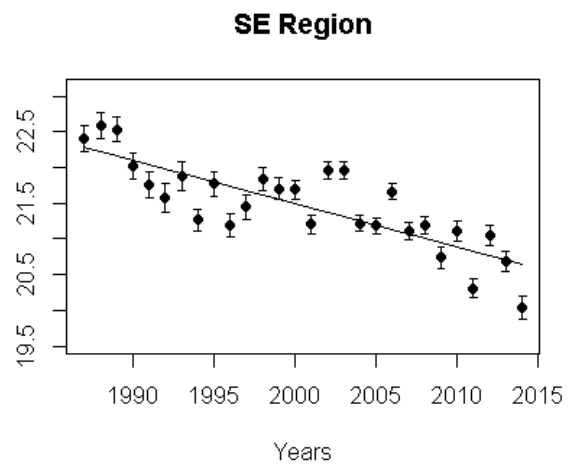
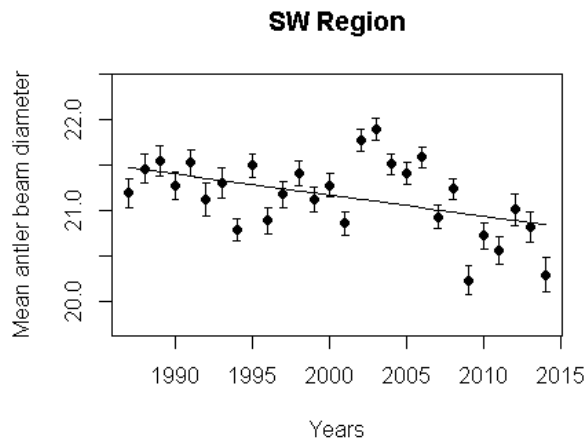


UP Region



NLP Region

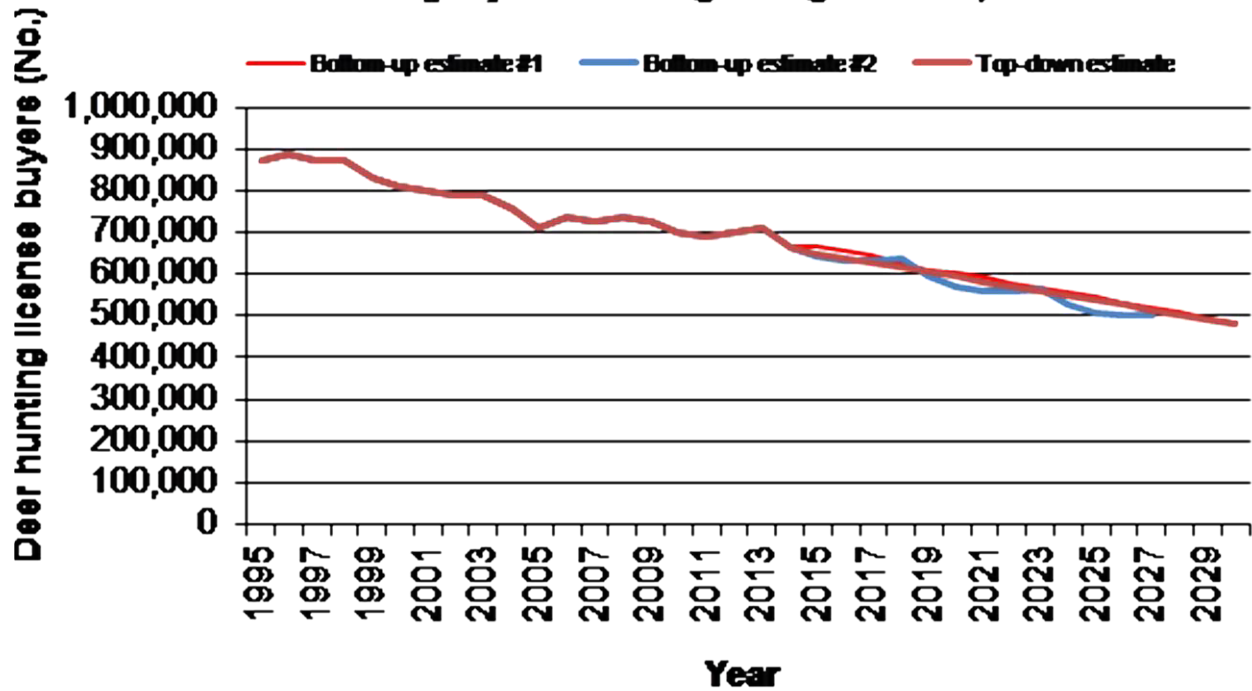




III. Population Estimate/Trends (cont'd)

Demographics –

Deer hunter numbers (projections beginning in 2015)





IV. Deer Management Zones (For 2016):

DEER

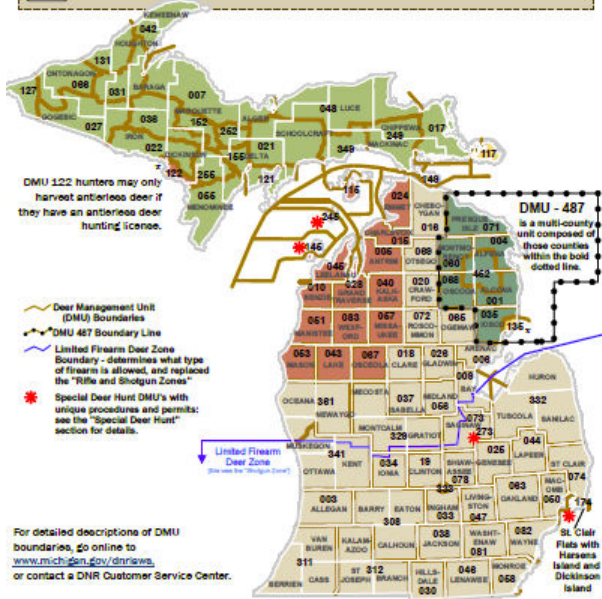
Antler Point Restriction (APR) Regulations

APR regulations vary throughout the state based on the type of deer license and the hunting location. Use the map and chart on these two pages to find the APR for your desired hunt.

1. On the map, locate the Deer Management Unit(s) (DMU) you wish to hunt.
2. Match the color of your desired DMU(s) to the color(s) in the chart to the right to see the type of deer you may harvest in each season based on your license.

Antler Point Restriction Key

	Antlerless Deer		3 or more points* on one side
	At least one antler 3 inches or longer		4 or more points* on one side
	2 or more points* on one side	* A legal point must lie at least 1 inch in length	



		Seasons		
		Archery	Firearm	Muzzleloader
Deer License				
Deer Combo License	Regular Tag			
	Restricted Tag			
Deer License		or		
Deer Combo License	Regular Tag	or		
	Restricted Tag	or		
Deer License		or		
Deer Combo License	Regular Tag	or		
	Restricted Tag	or		
Deer License		or		
Deer Combo License	Regular Tag	or		
	Restricted Tag	or		
Deer License				
Deer Combo License	Regular Tag			
	Restricted Tag			

Statewide: limit of two antlered deer. When harvesting two antlered deer, one antlered deer must have at least four or more points on one side.

2016-17 Harvest Regulation Summary

V. Regulation/legislation

1. New for 2016

- No new changes have been proposed for the 2016 deer hunting season. However, our CWD core zone and Management Zone have been expanded due to the discovery of additional CWD positive deer outside of the original core zone.

VI. Urban/Special Hunts

Ann Arbor completed the first year of a research project that aims to evaluate the efficacy of a joint management approach using sterilization and sharpshooting. Shooters removed 96 deer during the first year research effort, while sterilizing 54 female deer. The city has allocated additional money for deer research this year, though an official amendment for the existing permit to continue research has not



Michigan White-tailed Deer Report | 2016-17

yet been received by the Department. The authorization of this permit has led to fractured relationships with many conservation organizations, including Safari Club and Michigan United Conservation Clubs, who view this permit and authorization of sterilization of deer as a betrayal of trust between the management agency and their organization.

VII. Deer Management Assistance/Crop Damage

The agency completed a 3 year pilot program to look at an exception to the Deer Management Assistance Permit (DMAP) regulations that allows for the use of firearms/rifles during the archery season (except Oct 1-4 and Nov 10-14) and/or to harvest one antlered deer per year with either method of take by season or with a firearm. This pilot program is located in 5 counties in the orchard belt of Michigan and was created to alleviate concerns with damage to fruit bearing trees. DMAPs were previously only allowed to be used with the proper equipment in the appropriate season. However, several landowners requested additional methods to protect their agricultural interests, such as the allowance of firearms regardless of the season. Results from the three year pilot shows that 105 antlerless deer were taken in 5 counties under the firearms exception, significantly less than the 5,700+ antlerless deer taken during hunting seasons, and the 900+ antlerless deer taken on DMAPs without the firearms exception during this same time frame. Only 4 antlered deer were taken in the 5 counties during this three year period. A current panel of stakeholders has been reconvened to determine if this pilot should be extended throughout the state.

VIII. Diseases - CWD

Since the discovery of CWD in May of 2015, the MDNR has completed one year of surveillance in the designated CWD Management Zone. A total of 13,636 deer have been sampled statewide during that time, with the detection of 9 total CWD positive animals. Positive deer have been identified outside of the core surveillance area each year, leading to further expansion of our CWD core Management Zone to what is now 20 townships over 5 counties (see map below). Additionally, CWD was reported in a captive cervid farm in Mecosta County in January 2016. Surveillance will be conducted over 9 townships surrounding that location to determine if the disease is present at 0.1% in the deer herd this coming hunting season. The cervid farm has been depopulated as of Summer 2016.

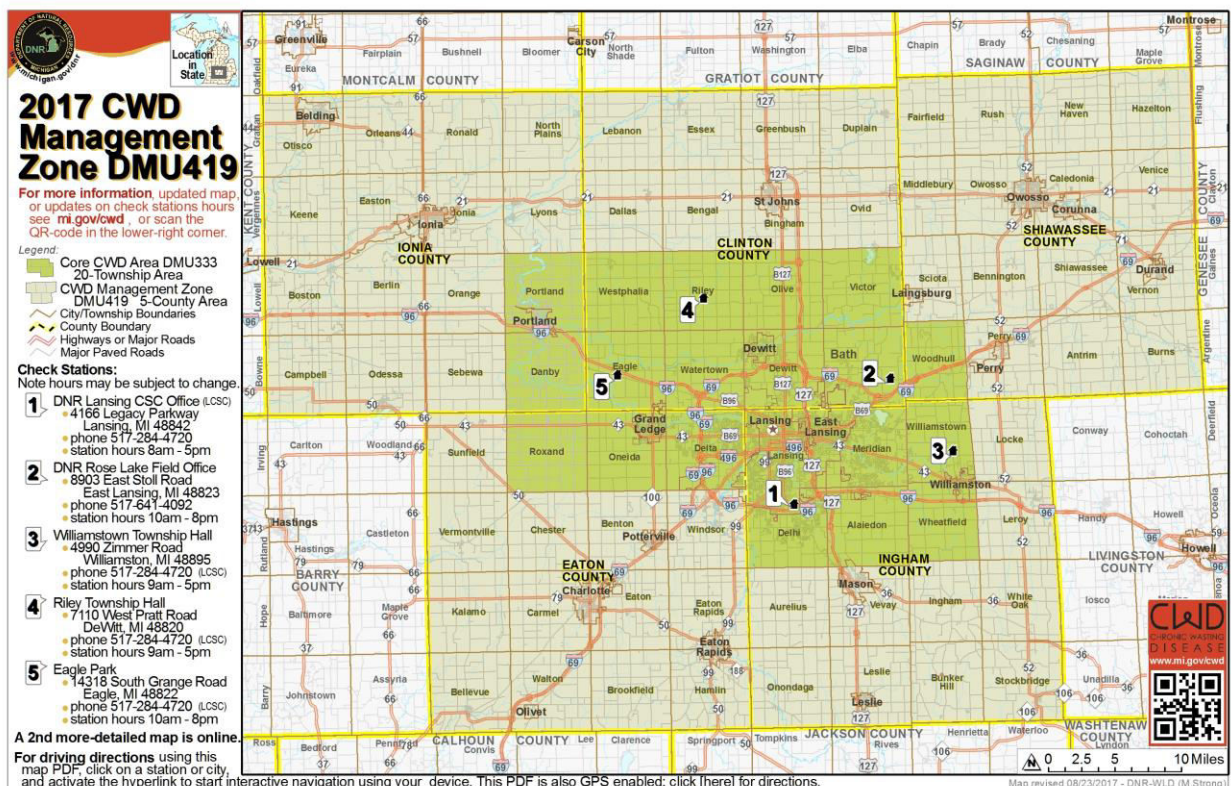


Michigan White-tailed Deer Report | 2016-17

Table 1. Number of deer tested in Michigan for chronic wasting disease since first detected in free-ranging deer, through August 23, 2017.

	Targeted Deer	Roadkill Deer / Deer Found Dead	Deer taken on Disease Control & Crop Damage Permits	Deer Culled by Wildlife Services	Hunter Harvested Deer	Total	CWD Positive Deer
CWD Core Area (9 TWP)	61	2170	954	1193	4048	8426	5
CWD Management Zone* (3 County)	74	266	173	0	2139	2652	2
Remainder of State	342	470	777	183	786	2558	0
Total	477	2906	1904	1376	6973	13636	9

*CWD Management Zone totals exclude deer taken from within the Core Area.





IX. Research

EHD Recovery

Research from MSU is looking at the rebound of deer populations after an EHD outbreak. The project is headed by Sonja Christensen, previous Massachusetts Deer Project Leader, through Michigan State's Boone and Crockett Quantitative Wildlife Center.

CWD Research

Research is ramping up from MSU looking at the influence of external factors on the spread or potential introduction. A field study will begin in the winter of 2017, including the use of GPS collars to monitor movements within the existing CWD management zone. Modeling looking at potential risk to CWD expansion or introduction will occur over the next couple of years.

Explaining trophy white-tailed deer harvest data

Research from MSU is looking at using trophy white-tailed deer harvest data to help determine possible explanations for the landscape distribution of trophy harvest occurrences that are seen throughout the Midwest. Project is being headed by Rebecca Cain through Michigan State's Boone and Crockett Quantitative Wildlife Center.

Predator-Prey Project

Project is entering its eighth year looking at the complex interactions of deer survival, winter severity, and predators in Michigan's Upper Peninsula. The initial study was set in the low snow fall zone, and the team is currently in the process of completing its research in the mid-snowfall zone. A final three years will begin in the high snow fall zone where deer are obligate migrators. Project is funded by Safari Club International and headed up by researchers at Mississippi State and Northern Michigan University. Visit <http://www.fwrc.msstate.edu/carnivore/predatorprey/index.asp> for more details.

X. Hot Topics

CWD, UP Deer Regulations, DMAP/Out of Season Permits

XI. Relevant Links

www.michigan.gov/deer

www.michigan.gov/cwd

APPENDIX G

MINNESOTA



2017 Minnesota Deer Program Report

Brian Haroldson, Andrew Norton, & Adam Murkowski

I. Current Harvest

In 2016, hunters registered 173,213 white-tailed deer, up 9% from 2015 and the second consecutive year of increase, but down 35-40% from peak harvest levels in the early-to-mid 2000s (Table 1, Figure 1). Increased harvest in 2016 was likely due to additional deer on the landscape following conservative harvest strategies in 2014 and 2015, consecutive mild winters in 2014-15 and 2015-16, and additional harvest opportunities in 2016. Firearm hunters accounted for 83% of total harvest, while archers and muzzleloader hunters accounted for 12% and 5%, respectively. Total license sales increased 3% between 2015 and 2016 (Table 2).

Table 1. Registered deer harvest in Minnesota, 2014-2016.

Season	Antlered			Antlerless			Total		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Firearm	70,466	83,939	88,876	45,248	48,758	55,594	115,714	132,697	144,470
Archery	8,111	9,468	8,931	9,764	10,606	11,429	17,875	20,074	20,360
Muzzleloader	2,459	2,657	3,113	3,394	3,915	5,270	5,853	6,572	8,383
Total	81,036	96,064	100,920	58,406	63,279	72,293	139,442	159,343	173,213

II. License and Season Information

Table 2. Statewide deer license sales in Minnesota, 2010-2016.

	2010	2011	2012	2013	2014	2015	2016
FIREARM							
Resident License	379,500	381,775	391,615	387,373	372,659	376,942	376,149
Non-Resident License	11,895	11,945	12,484	12,410	11,642	12,270	12,590
Mgmt/Intensive Harvest Permit	143,640	137,348	85,336	92,879	28,239	46,017	65,081
Youth License	59,691	60,921	62,932	64,608	62,673	62,602	61,442
Early Antlerless Season Permit	9,737	0	0	1,126	1,362	2,117	2,568
Disease Management Permit	1,531	4,589	4,362	3,308	0	0	3,308
Free Landowner License	4,235	3,805	4,769	4,800	4,383	4,228	4,325
Total License Sales	610,229	600,383	561,498	566,504	480,958	504,176	525,463
Either-Sex Permits Issued	54,381	11,456	32,766	36,178	26,326	30,855	39,552
ARCHERY							
Resident License	90,171	88,520	93,959	92,459	91,907	94,390	93,327
Non-Resident License	1,630	1,713	1,810	1,903	1,897	2,032	2,087
Youth License	9,562	10,298	11,271	12,169	11,907	11,905	10,860
Total License Sales	101,363	100,531	107,040	106,531	105,711	108,327	106,274
MUZZLELOADER							
Resident License	51,517	54,778	53,445	46,217	39,283	44,955	46,433
Non-Resident License	411	415	452	400	351	435	440
Youth License	3,770	4,206	4,439	4,622	4,316	4,786	4,738
Total License Sales	55,698	59,399	58,336	51,239	43,950	50,176	51,611

Table 3. Deer license fees in Minnesota, 2016.

License Type	Resident	Nonresident
Landowner	\$0	\$0
Youth (Age 10-12)	\$0	\$0
Youth (Age 13-17)	\$5	\$5
Disease Mgmt	\$2.50	\$2.50
Early Antlerless	\$7.50	\$40
Bonus Antlerless	\$15	\$80
Regular Firearm	\$30	\$165
Regular Archery	\$30	\$165
Regular Muzzleloader	\$30	\$165
Super Sports	\$93	N/A

Table 4. Season dates for various deer seasons in Minnesota, 2016.

Season	Zone	Dates
Archery	Statewide	Sept. 17 - Dec. 31
Early Antlerless	*	Oct. 20-23
Youth Firearm	*	Oct. 20-23
Firearm	1	Nov. 5-20
Firearm	2	Nov. 5-13
Firearm	3A	Nov. 5-13
Firearm	3B	Nov. 19-27
Firearm	6	Nov. 5-27
Muzzleloader	Statewide	Nov. 26 - Dec. 11

* = Select DMUs throughout the state.

III. Historical Harvest

The statewide deer harvest generally increased from the mid-1970s through the early-2000s. After a record harvest of 289,421 in 2003, management changes were made to lower densities across much of Minnesota. From 2005-2007, through a public goal-setting process, goals for much of the state were set to lower deer densities. Liberal bag limits and high antlerless harvests contributed to high harvest numbers, and the statewide deer population declined toward goals by the late-2000s. In most deer management units (DMUs), recent management efforts have focused on maintaining or increasing deer populations.

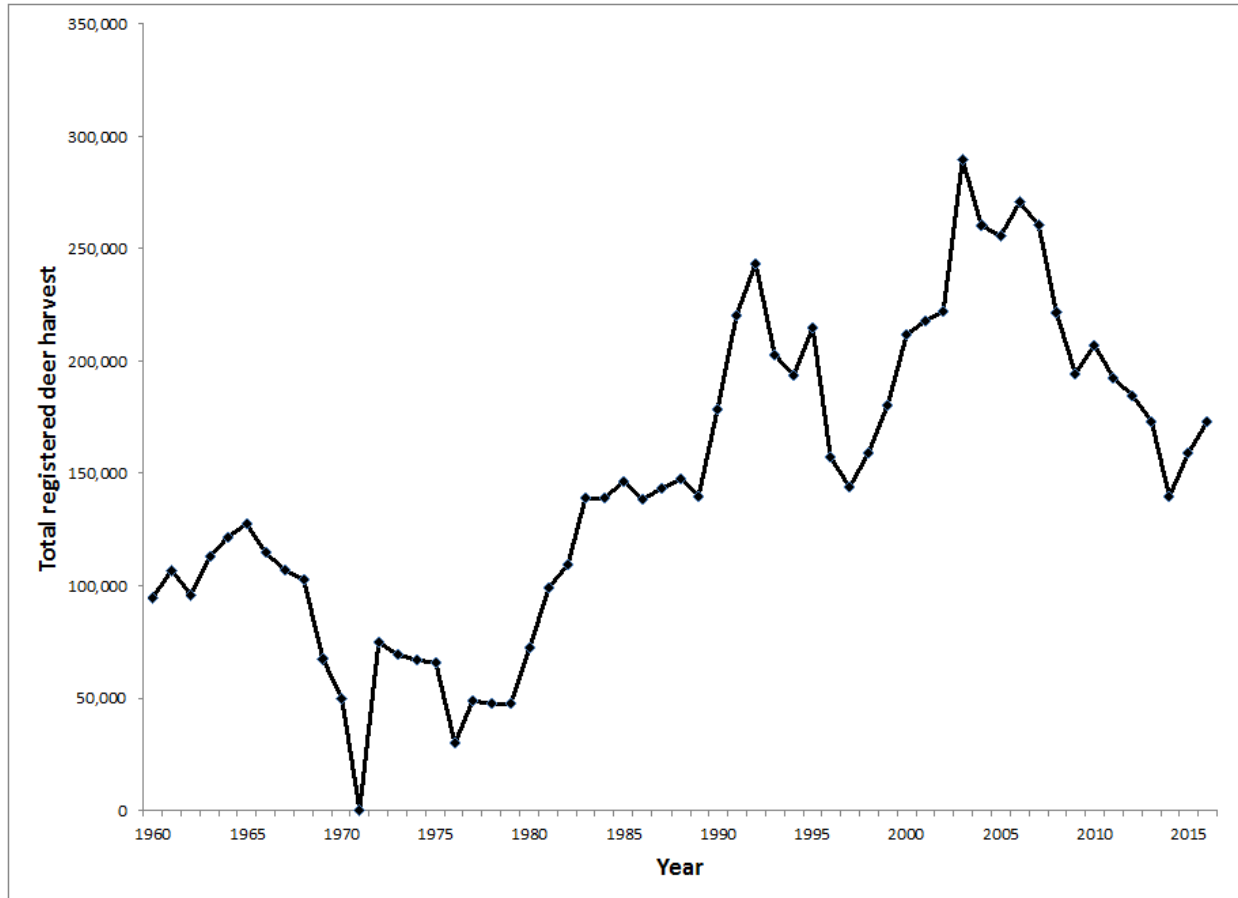


Figure 1. Total registered deer harvest in Minnesota, 1960-2016.

IV. Population Estimates/Trends

MNDNR estimates deer populations at the DMU level and adjusts management strategies to achieve population goals. Where possible, population estimates from modeling are calibrated with data from aerial surveys. The Minnesota deer population increased during the last few decades of the 20th century as a result of conservative antlerless deer quotas generally intended to maximize sustained harvest. However, periodic severe winters resulted in a decreasing population in some years. Following deer population goal revisions during 2005-2007, deer densities in most DMUs were intentionally reduced and/or stabilized through the 2013 deer season. Management strategies are adjusted accordingly as new goals are established through the public goal-setting process.

V. Deer Management Units/Zones

Annually, 1 of 7 management strategies are implemented within each DMU, based upon estimated deer density in relation to population goal. During 2016, DMUs were partitioned into 5 Bucks-Only areas, 67 Lottery areas, 32 Hunter Choice areas, 20 Managed areas, 3 Intensive areas, and 1 No Limit Antlerless area (Figure 2). The statewide management strategy will become more liberal in 2017, with multiple deer allowed in 33% of DMUs vs 19% in 2016.

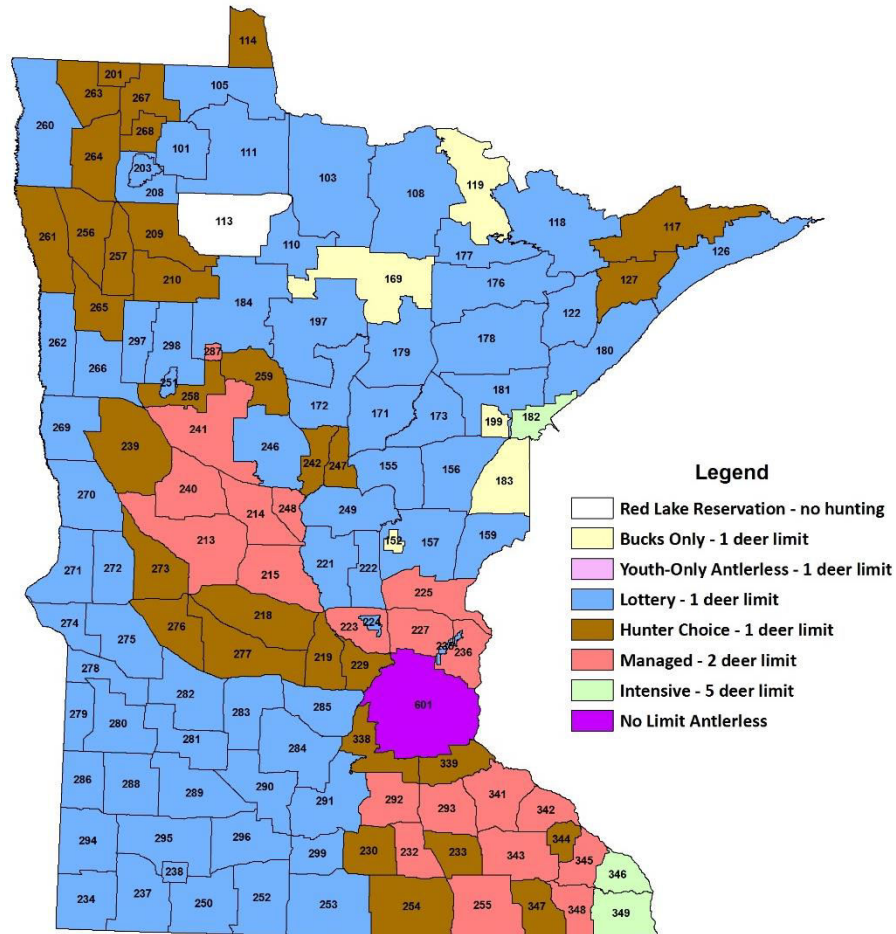


Figure 2. Deer season management designations in Minnesota, 2016.

VI. Regulation/Legislation Changes

New for 2017:

- All licensed hunters may use magnifying scopes during the muzzleloader deer season. Scopes were previously banned during the muzzleloader season for hunters less than age 60, except by special permit.
- Blaze pink clothing can now be substituted for blaze orange clothing during the small game season, firearm deer season, and muzzleloader deer season.
- The bag limit for deer in Intensive management areas has been reduced from 5 animals to 3.
- DMU boundaries in the northeast have been modified to better reflect where deer and moose occur on the landscape.
- Four southeast DMUs will be open to a 4-day, early antlerless season to address high deer densities and damage to agricultural crops. This season is considered annually when formulating deer management recommendations.
- MNDNR will collect tissue samples from adult deer for chronic wasting disease (CWD) testing in 8 north-central, 6 central, and 7 southeast DMUs. CWD sample submission is

mandatory during all deer seasons in DMU 603 and during the first two days of the firearm deer season in other surveillance DMUs.

- Deer feeding is prohibited in 5 north-central and 6 central counties surrounding locations where CWD was recently detected in captive deer. This includes all of Aitkin, Crow Wing, Kandiyohi, McLeod, Meeker, Morrison, Stearns, Wright, and portions of Cass, Mille Lacs, and Renville counties.
- Deer feeding and deer attractants continue to be prohibited in 5 southeast counties surrounding DMU 603. This includes all of Fillmore, Houston, Mower, Olmsted, and Winona counties.

VII. Urban/Special Hunts

Special Hunts: MNDNR cooperates with municipalities, state and county parks, and other public land entities throughout Minnesota to administer special hunts in areas where the number of hunters and weapon types must be limited to control the harvest or in the interest of public safety. During the 2016 deer season, special hunts were held in 88 areas and 1,667 deer were harvested.

Urban Deer Damage Management: An approximately 300-square mile area surrounding the Twin Cities metropolitan area is designated a “metro zone” where hunters may harvest an unlimited number of antlerless deer with proper licenses. In rare circumstances, MNDNR issues shooting permits for managing deer in urban areas. When permits are issued, deer may be removed outside of hunting seasons, at night, over bait, and with firearms. Either animal damage contractors or local law enforcement conduct the deer removals and all venison must be donated for charitable food distribution. Approximately 12 permits are issued annually in Minnesota, usually in the metro zone.

VII. Deer Management Assistance/Crop Damage

MNDNR does not compensate farmers financially for crop damage caused by deer. Wildlife managers are available to work cooperatively with agricultural producers to develop strategies to reduce deer damage and to improve deer population management. Farmers who enter into a Cooperative Damage Management Agreement with MNDNR are eligible to receive material assistance from the state, including installation of exclusion fencing. To minimize damage to standing crops, localized population management techniques (including hunting and shooting permits) are used to decrease deer numbers where they are causing damage. If sport-hunting is utilized to the fullest extent and damage is still excessive, MNDNR may issue shooting permits to agricultural producers to harvest deer outside of hunting seasons. In addition, a pilot program was instituted in 2012 in southeastern Minnesota, which allows the use of depredation permits allocated to specific properties where deer damage is occurring. Depredation permits allow increased bag limits for private sport-hunters to harvest additional antlerless deer during regular hunting seasons. This program is undergoing review.

IX. Diseases

CWD Surveillance: During November 2016, MNDNR sampled 2,966 hunter-killed deer for CWD within 10 DMUs in southeast Minnesota (Figure 3). Surveillance efforts were focused within

this region in response to increased incidence of CWD in deer from northeast Iowa and western Wisconsin. Three deer tested positive for the disease in DMU 348 (Fillmore County). MNDNR enacted its CWD Response Plan, which included the following actions: 1. Creation of a disease management zone (DMZ) surrounding the kill locations of the positive animals; 2. Completion of an aerial deer survey within the DMZ; 3. Addition of post-season sampling within the DMZ to enhance our understanding of the prevalence and spatial extent of the disease outbreak; and 4. Ban on recreational deer feeding in the counties surrounding the DMZ. During January-March 2017, an additional 1,179 deer within the DMZ were tested, including those obtained via a 16-day special hunt, landowner shooting permits, and a contract with USDA–Wildlife Services for targeted deer removal. As a result, 8 more CWD positive deer were found. In addition, CWD was diagnosed in captive deer herds in north-central and central Minnesota in 2016 and 2017, respectively. MNDNR will focus 2017 surveillance efforts on 8 north-central, 6 central, and 7 southeast DMUs. Prior to 2016, CWD had been documented in Minnesota in 3 captive elk herds (2002, 2009), 1 captive white-tailed deer herd (2006), 1 captive European red deer herd (2012), and a single, wild white-tailed deer (2010).

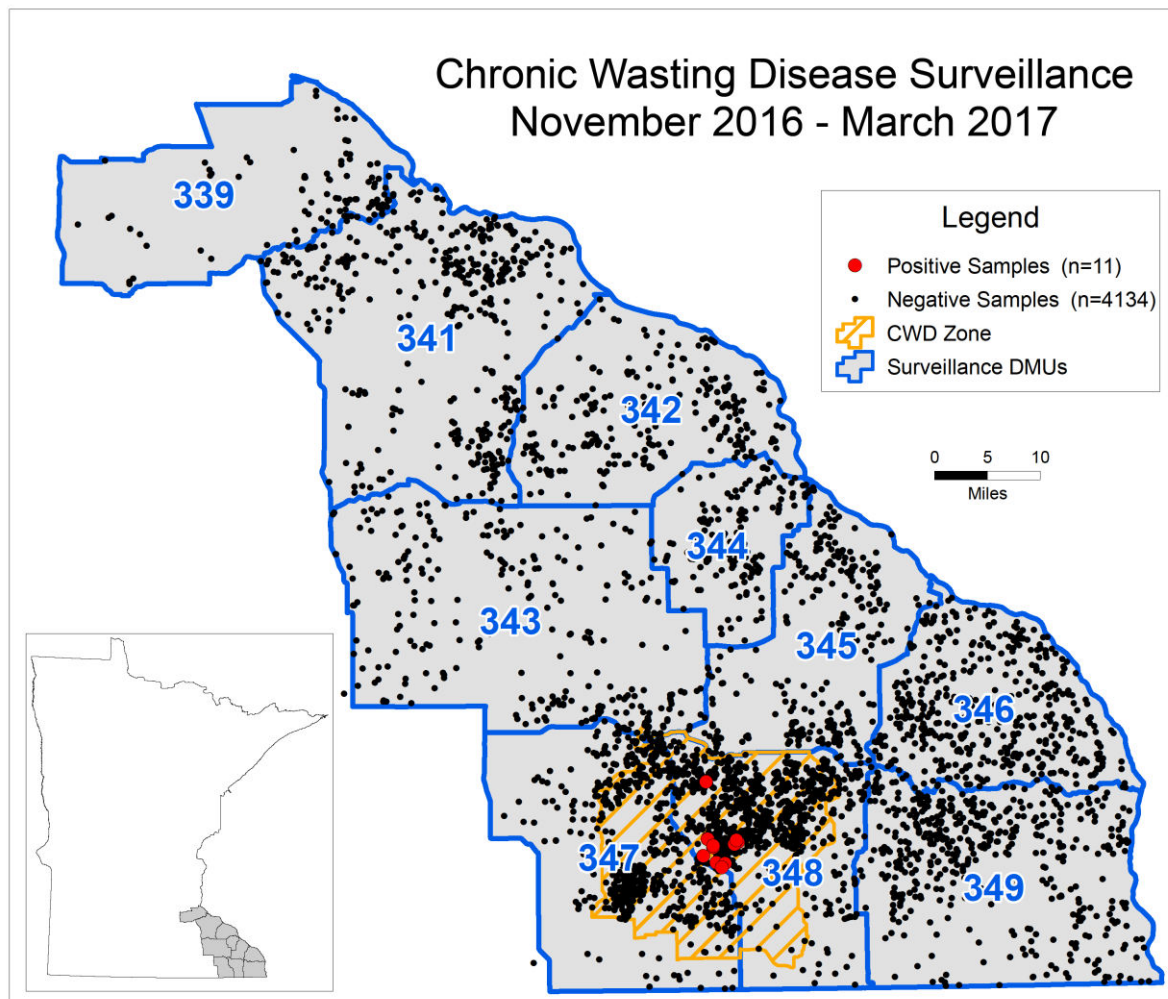


Figure 3. Sampling distribution of deer tested for chronic wasting disease in southeast Minnesota, 2016-2017. Eleven deer tested positive for the disease.

X. Research

Agricultural Deer Damage Research: The primary objective of this study is to evaluate the effectiveness of localized management (i.e., shooting and depredation permits) for reducing fine-scale deer abundance and to examine whether damage caused by deer to agricultural crops is reduced on properties where deer densities are lowered. Seven private agricultural properties were included in the study, including 4 properties where landowners used shooting permits and depredation permits to harvest extra deer in addition to normal sport-hunting. Producers on properties with integrated management readily utilized extra deer harvest opportunities provided by MNDNR, and management intensity on these properties was more than double the management intensity on properties where normal hunting was used. With integrated management, nearly half of the deer estimated to be utilizing the properties were harvested annually. Despite increased harvest pressure on properties with integrated management, deer damage to corn was similar on all properties regardless of the deer management strategy used (12% mean proportional corn loss). Although corn damage was similar across properties, increased deer harvest pressure on properties with integrated management may have prevented corn damage from being worse had additional deer not been removed. The results of this study will provide a basis for improving the framework for future application of localized management across the state.

Distance Sampling – Roadside Spotlight Surveys: Working with MNDNR, Eric Anstedt, a Minnesota State University M.S. student, completed a project to improve spotlight surveys in the agricultural regions of Minnesota using habitat suitability index (HSI) modeling to stratify the landscape. An HSI model previously created for white-tailed deer populations in Illinois (original HSI) and a modified HSI model were evaluated. Spotlight surveys were conducted in spring 2015 and 2016 to test both models on a local level. The modified HSI model was more efficient at predicting where deer could be in agricultural landscapes, in large part, because the original HSI model ignored grassland habitats and many deer were observed in these habitats. The modified HSI model was recommended to stratify habitats for roadside surveys to better predict the distribution and abundance of white-tailed deer in agricultural landscapes, which will improve sampling efficiency. Results of this study will inform additional research to develop sampling methods for estimating deer populations in the farmland of Minnesota.

Evaluating GPS Collars for Monitoring Neonatal Deer Survival and Movement: The primary objective of this upcoming study is to evaluate GPS collar performance and the effect of increased weight of GPS collars on fawn behavior compared to traditional breakaway VHF collars.

Informing Winter Habitat Management Prescriptions and Deer Population Vital Rate Estimates: The primary objective of this upcoming study is to evaluate deer resource use in north-central and northeast Minnesota using GPS collars.

Deer Movement Dynamics and Potential Prion Transmission from a CWD Disease Outbreak:

The primary objective of this upcoming study is to evaluate dispersal rates and seasonal movement patterns of deer in southeast Minnesota using GPS collars.

Bow Hunter Observation Survey: The primary objective of this upcoming study is to evaluate the use of bow hunter observation data via mail and email surveys as an index of deer, turkey, and furbearer populations. The survey is modeled following the design currently implemented by the Iowa DNR.

XI. Hot Topics

Deer Management Program Audit: Hunters raised concerns over lower numbers of deer harvested in recent years and the accuracy of MNDNR's deer population estimates. They also expressed dissatisfaction with the availability of information on MNDNR's deer management activities. As a result, the Minnesota Office of the Legislative Auditor (OLA) conducted an audit to examine the extent to which MNDNR uses appropriate data, tools, and techniques for monitoring and estimating deer populations, based on recommended practices in research literature and methods implemented in other states. Assessing MNDNR's deer population estimates also required technical expertise to test the sensitivity of MNDNR's statistical model. To conduct this work, OLA contracted with the Wildlife Management Institute. Key findings of the OLA report and MNDNR responses and intended actions related to those items are as follows (see link for complete report in Relevant Links section):

- MNDNR should develop a deer management plan that defines and prioritizes MNDNR resources, goals, and objectives, and includes strategies to improve and maintain adequate deer hunting and wildlife viewing opportunities.
 - MNDNR is currently developing a deer management plan.
- MNDNR should improve its resources for estimating deer populations; specifically, MNDNR should conduct field research to collect and utilize more information about Minnesota's deer, and to validate MNDNR deer population estimates.
 - MNDNR generally concurred with this recommendation. However, as highlighted in the OLA report, the importance of knowing the precise size of the deer population is often overemphasized, and we believe that any additional research and model validation efforts should be limited to what is necessary for deer managers to effectively model and manage deer populations.
- MNDNR should improve its statistical methodologies, deer model data, and records management system to better simulate changes in deer populations and reduce the risk of staff mistakes.
 - The OLA found that the deer population model used by MNDNR is sound, has no coding errors, and is effective at generating trend estimates that help inform management designations. MNDNR has already incorporated some of the evaluation recommendations related to model improvements to reduce possible errors.
- MNDNR should expand the data and information it uses and provides to Deer Advisory Team members when setting deer population goals. Such data would provide better insight on local deer environments, deer survival rates, deer impact on local

environments, and individuals' perspectives about deer. MNDNR should continue with its process to update deer population goals across the state, as defined within a formal deer management plan.

- MNDNR will continue deer population goal-setting after completion of the statewide deer management plan in 2018, and MNDNR plans to provide additional information as part of the process.

Deer Plan: In 2016, the Minnesota Office of the Legislative Auditor (OLA) issued an evaluation on MNDNR's deer management program that recommended we develop a long-range, strategic deer management plan. MNDNR committed to completing a statewide plan by spring 2018. Since December 2017, a public citizen advisory committee has been meeting monthly to provide input and feedback to MNDNR on development of this plan.

XII. Relevant Links

2017 Hunting & Trapping Regulations –

<http://www.dnr.state.mn.us/regulations/hunting/index.html>

2017 Deer Hunting Season Information –

<http://www.dnr.state.mn.us/hunting/deer/index.html>

Annual report summarizing deer harvest, population modeling, and winter severity –

<http://www.dnr.state.mn.us/mammals/deer/management/statistics.html>

CWD news, testing, and results –

<http://www.dnr.state.mn.us/cwd/index.html>

General information on goal setting –

<http://www.dnr.state.mn.us/mammals/deer/management/population.html>

Minnesota Office of the Legislative Auditor report on deer population management –

<http://www.auditor.leg.state.mn.us/ped/2016/deermanagement.htm>

APPENDIX H

MISSOURI

Missouri Deer Program Report
By: Barb Keller and Kevyn Wiskirchen



I. Current Harvest

The 2016-2017 harvest of 266,244 deer was a 3% decrease from 2015-16 and was 5% less than the 10-year-mean harvest. At the county-level, harvest throughout the state was generally within 5% of harvest during the previous year. Antlered buck harvest continued to exceed antlerless harvest for the 3rd consecutive year, and was the highest antlered buck harvest ever recorded in Missouri. The high antlered buck harvest was likely due to the removal of the antler point restriction from 6 counties and the recovery of the population from the severe hemorrhagic disease outbreak of 2012.

Season/Portion	Antlered Bucks			Button Bucks			Does			Total		
	2015	2016	Diff	2015	2016	Diff	2015	2016	Diff	2015	2016	Diff
Archery	20,169	20,771	3%	5,419	4,694	-13%	24,171	22,086	-9%	49,759	47,551	-4%
Urban	1	N/A	---	66	N/A	---	325	N/A	---	392	N/A	---
Managed Hunts	424	385	-9%	224	222	-1%	820	786	-4%	1,468	1,393	-5%
Early Youth	8,042	7,258	-10%	1,514	1,007	-33%	4,027	2,914	-28%	13,583	11,179	-18%
Late Youth	664	1,168	76%	376	433	15%	1,313	1,389	6%	2,353	2,990	27%
November	90,094	95,717	6%	20,911	18,977	-9%	75,537	71,187	-6%	186,542	185,881	0%
Alt Methods	2,914	2,792	-4%	1,555	1,497	-4%	6,339	6,326	0%	10,808	10,615	-2%
Antlerless Only	146	28	-81%	1,723	1,131	-34%	7,673	5,376	-30%	9,542	6,535	-32%
CWD¹	70	54	-23%	14	11	-21%	35	35	0%	119	100	-16%
Total²	122,524	128,173	5%	31,802	27,972	-12%	120,240	110,099	-8%	274,566	266,244	-3%

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II. License and Season Information

Portion	2016-2017	2017-2018
Archery	September 15 - January 15	September 15 - January 15
Firearms		
Early Youth	October 29-30	October 28-29
November	November 12-22	November 11-21
Late Youth	November 25-27	November 24-26
Antlerless	December 2-4	December 1-3
Alternative Methods	December 24 - January 3	December 23 - January 2

Table 1. Permit prices and sales during 2015-2016.

Permit type	Cost	Number issued
Permittee Archery Any-Deer	\$19.00	115,475
Landowner Archery Any-Deer	\$0.00	94,339
Youth Archery Any-Deer	\$9.50	7,455
Non-resident Archery Any Deer	\$225.00	10,053
Permittee Archery Antlerless	\$7.00	51,784
Landowner Archery Antlerless	\$0.00	165,114
Youth Archery Antlerless	\$3.50	2,700
Non-resident Archery Antlerless	\$25.00	2,274
Permittee Firearms Any-Deer	\$17.00	289,281
Landowner Firearms Any-Deer	\$0.00	178,004
Non-resident Firearms Any-Deer	\$225.00	18,151
Youth Firearms Any-Deer	\$8.50	54,079
Permittee Firearms Antlerless	\$7.00	179,747
Landowner Firearms Antlerless	\$0.00	154,579
Youth Firearms Antlerless	\$3.50	21,520
Non-resident Firearms Antlerless	\$25.00	8,676
Resident Firearms		
Resident Firearms		846,324
Nonresident Firearms		
Nonresident Firearms		30,886
Resident Archery		
Resident Archery		423,738
Nonresident Archery		
Nonresident Archery		13,129
Permittee Archery & Firearms		
Permittee Archery & Firearms		722,041
Landowner Archery & Firearms		
Landowner Archery & Firearms		592,036

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III. Historical Harvest

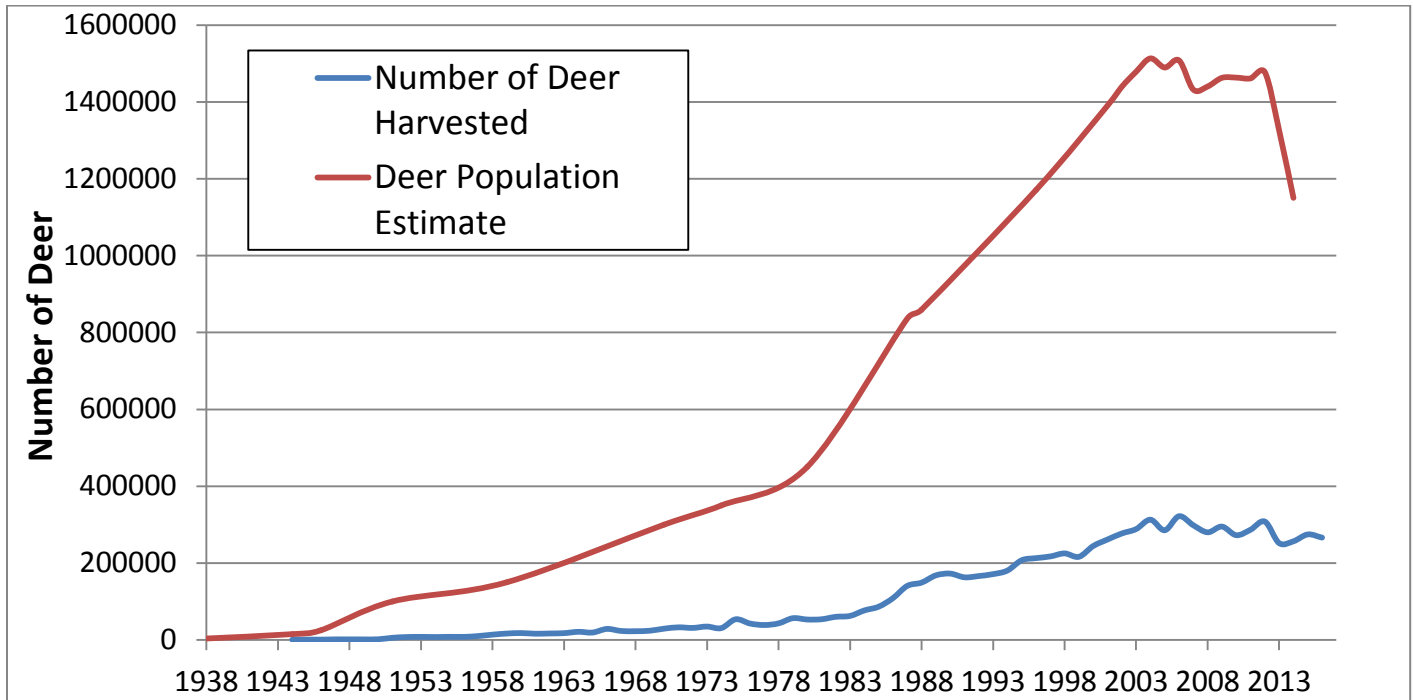


Figure 1. Simulated deer population and total deer harvest in Missouri, 1938–2016.

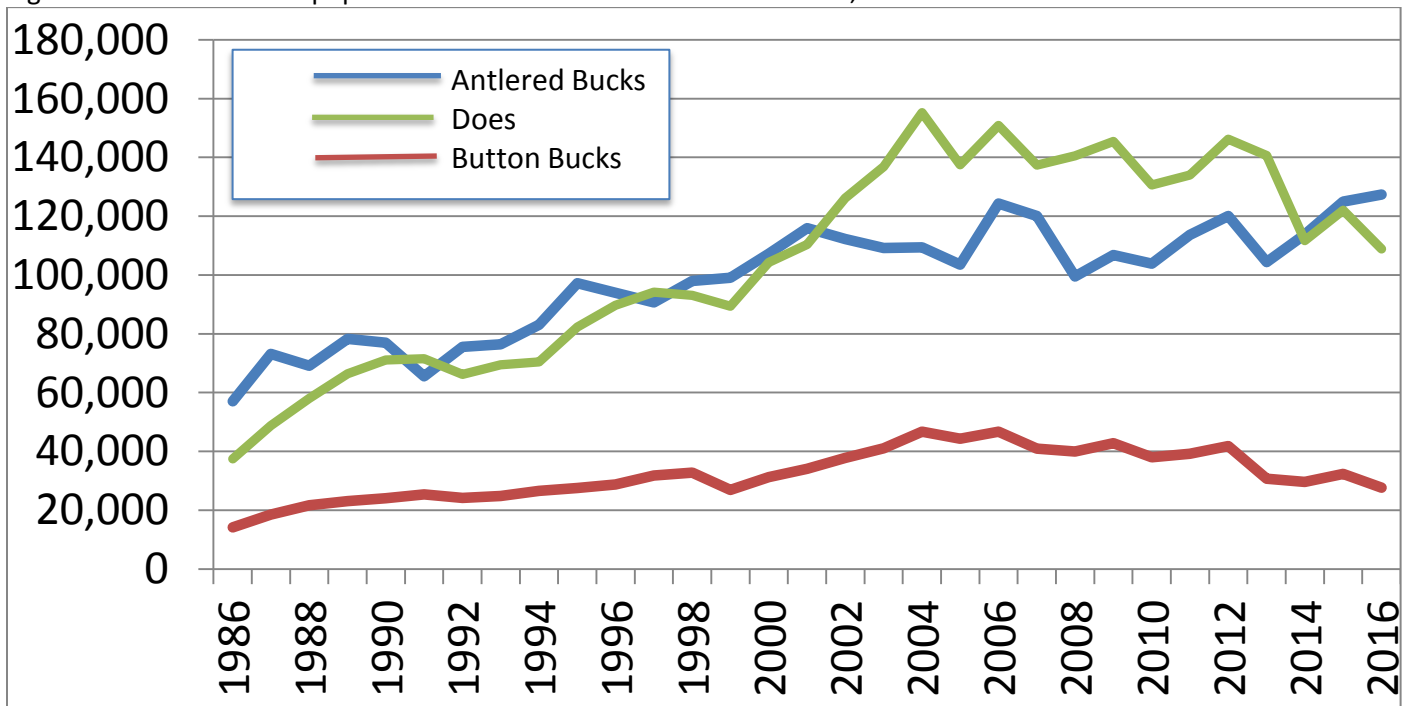


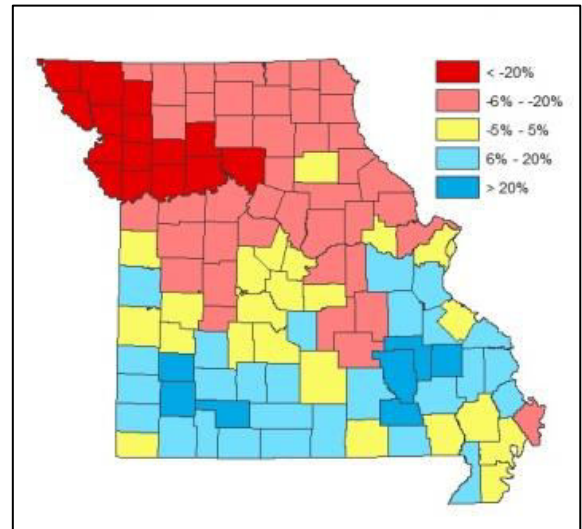
Figure 2. Sex ratio of deer harvest in Missouri, 1986–2016.

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IV. Population Trends

Missouri's simulated deer population as a result of a simple, deterministic accounting style model indicates statewide trends of decreasing deer populations with a peak occurring in the early 2000's (see figure in Current Harvest section). However, it is important to note that deer populations vary throughout the state due to habitat use and cover, hunter density and goals, harvest regulations, and hemorrhagic disease outbreaks. Historically higher deer numbers have occurred in northern Missouri that were above culturally acceptable levels, thus harvest opportunities were liberalized to reduce deer numbers. This coupled with hemorrhagic disease outbreaks have reduced deer densities in these areas, in some areas below desirable levels, thus regulations have been changed to promote population stabilization/increase. Generally, areas of southern Missouri have been stable to slightly increasing due to conservative antlerless harvest opportunities.



Percent change in county harvest totals in 2016-17 compared to the 10-year average.

V. Deer Management Units: Each of Missouri's 115 counties serves as a separate deer management unit. Additionally, some counties have portions designated as Urban Zones, thus are considered separate management units.

VI. Regulation/legislation Changes

2016-2017 Season (significant changes)

- Hunters may now take only two antlered deer during the archery and firearms deer season combined. Only one antlered deer may be taken during the firearms season, and only one antlered deer may be taken during archery season prior to the November portion of the firearms season.
- The urban zones portion of the firearms deer season has been eliminated.
- The antlerless portion of the firearms season has been reduced to 3 days and moved to the first weekend in December.
- The late youth portion of the firearms season has been expanded to 3 days and moved to late November.
- Crossbows are now a legal archery method.
- The CWD management zones have been expanded from 19 to a total of 29 counties. Regulation changes that apply to counties in management zones include:
 - Feeding and mineral supplementation ban
 - The 4-point antler point restriction is repealed in those counties where it was previously instituted
 - Antlerless permits are increased from 1 to 2 where not already in effect
 - Hunters harvesting deer during the opening weekend of the firearms season must present the deer or deer head to a sampling station on the day of harvest

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2017-2018 Season (significant changes)

- Youth hunters are now allowed to take their second antlered deer during the early youth portion of the firearms season.
- The CWD zone has been expanded from 29 to 41 counties. Regulation changes that apply to counties in management zones include:
 - Feeding and mineral supplementation ban
 - The 4-point antler point restriction is repealed in those counties where it was previously instituted
 - Antlerless permits are increased from 1 to 2 where not already in effect
- Mandatory CWD sampling during opening weekends of firearms season is now only required in a subset of CWD management zone counties (25 of 41).

VII. Urban/Special Hunts

Annually there are managed deer hunts that occur on state (e.g., parks, some MDC lands) and federal properties that restrict the number of hunters and harvest based on a lottery, quota system. These are approved by the Missouri Department of Conservation annually, and run by the agency with authority over that area.

Currently, there are 2 urban zones in Missouri, including Kansas City and Springfield. These areas include whole or portions of a county and have more liberal regulations than other areas to increase the harvest of deer. In 2016, the St. Louis urban zone was eliminated because these counties have been included in a CWD management zone. The regulations that go into effect within CWD management zones made the urban zone designation redundant. The urban zone portion of the firearms season has also been eliminated due to low hunter participation and harvest.

VIII. Deer Management Assistance/Crop Damage

Currently, MDC can provide deer depredation permits to landowners and lessees to address deer conflicts resulting in significant economic losses (e.g., crop damage, nursery damage) and risks to human safety (i.e., airports). However, this program is currently being reviewed and revised to increase program consistency and effectiveness. Additionally, deer depredation permits are not always appropriate or publically acceptable; therefore MDC is currently in the initial stages of developing a deer management assistance program (DMAP) to offer several options to localized deer management issues.

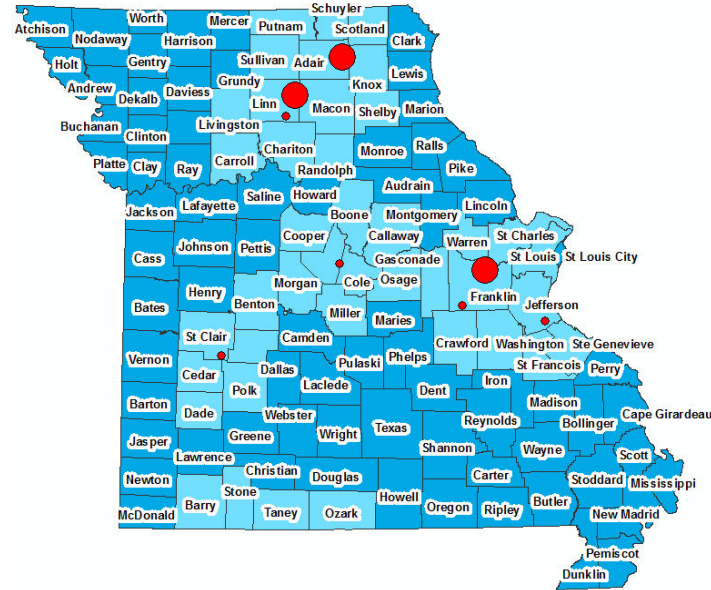
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IX. Disease Issues / Updates

Chronic Wasting Disease

During the 2016-2017 surveillance season, CWD-positive deer were discovered in 3 new areas. A CWD positive deer in Southern Jefferson County expanded the Eastern CWD management zone by 2 counties (St. Francois and Ste. Genevieve). A CWD positive deer was detected in Southwest Franklin County, well outside the core area in Northern Franklin County. Two CWD-positive deer were detected during statewide surveillance in Southeast St. Clair County, 82 miles away from the nearest known CWD detection in Cole County. These two adult bucks were harvested on the same property in St. Clair County. As a result of these positive detections 6 new counties were added to the CWD Management Zone. As of June 2017, CWD has been detected in 42 free-ranging deer in Macon (23), Adair (10), Cole (1), Franklin (4), Jefferson (1), Linn (1), and St. Clair (2) counties, and 11 captive deer in Linn (1) and Macon (10) counties.



This map illustrates the distribution of detected CWD Management Zones (light blue), Core Areas (large red circle) and single detections outside of Core Areas (small red circle) as of June 2017.

During the 2016-2017 surveillance season, we tested 25,659 deer for CWD. The majority of these samples (~19,200) were a result of the mandatory sampling regulation that went into effect during the 2016 deer season. We sampled 3,197 deer during our statewide surveillance, which occurred primarily in Northern Missouri with the aid of cooperating taxidermist. Statewide surveillance will take place in southern Missouri during the 2017-2018 sampling season. During the post-season targeted sampling that occurs in areas of known CWD infection, we sampled 746 deer.

X. Research

Statistical Population Reconstruction - In collaboration with the University of Missouri and the University of Washington, MDC has investigated a new method of modeling deer populations called Statistical Population Reconstruction (SPR). This new method provides several improvements over current population models that will increase model accuracy and strengthening the foundation for monitoring regional and county-specific deer populations. This modeling approach uses a variety of data that MDC currently collects including age at harvest information, hunter effort, and harvest data. However, additional information will be needed, determining harvest vulnerability of antlered males and survival rates via the Deer Survival Project, as well as expanding the age at harvest data collection samples and methods. One way we are expanding age at harvest data collection is through measurement data collected by hunters. Beginning in 2016, hunters using telecheck or the MOhunting app to check a deer were asked: Is the length from the inner corner of the eyeball to the upper edge of the nostril greater than 4.5 inches (if checking a doe); or Is the circumference of the antler 1 inch above the base greater than 2.5 inches (if checking an antlered buck)? These 2 questions will help us determine if the doe harvested was a fawn or older, or if the buck harvested was a yearling or older. This information will be incorporated in new SPR models.

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Modeling Chronic Wasting Disease Dynamics and Impacts - In collaboration with the University of Missouri, MDC has implemented a research project to model CWD distribution and potential impacts on Missouri's deer population. We plan to model the distribution and prevalence of CWD currently and in the future given various scenarios. This will allow us to model potential impacts of CWD on the deer herd, including survival and abundance. Additionally this information may provide insight on management adjustments that could limit CWD distribution and prevalence. In addition to the application to the CWD Management Zones it will allow MDC to evaluate the impact of various management practices on CWD prevalence and distribution. Also, the study will provide the ability to compare various monitoring strategies, thus increase our ability to detect CWD early so that management efforts can be effective, while ensuring the efficient use of resources.

The CWD sampling and surveillance model is completed and currently being used to evaluate surveillance confidence throughout the state. A second model, the infection dynamics model, has recently been completed and has yet to be evaluated. The infection dynamics model will allow us to simulate the spread of CWD across the landscape based on specific parameters related to county-level deer populations and evaluate the effect of different management scenarios on the spread and prevalence of the disease.

Deer Survival, Recruitment, and Movements in Two Contrasting Habitats

The Missouri Department of Conservation and the University of Missouri have initiated a 5-year study to evaluate deer survival, reproduction, and movement patterns within two contrasting habitats with application to deer population models (e.g., SPR), disease management protocols (e.g., development of CWD Management Zones, Core Areas) and localized deer management efforts.

This study is occurring in both the Ozarks and Northwest portions of Missouri that represent contrasting compositions of public land, habitat, and harvest regulations. Trapping efforts began in January 2015 to capture, GPS-collar, and monitor deer of all age and sex classes within both study areas. Our annual target sample size is a total of 180 deer (i.e., 30 adult bucks, 30 yearling bucks, and 30 does in both regions) between both regions from the winter capture. We captured 100, 132, and 139 deer during winter 2015, winter 2016, and winter 2017, respectively. Including carryover from the previous year, we are currently monitoring 205 collared deer, not including fawns. We capture fawns each spring with the use of VITs implanted in pregnant does during winter captures and also opportunistic methods. Over three years, a total of 226 fawns have been captured, radiocollared, and monitored for survival.

Seasonal Movements of Deer Associated with Small Crop fields

A new research project began in summer 2016 aimed at gaining a greater understanding of deer movement ecology related to small cropfields in Southeast Missouri. Browsing by deer can cause damage to soybean fields during the spring and summer, especially if these fields are small and surrounded by forested terrain. Damage permits are sometimes issued to farmers to reduce the local deer densities during the spring and summer, but this method has generally been unsuccessful at reducing damage problems and is unpopular with local hunters. The best option is to work with farmers reporting damage to reduce local deer densities during the fall deer seasons – but it seems deer are no longer present on the properties after the soybean fields are harvested. Are these deer making seasonal migratory movements? Or are they using refugia near the soybean fields during the fall and winter? To answer these questions, MDC staff will be capturing deer during the summer 2016-2018 that are using cropfields and fitting them with GPS

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collars. These collars will allow staff to track movements of deer throughout the year. The results of this project will be used to target efforts to reduce localized deer densities at the appropriate scale surrounding damage areas, and will have application to similar landscapes throughout Missouri. During summer 2016, 18 adult does were captured and collared. We plan to collar an additional 34 adult does during summer 2017. Preliminary movement data suggests does are primarily residents of the properties where they are captured with very little seasonal movement.

Factors affecting firearms deer harvest and hunter satisfaction, perceptions, recruitment, and retention

The Missouri Department of Conservation (MDC) has experimented with hunting regulations intended to achieve deer population objectives, improve hunter satisfaction and facilitate recruitment and retention of deer hunters. An experimental 4-point antler restriction (APR) was implemented in 29 counties from 2004-2007 to facilitate deer population management and improve male deer age structure. MDC established experimental and control counties and collected pre- and post-treatment data. Firearms deer hunter information surveys also were conducted during the study period. MDC expanded the APR to include 65 counties in 2008 with a few additions since then. In 2012, because of the discovery of chronic wasting disease, MDC removed the APR from 6 northern counties; additional counties have been removed since 2012. MDC conducted preliminary analyses but has not done a thorough evaluation of the biological and social impacts of the APR, especially since the expansion in 2008. The objectives of this project are to 1) Assess the effect of the APR on the number and age structure of deer taken during the firearms deer season, 2) Assess firearms hunter attitudes toward the 4-point antler restriction, and 3) Assess deer hunter recruitment and retention in Missouri. Manuscripts have been completed and are in the review process for objectives 1 and 2.

Progress towards Objective 3: We used information from the telechecked deer harvest, the point-of-sale permit system, hunter information mail surveys conducted 2005-2008 and 2011-2013, and census data (Missouri Census Data Center) to create datasets which include the demographics, deer permit-buying history (2001-2015), permit-buying rates, deer harvest success, and various perceptions, attitudes, and hunting activities of individuals who received a deer hunter attitude survey during at least one of the years 2005-2008 and 2011-2013. These datasets were used to develop hunter typologies and will be the bases for "survival" analyses to assess hunter recruitment and retention. From this analysis we will project future trends and determine factors that affect hunter recruitment and retention. We will make recommendations based on these analyses on what hunter groups MDC might target to increase recruitment and improve retention of deer hunters.

XI. Hot Topics

Captive Cervid Litigation update: The judge in the case of Donald Hill et al. (members of the Missouri Deer Association) vs. the Missouri Department of Conservation ruled in favor of Hill et al. in September 2016. The suit put forward by Hill et al. claimed that 1) MDC does not have authority to regulate privately owned deer and 2) the regulations violate the Right to Farm Amendment. As a result of this ruling, the following regulations put forth by MDC for captive cervid facilities cannot be enforced:

- No live importation into the state
- Fencing standards
- Mandatory CWD testing of all mortalities for both breeding operations and shooting facilities
- Mandatory CWD positive reporting

Missouri Deer Program Report
By: Barb Keller and Kevyn Wiskirchen



- Specific herd and movement records documentation and retention
- New facility exam
- No new facility within 25-miles of CWD positive cervid
- CWD certification Program / Herd Plan

This ruling is currently being appealed by MDC.

XII. Relevant Links

2017-18 Fall Deer & Turkey Hunting Booklet

<https://huntfish.mdc.mo.gov/sites/default/files/downloads/2017FDT.pdf>

White-tailed Deer Management Plan

http://mdc.mo.gov/sites/default/files/resources/2014/05/deer_management_plan.pdf

APPENDIX I

NEBRASKA



NEBRASKA DEER STATUS REPORT



2017 Midwest Deer & Wild Turkey Group
 Kit Hams, Nebraska Game and Parks Commission
 Moravia, Iowa / Honey Creek Resort
 August 28-30, 2017

I. Current Harvest

Total deer harvest was 58,104, consisting of 46,920 whitetail and 11,184 mule deer. WT buck harvest decreased 4% to 27,241 and ranks 10th all-time. MD buck harvest increased 4% to 9,257 and ranks 1st all-time.

Mule deer and whitetail deer are mostly recovered from the EHD/drought losses of 2012 and meningeal worm losses to mule deer in 2010-2011.

Deer Harvest: 2016-2017

Permit	Adult Bucks		Antlerless		Permits Sold	Success Rate
	MD	WT	MD	WT		
Nov. Firearm	4,971	13,235	241	4,762	42,998	54%
Landowner	1,430	3,443	464	1,849	14,079	51%
Statewide Buck	482	3,553	0	39	12,630	33%
Youth	1,439	2,967	210	1,145	12,005	48%
Archery	512	2,834	56	625	17,373	23%
Muzzleloader	407	848	94	498	7,742	24%
Season Choice AO	21	190	774	5,691	19,311	35%
River Antlerless	1	169	22	4,946	9,065	57%
Total	9,257	27,239	1,861	19,555	135,440	

II. License and Season Information

Deer permit sales the past ten years ranged from 122,000 to 142,000. 135,440 permits were issued in 2016 (residents purchased 87%). A minor permit fee increase took place in 2016. Total deer permit revenue was \$6.1 million.

\$7 youth deer permits are important to youth permits were available to all resident and nonresident youth age 10-15. Youth permits are valid statewide with minor exceptions.

Bonus “free” antlerless WT permits are added to existing permits in units we are unable to increase harvest by increasing permit quotas.

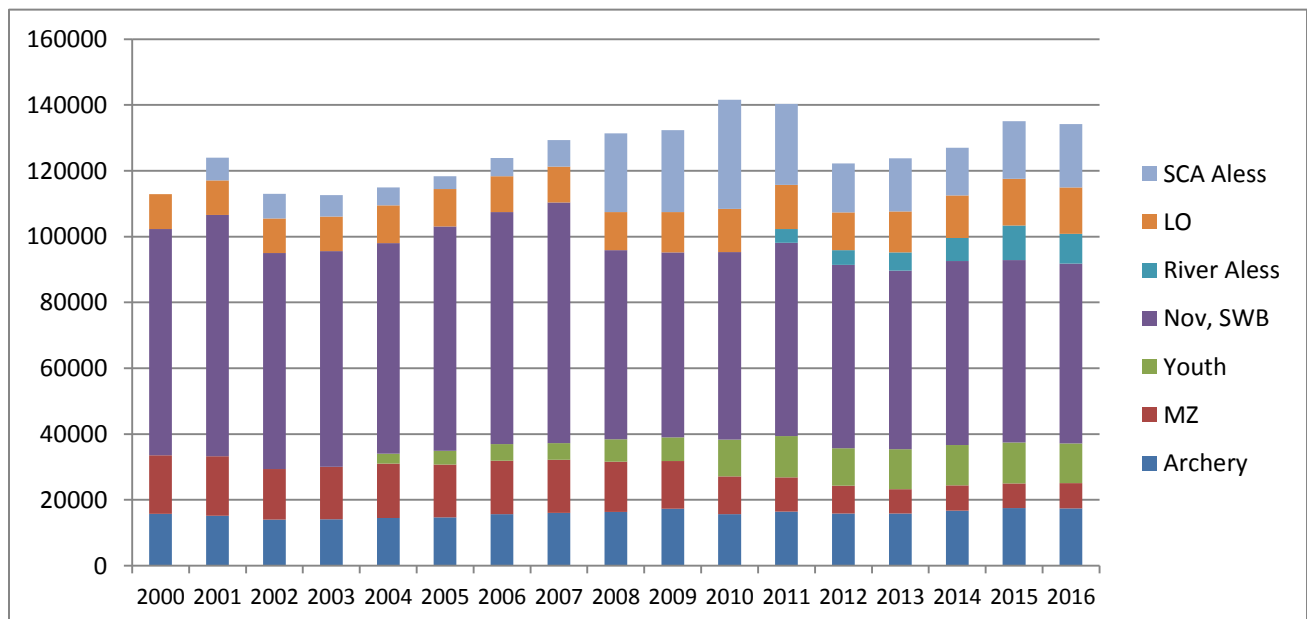
2016 License and Permit Fees

License	Resident	Nonresident
Youth Deer	\$7	\$7
River Antlerless	\$12	\$62
SCA Antlerless	\$31	\$62
Landowner	\$16.50	\$109
AR, MZ, Firearm	\$31	\$216
Statewide Buck	\$74.50	\$537
Habitat Stamp	\$20	\$20

2016 Season Dates

Archery	Sept. 1 – Dec. 31
November Firearm	Nov. 12-20
December MZ	Dec. 1-31
Antlerless	Sept. 1 – Jan. 15
Statewide Buck	Sept. 1 – Dec. 31
Youth and Landowner	Sept. 1 – Jan. 15

Deer License Sales 2000-2016



III. Historical Harvest

Nebraska's first deer season was in 1945 when 361 mule deer were harvested. Harvest of MD bucks peaked in 2016 at 9,257. Two WT bucks were harvested in 1945. WT buck harvest surpassed MD buck harvest in 1969 when 5,700 WT bucks were harvested. WT herds peaked in 2010 (38,000 bucks harvested) and crop damage exceeded landowner tolerance. Aggressive harvest reduced herds in some units and large EHD losses in 2012 reduced herds by 30% in much of the state. Current deer populations are at acceptable levels.

IV. Population Trends

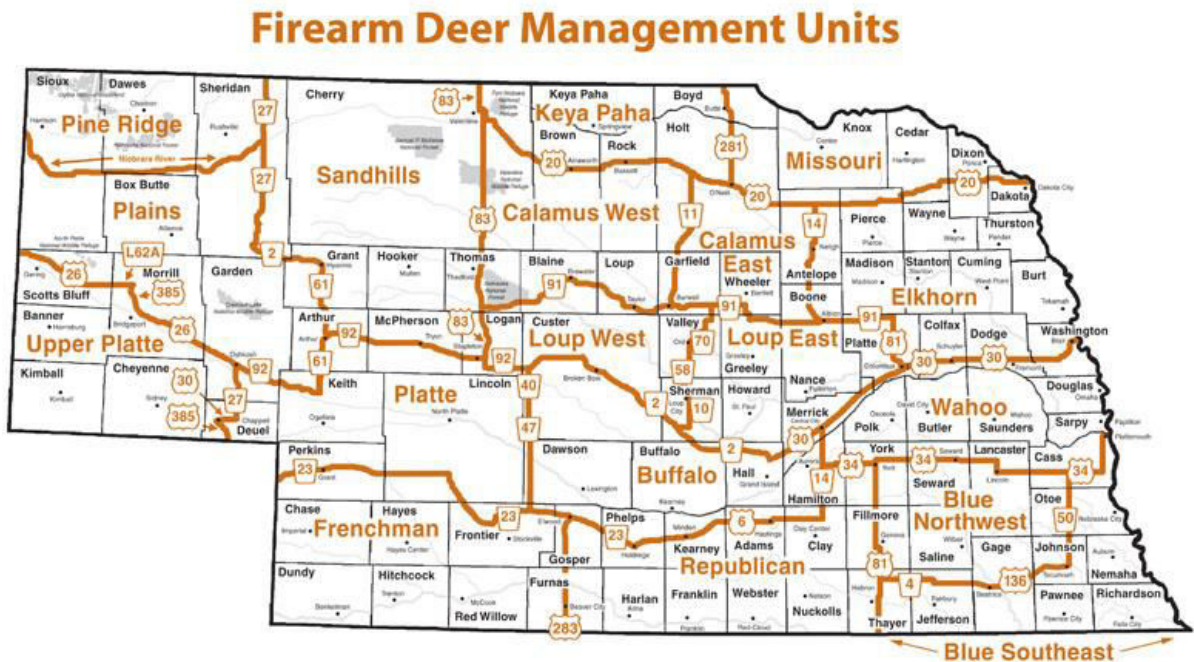
Whitetail populations have generally increased until interrupted by aggressive antlerless harvest and EHD events. Current goals are to allow limited herd growth in units with large EHD losses in 2012. Increased use of liberal antlerless seasons and permits has been somewhat effective in controlling herd growth.

Mule deer herds are increasing in most western units and generally grow in response to low doe harvest.. Eastern MD units struggle to maintain viable populations regardless of management actions. Restricted doe harvest and favorable weather the past 4 years has allowed mule deer to grow. Significant

Buck harvest is our primary indicator of population trends.

V. Management Units

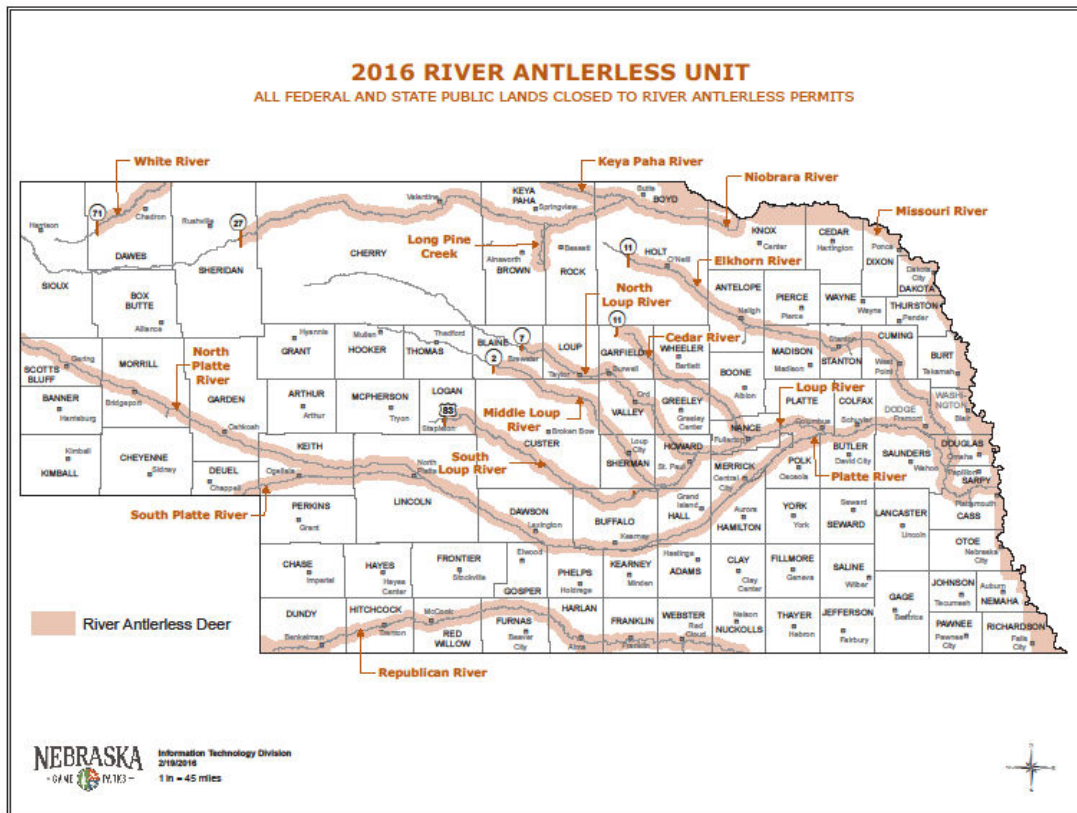
There are 18 deer management units with harvest objectives for each unit.



VI. Urban / Special Hunts

There are a limited number of park and refuge hunts that allow deer hunting in state parks that are normally closed to hunting. Total annual harvest ranges from 100-300.

The “River Antlerless Unit” directs antlerless whitetail harvest to 10,000 sq. miles of river corridors where the majority of crop damage complaints occur. All permits are \$14 and valid for two antlerless whitetail during the 137 day season. 12,000 permits for two antlerless WT were authorized. 9,065 permits were issued. 5,139 deer were harvested.



VII. Regulation / Legislation Change

No major regulatory or statute changes in 2016.

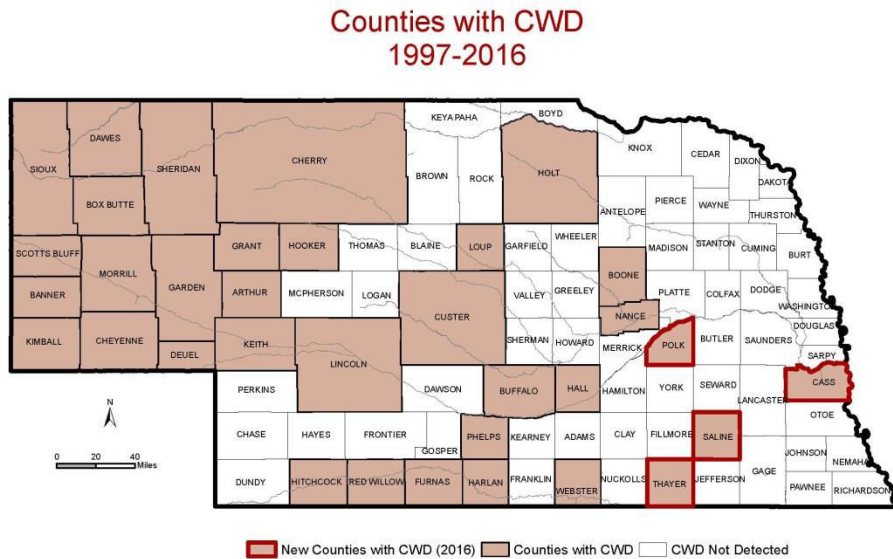
VIII. Management Assistance/Crop Damage

Landowner damage permits are given to landowners experiencing excessive crop damage. Most problem areas are associated with “defacto refuges” where hunting is limited on adjacent private land. Permits are free to landowners experiencing damage. Carcasses must be utilized for human consumption. Annual kill ranges from 50-500 statewide. Less than 100 were killed in 2016.

IX. Disease Issues

No significant losses were reported due to EHD, CWD or Meningeal worm in 2016.

CWD has been present in Nebraska for 20 years and is now present in about 50% of the state. In 2016, 759 deer were sampled in Southeast deer units and CWD was found in five new counties (1% infection rate). Six deer units in Southwest and Panhandle regions of Nebraska will be sampled in 2017. This includes the Pine Ridge unit where CWD infection rate was 6% when last sampled in 2011.



X. Research

Population estimate of elk based on DNA in fecal samples was initiated in 2015.

XI. Hot Topics

The spread of EHD and the increased threat for transfer to humans is a concern.

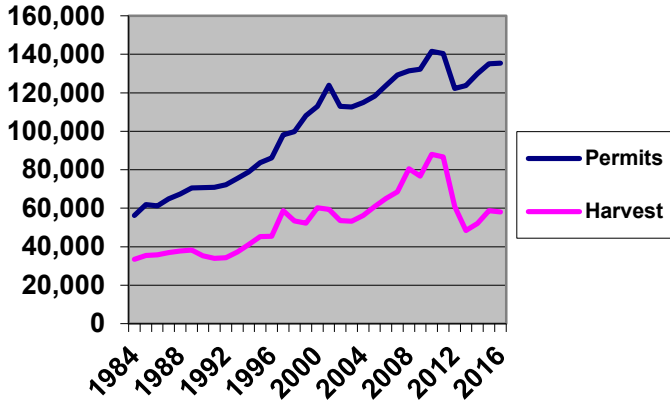
XII. Relevant Links

2016 Big Game Guide: <http://digital.outdoornebraska.gov/i/678699-big-game-guide-2016>

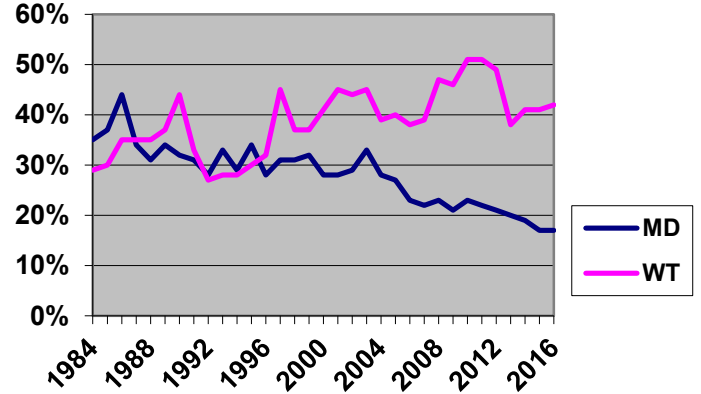
2017 Big Game Guide: <http://digital.outdoornebraska.gov/i/822519-big-game-guide-2017>

Nebraska Deer Season Statistics (1984-2016)

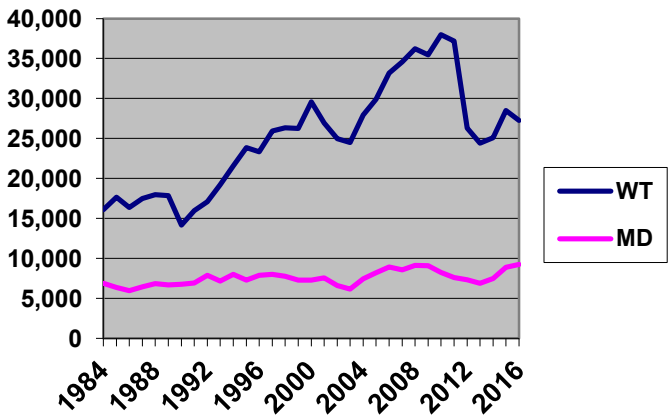
Deer Permits & Harvest



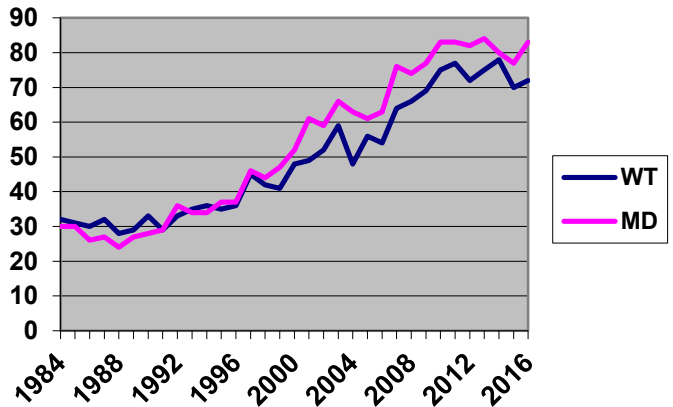
% Antlerless of Total Kill



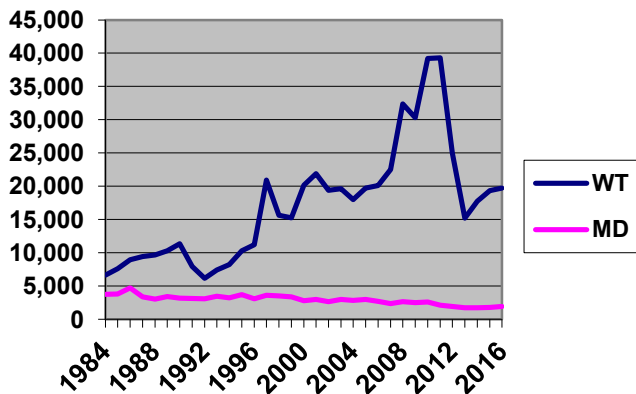
Buck Harvest



Age of Bucks - % Age 2+



Antlerless Harvest



APPENDIX J

NORTH DAKOTA

2017 North Dakota Deer Project Report for Midwest Deer and Turkey Study Group

Bill Jensen, Big Game Biologist
North Dakota Game and Fish Department
100 North Bismarck Expressway
Bismarck, ND 58501
E-mail: bjensen@nd.gov Phone: 701-220-5031

I. Current (2016) Deer Harvest

Season	License Issued	White-tailed Deer Harvested	Mule Deer Harvested
Youth Gun ¹	4,593	1941	166
Archery	26,755	10,985	806
Regular Deer-Gun	49,000	24,870	4,431
Muzzleloader	928	348	0
Total	84,276	38,144	5,403

¹Unsuccessful youth hunters may also hunt during the regular deer gun season.

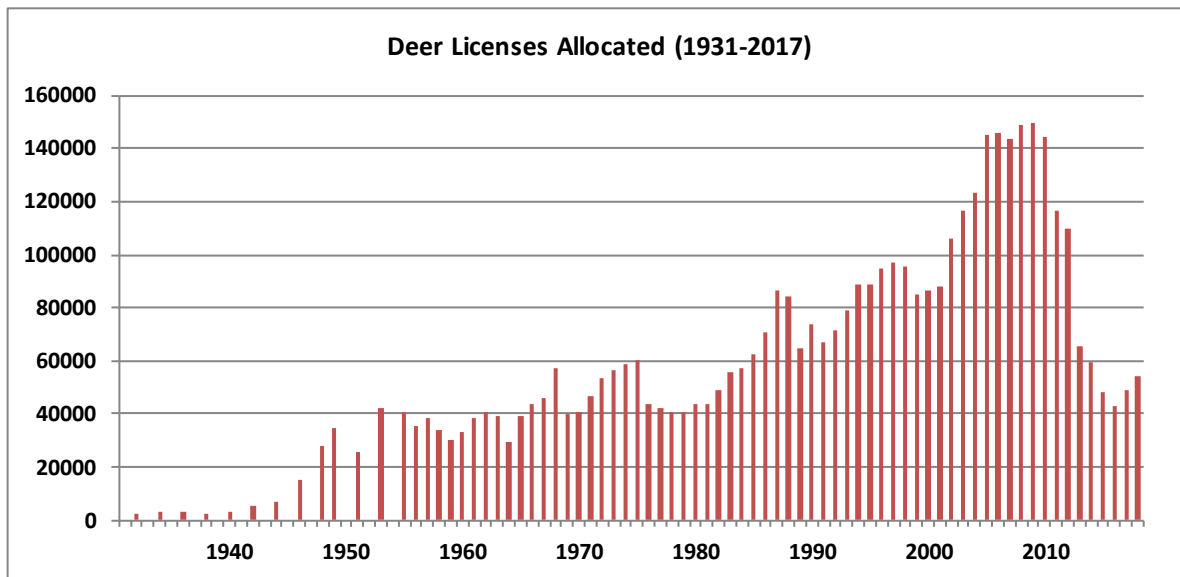
II. License and Season Information

Season	License Issued	License Description	License Cost	Season Dates
Youth Gun ¹	4,593	12-13 Antlerless WTD Statewide (limit of 1) 14 or 15 Any WTD Statewide Lottery on MD (Limit of 1)	\$10 (Under 16)	16/09/2016 to 25/09/2016

¹ Unsuccessful youth hunters may also hunt during the regular deer gun season.

Archery	26,755	Res. Any Deer Statewide	\$30 Res. \$250 Non Res.	02/08/2016 to 08/01/2017
Regular Deer-Gun	49,000	Lottery	\$30 Res. \$250 Non Res.	4/11/2016 to 20/11/2016
Muzzleloader	928	WTD Only Equals 2% of Regular Deer- Gun Licenses	\$30 Res. Only	25/11/2016 to 11/12/2016

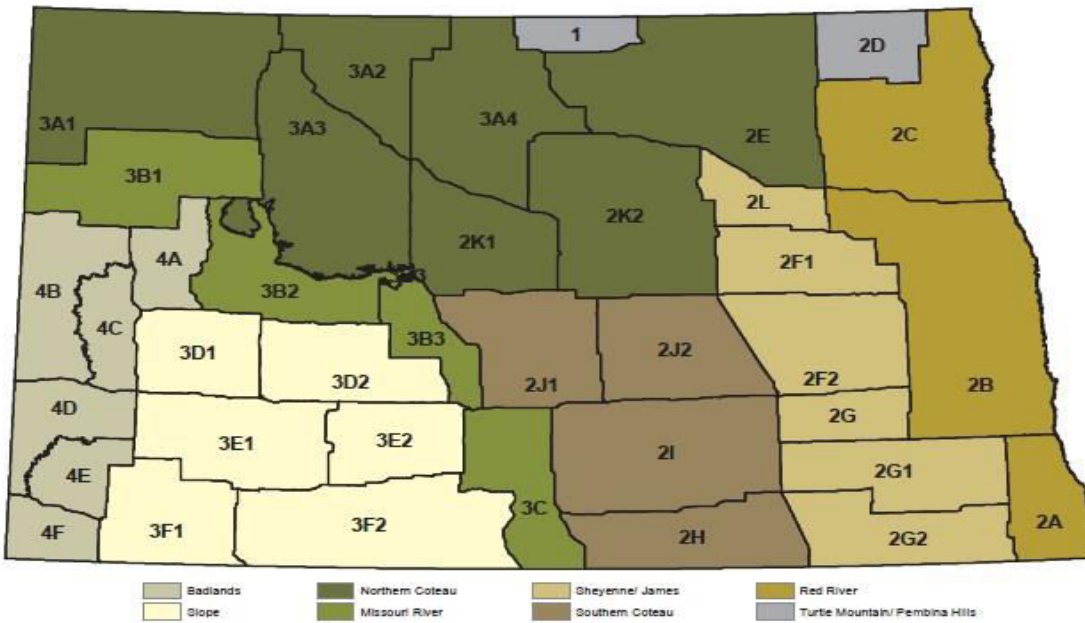
III. Historical Harvest



III. Population Trends

We use a series of population indices to set harvest rates. We do not attempt to estimate the statewide deer population. Due to recent hard winters and aggressive harvest management, deer numbers had been at their lowest levels since the early 1980s but are rebounding. This is reflected in the number of lottery licenses available for our deer-gun season.

IV. North Dakota Deer Hunting Units and Major Management Regions



V. Regulation/Legislation Changes/Management Notes

The 2017 North Dakota deer hunting season will include 54,500 licenses, an increase of 5,500 from 2016. There will not be a concurrent season again in 2017 (hunters will be allowed only one license for the gun season).

Management Notes:

Population and harvest data indicate the state's deer population is stable to increasing due primarily to eight years of reduced gun licenses combined with milder winter weather. Consequently, there will be a conservative increase in deer licenses allocated in 2017 to increase hunting opportunities while continuing to encourage population growth. The statewide hunter success rate in 2016 was 66%, which was similar to 2015 (68%), and just below the goal of 70%.

Deer numbers remain below objectives in most units due to prolonged effects of severe winters during 2008/09-2010/11, which not only increased adult mortality but also reduced fawn production. The extreme winter conditions followed nearly a decade of aggressive deer management that featured large numbers of antlerless licenses in most units. In addition, the northeastern part of the state also experienced severe winters during 2012-2013 and 2013-2014, which continued to impede population recovery. The 2016-2017 winter varied from extremely mild in the southeastern part of the state to severe in the north-central and northeastern part of the state. Severe winter conditions occurred during December, but February and March experienced above normal temperatures and little snowfall, which lessened the overall impact of the winter.

Further, high quality deer habitat continues to be lost statewide (e.g., conversion of CRP acres to cropland, removal of shelterbelts, burning and draining of cattail sloughs, unprecedented oil development in the badlands) which limits the potential for population recovery.

Biologists surveyed 26 of 32 hunting units with winter survey blocks in January and February.

Changes in Deer Numbers in Management Regions:

Slope: White-tailed deer are generally at the same level as 2011 and 2013 when comparing our aerial survey information.

Whereas mule deer have shown some slight increases.

Missouri River: White-tailed deer numbers are at higher level compared to 2013 when comparing our aerial survey information.

Coteau: Most units have shown an increase in deer numbers.

Souris Des Lacs: 3A4 is about the same as 2013 when comparing our aerial survey information.

Turtle Mountains (1): Deer are at a lower level compared to 2013 when comparing our aerial survey information.

Devils Lake (2L), Pembina Hills (2D), and Upper Red River Valley (2B & 2C): Deer are at the same level compared to 2013 when comparing our aerial survey information.

Sheyenne – James Units (2F1, 2F2, 2G, 2G1, and 2G2) were not surveyed due to poor snow conditions.

The 2017 badlands mule deer spring index increased by 16% from 2016. The population index increased for the fifth consecutive year, due to no antlerless harvest from 2012-2015 and milder winter conditions. Improved fawn production in 2013-2016 is a major factor contributing to the upward population trend. The badlands mule deer spring index decreased by 49% in the previous five years due primarily to record low fawn production following the severe winters in 2008/09-2010/11. A conservative management approach will continue for mule deer in the badlands for 2017. No antlerless mule deer licenses will be issued in hunting unit 4A due to higher winter mortality, which caused a slight decline in mule deer numbers from 2016. This restriction applies to sportsmen gun licenses, any-deer archery licenses, gratis licenses, and youth licenses. Mule deer numbers are above the population objective and long-term average in the southern badlands and within hunting units 4B and 4C in the northern badlands. Therefore, the number of antlerless mule deer licenses will be increased in 4D (200), 4E (150), and 4F (150). Antlerless mule deer licenses will also be issued in 4B (150) and 4C (150) for the first time since 2011. Harvesting antlerless mule deer will also be permitted in hunting units 3B1, 3B2, 4B, 4C, 4D, 4E, and 4F with a gratis license, antlerless mule deer license, any-deer archery license, or youth license.

- * 54,500 licenses available for the 2017 regular season. This is an increase of 5,500 licenses from 2016.
 - Any Antlered licenses increased by 1,450
 - Any Antlerless licenses increased by 1,750
 - Antlered white-tailed deer licenses increased by 550
 - Antlerless white-tailed deer licenses increased by 950
 - Antlered mule deer licenses increased by 200
 - Antlerless mule deer licenses increased by 600

- * Antlerless mule deer license will be issued in hunting units 3B1 (50), 3B2 (50), 4B (150), 4C (150) 4D (200), 4E (150), and 4F (150); however no antlerless mule deer licenses will be issued in hunting unit 4A.

- * A total of 1,022 muzzleloader licenses will be available in 2017. The total is comprised of 511 antlered white-tailed deer licenses and 511 antlerless white-tailed deer licenses. This is an increase of 94 muzzleloader licenses from 2016.

- * In 2017, there will be 245 “I” licenses available for the youth deer hunting season. This is an increase of 20 licenses from 2016. “I” licenses are limited in number for units 3B1, 3B2, and 4A-4F, and are valid for any deer, except antlerless mule deer in unit 4A. There are unlimited “H” youth deer hunting licenses that are valid for any deer statewide except mule deer in the above restricted units.

- * A total of 382 nonresident any deer archery licenses are available for 2017. This is an increase of 101 any deer archery licenses from 2016. The number of nonresident any deer archery licenses will increase to 502 in 2018

VI. Urban/Special Herd Reduction Deer Seasons

Three special concurrent experimental deer bow seasons are proclaimed for portions of the City of Bismarck, and private land in Burleigh County located adjacent to the City of Bismarck. The private land in Burleigh County is described as follows: starting where the southwest boundary of the city limits of Bismarck joins the east bank of the Missouri River, then following the city limits of Bismarck easterly to the point where it meets the west bank of Apple Creek in the northeast one-quarter of Section 26, Township 138 North, Range 80 West, then following the west bank of Apple Creek in a general southwest direction to its junction with the north boundary of Apple Creek Wildlife Management Area (WMA) and then west and south along the WMA boundary to the Missouri River, then following the east bank of the Missouri River to the point of origin. This does not include the NDDOCR property referred to in Section 4(E).

Hunters who desire to hunt within the city limits of Bismarck must receive a trespass permit from the Bismarck

Chief of Police (701-223-1212), prior to being issued up to three special deer bow licenses from the Game and Fish Director. Hunters will be restricted to those dates and locations specified on the trespass permit(s). No orange clothing is required when hunting within the Special Herd

Reduction areas unless required by city officials within city limits. In addition, hunters may use their Deer Bow license during the Deer Bow season (2 September 2017 through 8 January 2018) after obtaining a trespass permit. In the area outside the city limits of Bismarck no trespass permit is needed. These licenses are available only at the North Dakota Game and Fish Department headquarters in Bismarck.

VII. Deer Management Assistance/Crop Damage Harvest

Depredation Assistance Program - provides funding for activities used to alleviate/minimize damage to private livestock feed supplies caused by big game animals (manpower, technical assistance, temporary fencing, repellents, scare devices, and deer-proof hay yard fences). Payments will not be made for damage caused by wildlife. Since 2005 the department has been facilitating a program that couples producers that have chronic deer depredation problems with hunters interested in harvesting antlerless does. Interested hunters enter their contact information on our website. Landowners determine how many hunters they are willing to host. The predetermined number of hunters are randomly selected from the website and sent a letter with the phone number of a landowner wanting deer removed. Over the past decade the number of landowners in the program has gradually declined as deer depredation problems have been reduced and hunters have developed relationships with landowners.

VIII. Disease Issues

North Dakota Game and Fish Department Wildlife Disease Report for MAFWA WHC Meeting April 2017

Prepared by Dan Grove, DVM
Wildlife Veterinarian NDGFD

CWD

Background: In 2007 the NDG&F revised their hunter-harvested deer CWD surveillance strategy to increase sampling efficiency and efficacy. Six surveillance units have been established with sampling occurring in two surveillance units each year (See Map 1). This allows collection and sampling efforts to be focused in one-third of the state and for all surveillance units to be sampled over a three year period. All age classes are sampled for CWD.

2016 Surveillance: In 2016 the NDG&F collected and submitted 56 samples for CWD testing from targeted surveillance animals and 1513 from hunter harvested animals (See Table 1 for breakdown by species). Targeted surveillance occurs statewide and continues year-round. Samples from free-ranging cervids which exhibit signs consistent with CWD, died of unknown causes, were road killed, or were removed due to destruction of captive cervid facilities are considered targeted.

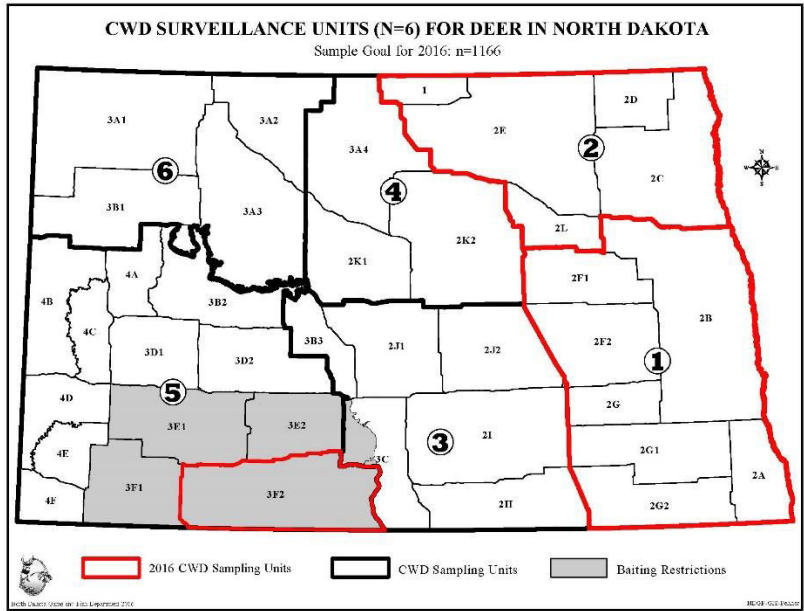
The goal for the 2016 hunter-harvested surveillance was to collect 916 deer samples (458 from 2 units) from eastern ND, which should allow for detection at 1% prevalence with 99% certainty..

Two adult mule deer bucks in 2016. Both animals were from DHU 3F2 (see Map 2 for locations)

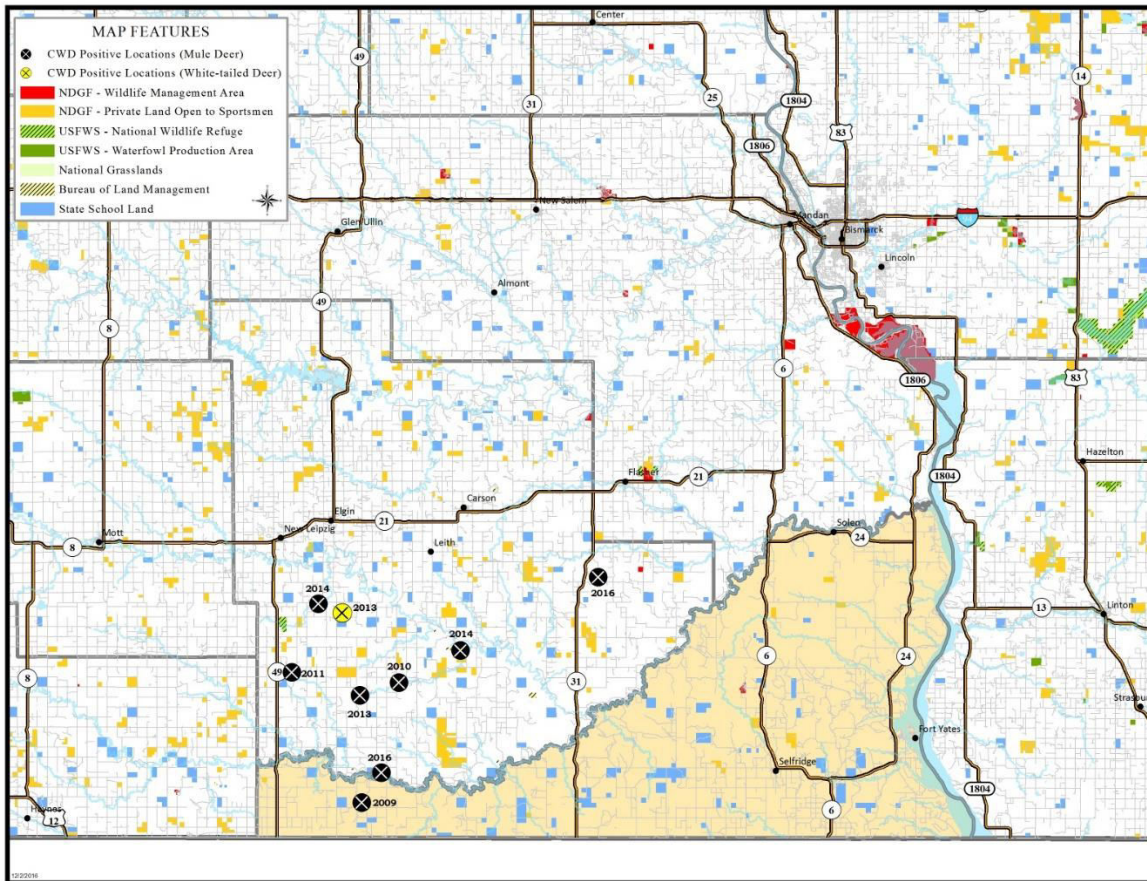
Table 1. Free-ranging cervids sampled for CWD as part of Hunter Harvested and Targeted Surveillance in ND

Species	Number Tested in 2016 HH (TS)	HH + TS Cumulative Testing 2000-2016	Number Collected as of April 1, 2017
White-tailed Deer	1220(20)	24274	54
Mule Deer	221(13)	4879	4
Elk	32(0)	1158	2
Moose	40(23)	467	10
Total	1513(56)	30778	70

Map 1. NDGFD CWD Units Sampled Fall 2016



Map 2. ND CWD Positives Map 2009-2016



RABIES

In 2016 rabies surveillance was conducted by the ND Department of Public Health and NDSU Veterinary Diagnostic Laboratory on suspect animals that involved human and domestic animal exposures.

In 2016 a joint effort to increase rabies surveillance from wildlife was conducted by NDGFD, NDPHD, NDSU VDL and USDA-WS. Surveillance animals were collected from routine trapping efforts performed by USDA-WS and NDGFD and through collection of road-kill and removal of neurologic wild animals. Sampling goals were set at 600 animals statewide.

NDGFD collected and submitted samples from a total of 56 animals in 2015. See Table 2 and Map 3 below. The majority of animals sampled by NDGFD came from apparently healthy hunter harvested animals. Additional archived samples from trapper/hunter harvested animals are still being processed at this time.

Table 2. Rabies Surveillance NDGFD 2016

Species	Total Sampled	Results
Bobcat	8	8 Negative
Coyote	6	6 Negative
Fisher	23	23 Negative
Raccoon	4	4 Negative
River Otter	12	12 Negative
Striped Skunk	3	1 Negative, 2 positive
Total	56	54 Negative, 2 Positive

VIRAL HEMORRHAGIC SEPTICEMIA

In 2016, 1 waterway was sampled for the presence of VHS in adult and young of the year Walleye. Samples were collected from Lake Sakakawea. All samples were negative for VHS. These efforts were undertaken at the behest of states that receive fish from North Dakota hatcheries.

Strychnine

Three white tailed deer were presented to the NDGFD WHL for necropsy. The deer were found dead on a property that had been having deer depredation issues. Upon examination the contents of the rumen contained grain that were brightly stained green. Samples were submitted to identify the source of the coloring. The samples tested positive for strychnine. See photos below. Given the volume of grain present it was presumed to be an intentional poisoning.

Image 1. Strychnine



Image 2. Strychnine



Sage Grouse Translocation 2017-2018

In April of 2017, 60 sage grouse were trapped near Rawlins, WY and translocated to Bowman County ND in a reintroduction project. As part of the import requirements into ND birds were tested for Avian Influenza, avian TB and fowl typhoid. As of 4/13/2017 approximately half of the samples for avian TB and fowl typhoid have tested negative. All samples were negative for AI. Additionally for background surveillance samples were collected for Mycoplasma and West Nile Virus. Results are still pending for these tests.

IX. Research

A Summary of activities conducted for the *Evaluation of the Life History Parameters and Management of White-tailed Deer in the Northern Great Plains* project during Fiscal Year 2017. Eric Michel, SDSU Postdoctoral Research Associate

Introduction

Past Analyses

Our goal for Fiscal Year 2017 was to evaluate different life history aspects of white-tailed deer (*Odocoileus virginianus*) that affected fawn survival and habitat use. In our first analysis, we assessed what landscape-level and environmental factors influenced fawn survival at one- and three-months of age. These two time periods are ecologically important as fawns avoid predation by displaying a hider strategy early in life then transitioning into a flight strategy once they become more mobile (Lent 1974, Carl and Robbins 1988). We found that fawns displayed increased survival when they experienced warm temperatures and increased total rainfall in June. This may indicate that a flush in spring vegetation (influenced by temperature and precipitation) may influence fawn survival by affecting vegetation quality and quantity leading to improved lactation efficiency for the dam (Landete-Castillejos et al. 2005, Therrien et al. 2008). We also found that patch connectance (percent of patches connected by a predetermined distance found within a fawn's home range) positively influenced three-month fawn survival. This result indicates that fawns that have shorter distances between cover patches are more likely to escape predators once they are mobile. This finding also supports previous literature showing decreased probability of fawns eluding predators with increased distance to grassland and wetland patches (Grovenburg et al. 2012a). These results emphasize the importance of understanding how both environmental and landscape level factors impact fawn survival in the Northern Great Plains. Details for this analysis were reported in the October–December 2016 Quarterly Report and have been submitted to PLoS ONE for publication.

Our second analysis assessed if any habitat types were disproportionately available to fawns relative to those available to dams. We evaluated these relationships by comparing percent habitat types found within a fawn's home range compared to that of its dam. We found a consistent pattern of the disturbed habitat type (habitat associated with farmsteads and road ditches) being greater within a fawn's home range compared to its dams while the cropland habitat type was less available in a fawn's home range compared to its dam's home range. These results indicate that the complex habitat associated with farmsteads and road ditches provide important fawning cover in agriculturally dominated landscapes. Alternatively, potential human

presence associated with these habitat types may reduce predator presence, which may increase the probability of fawn use. Similar results have been reported for elk (*Cervus elaphus*; Cleveland et al. 2012) and sharp-tailed grouse (*Tympanuchus phasianellus*; Burr et al. 2017). Additionally, if fawns and their dams are disproportionately using habitat associated with farmsteads, this could potentially result in increased wildlife-livestock interactions and increase the possibility of disease transmission. Although this scenario is speculative, it is plausible and should be considered when monitoring wildlife and livestock diseases. Managers should therefore strive to replicate the complex habitat types associated with farmsteads in areas away from the farmstead to minimize wildlife-livestock interactions. Managers should also include diverse habitat types in agriculturally dominated landscapes as percent cropland was consistently less available to a fawn compared to its dam. Details for this analysis were provided in the January–April 2017 Quarterly Report and have been submitted to the Journal of Wildlife Management for publication.

Current Analysis

Although fawns are restricted to habitat available within their dam's home range, fawns choose their specific bed site (White et al. 1972). Understanding what cover types (e.g., percent grass, forbs, row crops) and vegetative structure (e.g., vegetation height, percent canopy cover, total basal area) is associated with fawn bed sites is important as it likely influences a fawn's ability to avoid predators and thermoregulate during inclement weather. Therefore, we compared several cover types and vegetative structures found at bed sites to random points for fawns located in North Dakota and South Dakota, USA. We also evaluated if use of certain cover types varied throughout the fawning season.

Methods

Analyses were based on fawns captured in Burleigh, Dunn, and Grant counties, North Dakota and Perkins County, South Dakota, USA. Fawns were captured in Burleigh County, North Dakota from 20 May to 30 June, 2011 and from 23 May to 23 June in Dunn and Grant counties, North Dakota and in Perkins County, South Dakota in 2014 and 2015. Reproductive female postpartum behavior as an indicator of presence of fawns (Downing and McGinnes 1969, White et al. 1972, Huegel et al. 1985) and Vaginal Implant Transmitters (Advanced Telemetry Systems, Inc., Isanti, MN, USA) were used to assist in fawn captures (Swanson et al. 2008). We captured fawns by hand or net after locating them. We wore latex gloves and stored all radio-collars and other equipment in natural vegetation to minimize scent transfer. We fitted fawns with expandable breakaway radio-collars.

Fawn's were monitored daily for the first 30 days using a truck-mounted null-peak antenna system (Brinkman et al. 2002), hand-held Yagi antennas, aerial telemetry, and omnidirectional whip antennas. Bed site measurements were collected within 39 days if fawns did not flush from their bed site upon arrival. Bed site measurements were collected immediately if fawns flushed. Vegetation measurements were collected at a fawn's bed site and at a paired random site selected within 250 meters from the bed site. Random sites were selected in similar habitat as bed sites (e.g., grassland, row crop, riparian). Vertical height and density of understory vegetation were measured at each paired site using a modified Robel pole (Robel et al. 1970) with 10 cm increments. Measurements were recorded from the center of the bed site and random

site in each cardinal direction and were averaged to determine vertical height and density of understory (Robel et al. 1970). Ocular estimation of percent cover was recorded using 5% increments for bare ground, forbs (including alfalfa), grass, litter, row crop, shrub, and tree in 24, 1.0 m² Daubenmire plots (Daubenmire 1959) spaced at 1 m intervals along 2 perpendicular transects originating at the center of bed or random sites. Tree canopy cover was estimated at six meters north, south, east, and west of bed and random sites using a spherical densitometer (Uresk et al. 1999). Tree basal area was estimated at the center of bed and random sites using a 10-factor prism (Sharpe et al. 1976).

We assessed if vegetation characteristics varied from paired random sites using a conditional logistic model and estimated odds ratios using the clogit function in the Survival package in Program R (R Core Team 2016 version 3.3.1; Therneau 2015). We developed five models describing various vegetative composition and structure components (Table 1). We then ranked each model using Akaike's Information Criterion corrected for small sample size (AIC_c) and considered models within two Δ AIC as competing (Burnham and Anderson 2002). We derived AIC_c values, number of parameters, and model weights using the AIC_c and Weights functions in the MuMIn package in Program R (Barton 2016). We assessed correlation among explanatory variables using the cor.test function and included multiple variables in a single model when $|r| \leq 0.50$. Finally, we evaluated whether percent cover of certain habitat types varied throughout the capture season using a simple linear model. We labeled the earliest fawn caught in the study as 0 and sequentially numbered each subsequent day a fawn was caught. For example, if the earliest fawn in the study was caught on 23 May then that fawn was labelled 0. If three fawns were then caught on 24 May they each were labeled 1 and so on throughout the capture period. We evaluated this relationship for percent grass cover, percent forb cover, and percent row crop as these habitat types may be mechanically altered by humans throughout the fawning season. We considered variables significant when their 95% Confidence Intervals (95% CIs) excluded 0 (Burnham and Anderson 2002, Arnold 2010). We considered odds ratios significant when their 95% CIs excluded 1.

Results and Discussion

Fawn bed sites were located in six main cover types: alfalfa, grassland, riparian, row crop, wooded, and other. Most bed sites were located grasslands (47%) followed by riparian (23%) and wooded (16%) cover types. All other cover types contained $\leq 6\%$ of bed site locations.

We observed two competing models that best described vegetation characteristics at bed sites (Table 2). Structure was our top model and accounted for 73% of model weight. Understory vegetation height ($\beta = 0.02$, 95% CI = 0.001 – 0.043, $n = 138$) was greater at bed than random sites while percent canopy cover ($\beta = 0.03$, 95% CI = -0.001 – 0.052, $n = 138$) approached significance. Mean understory vegetation height was 41.3 ± 18.9 cm and mean percent canopy cover was $14.5 \pm 23.3\%$ at bed sites. Odds ratio estimates indicated that understory vegetation height (Odds ratio = 1.023, 95% CI = 1.002 – 1.044, $n = 138$) affected fawn selection of bed sites while percent canopy cover approached significance (Odds ratio = 1.026, 95% CI = 0.999 – 1.053, $n = 138$). Probability of bed site selection increased by 2.3% for every 1 cm increase in understory vegetation height and increased 2.6% for every 1% increase in canopy cover; however, interpretation of the effect of percent canopy cover should be made with caution as its

95% CI overlapped 1. Our diversity model included the effects of understory vegetation height, percent canopy cover, and percent grass cover. We considered the diversity model to be competing ($\Delta AIC_c = 1.95$, $w_i = 0.27$, $K = 3$); however, percent grass cover was not important in the model ($\beta = 0.00$, 95% CI = $-0.021 - 0.027$, $n = 138$) and we therefore only interpreted our structure model.

Our results support Grovenburg et al. (2010; northcentral South Dakota) and Uresk et al. (1999; northeastern Black Hills, South Dakota) who also found that fawns selected bed sites with taller understory vegetation heights compared to random locations. This differs from Huegel et al. (1986) who reported that fawns in southcentral Iowa selected for bed sites with increased woody vegetation. Although Huegel et al. (1986) found that fawns were more likely to bed in woody compared to non-woody vegetation, Huegel et al. (1986) also reported that understory vegetation density was greater at fawn bed sites. This indicates that vegetative structure, not composition, which varies across the white-tailed deer's range, is most important to fawns when selecting bed sites. Increased vegetative structure at fawn bed sites could potentially help fawns thermoregulate during inclement weather likely influencing survival (Grovenburg et al. 2010, Linnell et al. 1995). Increased understory vegetation height also provides increased cover and visual obstruction from predators potentially decreasing predation risk.

Fawn use of cover types did not vary throughout the capture season. We captured fawns from 23 May to 23 June. Percent grass cover ($\beta = 0.28$, 95% CI = $-0.353 - 0.888$, $n = 110$; Figure 1a), percent forb cover ($\beta = -0.03$, 95% CI = $-0.581 - 0.503$, $n = 110$; Figure 1b), and percent row crop ($\beta = -0.07$, 95% CI = $-0.280 - 0.136$, $n = 110$; Figure 1c) did not vary by capture day indicating newborn fawn use of these habitat types likely remain constant throughout the parturition season. A conservative strategy for Land Managers who must manipulate (e.g., mow) these habitat types, particularly the grassland and forb cover types, is to wait about 30 days after 23 June to do so. A less conservative, yet likely still adequate strategy, would be to wait about 14 days after 23 June to manipulate landscapes. This will allow fawns sufficient time to develop and become mobile so they can escape any human manipulations. Although fawn use of row crops was consistent throughout the capture season, it was relatively low compared to grassland and forb cover types (Figure 1c). Therefore, harvesting crops, particularly winter wheat, is not likely to negatively impact fawn survival. Nevertheless, farmers concerned about affecting fawn use of wheat fields should adhere to harvesting winter wheat about 14 – 30 days after 23 June.

Management Implications

We recommend that Managers focus on maintaining grassland, riparian, and forested cover types, particularly in agriculturally dominated landscapes, as those cover types contained over 75% of all bed site locations. An understory vegetation height of at least 41 cm should be managed for and, if possible, promoted in areas adjacent to wooded cover types allowing for inclusion of the canopy cover component, which also is likely to be important in bed site selection. Finally, habitat manipulation (e.g., mowing) should not occur until at least 7 July allowing most fawns to become mobile and escape machinery.

Next Quarter Goals

We will prepare the results we present here for submission to the *Journal of Wildlife Management*. We will then begin to combine and format location data of adult females into a single master database. Our first analysis for adults will assess whether habitat complexity influences home range size, migration tactic (i.e., migrator, resident, late-season movement), and migration distance. We will also begin preparing an extension publication for use by State Agency Biologists and the general public. This publication will inform Agency Biologists how to evaluate fawning habitat on properties that are being considered for acquisition as well as landowners interested in improving habitat on their properties. This extension publication will also inform Agency Biologists and private land owners about the type of habitat need to promote increased fawn survival.

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Table 1. List of variables included for each of five models describing various vegetation characteristics and structure found for 280 white-tailed deer fawn bed and random sites located in Burleigh, Dunn, and Grant counties, North Dakota and Perkins County, South Dakota, USA.

Model Name	Variables Included
Grass Cover	Percent Grass
Woody Cover	Percent Tree, Shrub, Basal Area
Food	Percent Forb, Percent Row Crop
Structure	Understory Height (cm), Percent Canopy Cover
Diversity	Understory Height (cm), Percent Canopy Cover, Percent Grass

Table 2. Model results describing for five models describing various vegetation characteristics and structure found for 280 white-tailed deer fawn bed and random sites located in Burleigh, Dunn, and Grant counties, North Dakota and Perkins County, South Dakota, USA.

Model	Δ AICc	w_i	K
Structure	0.00	0.73	2
Diversity	2.00	0.27	3
Grass Cover	15.83	0.00	1
Woody Cover	16.47	0.00	3
Food	17.74	0.00	2

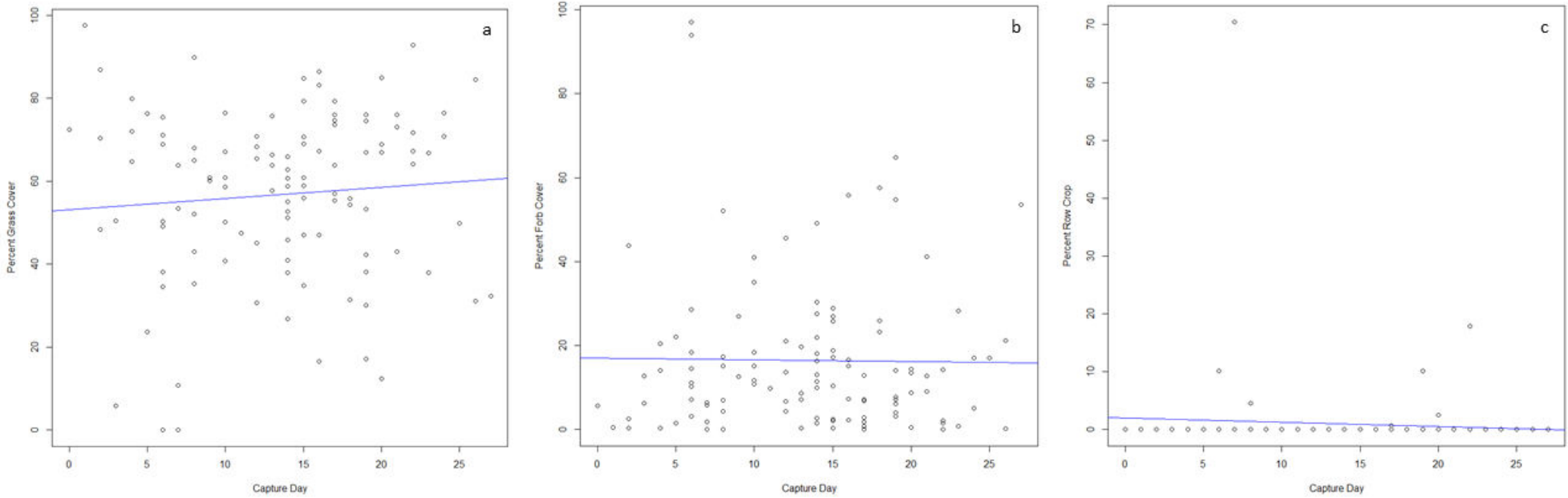


Figure 1. Relationship between percent cover types and capture day for a.) percent grass cover, b.) percent forb cover, and c.) percent row crop for 113 white-tailed deer fawns captured in Burleigh, Dunn, and Grant counties, North Dakota and Perkins County, South Dakota, USA.

EXAMINING DEER HUNTER DEMOGRAPHICS, PERCEPTIONS, AND FACTORS INFLUENCING SATISFACTION AND SUCCESS DURING A TIME OF STATEWIDE DEER POPULATION DECLINES. KRISTEN E. BLACK. 2017 (THESIS ABSTRACT).

North Dakota's white-tailed deer (*Odocoileus virginianus*) and mule deer (*O. hemionus*) populations have declined significantly since their peak in 2008-2009. This may be due to heavy harvest pressure in an effort to reduce deer depredation on agricultural crops, a series of harsh winters, habitat fragmentation or loss, predation, and disease. In 2009, about 144,400 deer gun hunting licenses were allocated through a lottery system by the North Dakota Game and Fish Department (NDGF). Interest in deer hunting in North Dakota is high, with more than 69,700 resident and non-resident hunters applying for the 43,275 licenses available for the 2015 deer-gun hunting season by a lottery system. In 2014 the NDGF became interested in learning more about the demographic composition, desires of deer hunters in the state, and in exploring potential regulatory changes. To these ends NDGF contracted with the University of North Dakota Biology Department to conduct a human dimensions survey of North Dakota deer hunters. The objectives of this study were to 1.) collect North Dakota deer hunter demographics; 2.) assess factors influencing satisfaction and harvest success in four groups of hunters: firearms, archery, muzzleloader, and landowner/gratis; 3.) evaluate the potential effects of NDGF converting to a completely computer-based licensing and surveying system; and 4.) determine public perceptions of deer population decline in the state. A questionnaire was distributed to 4,000 randomly selected North Dakota resident deer license applicants from the 2015–2016 deer hunting season during April of 2016. From the completed and returned questionnaires, NDGF will be able to make informed decisions about regulation changes for future deer hunting seasons.

EFFECT OF OIL AND GAS DEVELOPMENT ON SURVIVAL AND HEALTH OF WHITE-TAILED DEER IN THE WESTERN DAKOTAS. KATHERINE L. MORATZ. 2016 (THESIS ABSTRACT).

Oil and gas development in North Dakota has resulted in the need for information regarding how increased activity has affected white-tailed deer (*Odocoileus virginianus*) populations. We evaluated white-tailed deer ecology in response to energy development and hypothesized that oil and gas development would negatively affect adult and neonate white-tailed deer due to increased vehicle traffic and human-related effects. We captured and radio-collared adult female and neonate white-tailed deer across three study areas: Dunn County, North Dakota, an area influenced by energy development, and Grant County, North Dakota, and Perkins County, South Dakota, areas not impacted by energy development at this time. We radio-collared 84 neonates and 150 adult females during 2014 and 73 neonates and 15 adult females during 2015. We observed 31 adult female and 44 neonate mortalities during the study. Predation was the greatest source of adult female (35%) and neonate mortality (61%). Intrinsic three- and six-month fawn survival models indicated capture type (six-months: 53%, SE = 0.07 and 74%, SE = 0.05, VIT and opportunistic six-month fawns, respectively) influenced survival. Extrinsic three- and six-month fawn survival models indicated that canopy cover at capture locations positively influenced fawn survival, whereas precipitation during 3-8 weeks of age negatively influenced fawn survival (six-months: 72%, SE = 0.04). Distance to nearest oil well did not influence survival ($\beta = -0.21$, SE = 0.56). We also estimated survival rates based on study area (Dunn, Grant, and Perkins counties) and season (Post-hunt, January-April; Pre-hunt, May-August; and Hunt, September-December). Dunn County displayed the highest annual survival rate (96%, SE=0.02) followed by Perkins (93%, SE = 0.03) and Grant (75%, SE = 0.06) counties. Seasonal survival was highest (100%) during Pre-hunt and Post-hunt periods in Dunn and Perkins counties and was lowest during the Post-hunt period in Grant County (87%). We analyzed 2014 and 2015 blood serum separately because all chemistry tests in Grant County differed ($p < 0.01$) between 2014 and

2015 except aspartate aminotransferase, blood urea nitrogen, and calcium. We found differences ($p < 0.05$) in creatinine kinase, globulin, glucose, lactate dehydrogenase, magnesium, sodium, and total protein values among study areas during 2014. Pathogens with the highest antibody prevalence included West Nile Virus (85%), epizootic hemorrhagic disease (48%), and malignant catarrhal fever (32%). We speculate that low sodium values and West Nile Virus may be contributing to low neonate survival rates in Grant County. Serum chemistry differences may be attributed to differences in forage quality and availability across study areas. Our results indicated that oil and natural gas development did not negatively affect white-tailed deer survival and health. Other density-dependent factors likely explained differences in survival across study areas; nevertheless, further monitoring is needed to assess long-term responses of white-tailed deer to energy development.

Pilot Study on presence of neonicotinoid insecticides in white-tailed deer.

Recent studies have suggested that immune suppression by neonicotinoid insecticides are the root cause of declining pollinator insects, and may also be affecting a wide range of wildlife taxa. Laboratory tests have shown neonicotinoids to cause birth defects in mice and rats. We are in the process of retrieving archived liver and spleen samples from big game that were necropsied at the Wildlife Health Lab in Bismarck. A total of 264 white-tailed deer liver samples have been tested for Clothianidin. Spleen samples are also being tested. This dataset is currently being analyzed.

Additional Big Game Products:

Publications:

Moratz, K.L., B.S. Gullikson, E.S. Michel, J.A. Jenks, W.F. Jensen. (In Review). Serological Survey and Pathogen Exposure of Adult Female White-tailed Deer in the Western Dakotas. *Journal of Wildlife Diseases*.

Kristen E. Black, K.E., W.F. Jensen, R.A. Newman, and J.R. Boulanger. (In Prep.). A Typology of North Dakota Deer-Gun Hunters during a Temporal Decline of Deer Populations.

Michel, E.S., J.A. Jenks, K.D. Kaskie, and W.F. Jensen. (In Review). Assessing variation of habitat availability for white-tailed deer fawn's in the North Great Plains.

Schaffer, B.A., J.A. Jenks, W.F. Jensen, E.S. Michel. (In Review). Assessing migration strategies and cause specific mortality of adult female white-tailed deer (*Odocoileus virginianus*) in North Dakota, USA. *Canadian Journal of Zoology*.

Moratz, K.L., B.S. Gullikson, E.S. Michel, J.A. Jenks, and W.F. Jensen (In Review). Effects of energy development and capture methods on white-tailed deer fawn survival. *Journal of Wildlife Management*.

Michel, E.S., J.A. Jenks, K.D. Kaske, R.W. Klaver, and W.F. Jensen (In Review). Weather and landscape factors affect white-tailed deer neonate survival at ecologically important life stages in the Northern Great Plains. *PLOS One*.

Moratz, K.L., B.S. Gullikson, E.S. Michel, J.A. Jenks, and W.F. Jensen (In Review). Energy Development Impacts on White-tailed Deer Survival in the Dakotas. *Wildlife Biology*.

Black, K.E., W.F. Jensen, R.A. Newman, and J.R. Boulanger (In Review). Deer Bowhunter Satisfaction during a Time of Declining Deer Populations in North Dakota. *Journal of Wildlife Management*.

Jensen, W.F., M. Carstensen, J.R. Smith, J.J. Maskey, Jr., and E. Michel (In Review). Changes in North American Moose Distributions and Densities (1980-2010). *ALCES*

Jensen, W.F., J.J. Maskey, Jr., J.R. Smith, and E.S. Michel (In Review). Estimating North Dakota Moose Reproductive Parameters during a Population Increase. *ALCES*

Black, K.E. 2017. Examining Deer Hunter Demographics, Perceptions, and Factors Influencing Satisfaction and Success During a Time of Statewide Deer Population Decline. Master's Thesis. University of North Dakota. Grand Forks. 126pp.

Michel, E.S., J.A. Jenks, and W.F. Jensen. 2017. Assessing parturition date synchrony for North Dakota Ungulates. *The Prairie Naturalist*. 49: 28-30.

Christie, K.S., W.F. Jensen, and M. S. Boyce. 2017. Pronghorn Resource Selection and Habitat Fragmentation in North Dakota. *Journal of Wildlife Management*. 81(1): 154-162.

Moratz, K.L. 2016. Effect of Oil and Gas Development on Survival and Health of White-tailed deer in the Western Dakotas. Master's Thesis. South Dakota State University, Brookings. 169pp.

X. Hot Topics

We are in the process of reviewing and developing an additional white-tailed deer population index. Currently we are looking at time series analysis of long-term survey and harvest datasets (1962-2016), Statistical Reconstruction Models and Removal Models.

XI. Relevant Contact Information and Links

Department Contact Information:

North Dakota Game and Fish Department

100 North Bismarck Expressway, Bismarck, ND 58501-5095

Phone: 701-328-6300

E-mail: ndgf@nd.gov

Website: <http://gf.nd.gov/>

Midwest Deer and Turkey Study Group

Website: <http://mdwtsg.org/>

APPENDIX K

OHIO



Ohio White-tailed Deer Report | 2016-17

Clint McCoy, Deer Biologist

Mike Tonkovich, Deer Program Administrator

I. Current Harvest

The 2016-17 deer harvest was 182,169; down 3.3% from the 188,335 reported in 2015-16, and on par with the three year average. This year's harvest decrease is not indicative of population trends. Rather, it is simply a result of having "normal" hunting conditions as opposed to the early crop harvest, poor mast crop, and favorable weather on key harvest dates that artificially inflated the 2015-16 harvest. Archers accounted for 45% of all deer harvested last year.

Bucks ¹		Does		Buttons		Total		
2016	3yr avg	2016	3yr avg	2016	3yr avg	2016	3yr avg	Diff (%)

Gun									
7-day	25,514	25,537	33,236	34,914	8,008	8,094	66,758	68,545	-2.6
2-day	2,889	-	5,076	-	1,263	-	9,228	-	-

Archery									
Crossbow	25,483	24,030	20,852	21,104	4,545	4,583	50,880	49,717	2.3
Vertical Bow	15,892	15,619	13,502	14,808	2,214	2,477	31,608	32,904	-3.9
Total	41,375	39,648	34,354	35,912	6,759	7,060	82,488	82,621	-0.2

Muzzleloader	4,384	4,040	9,641	8,339	1,818	1,644	15,843	14,023	13.0
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Youth	3,232	3,383	2,001	2,334	697	818	5,930	6,535	-9.3
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Total	78,132	75,274	85,254	87,839	18,783	18,989	182,169	182,102	0.0
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¹All bucks ≥1.5 years old, including those reported as antlerless deer (antlers < 3 inches or shed bucks).



Ohio White-tailed Deer Report | 2016-17

II. License and Season Information

A hunting license and either-sex or antlerless deer permit are required to hunt deer in Ohio.* Antlerless permits were only valid in 10 urban counties during the first nine weeks of the archery season (see 'Management Units'). Seniors born on or before 12/31/1937 and disabled veterans are eligible for free licenses and permits.

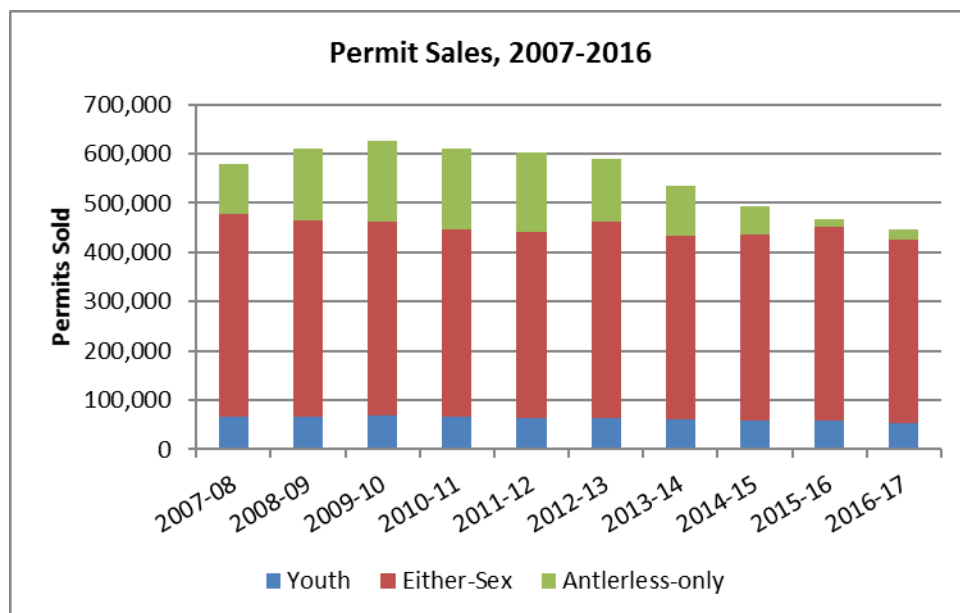
2016-17 License and Permit Fees

License/Permit	Resident	Nonresident
Adult Hunting License	\$19	\$125
Youth Hunting License	\$10	\$10
Senior License (66+)	\$10	N/A
Adult Either-sex Deer Permit	\$24	\$24
Youth Either-sex Deer Permit	\$12	\$12
Senior Either-sex Deer Permit (66+)	\$12	N/A
Antlerless Permit	\$15	\$15

*Landowners, spouse, and children are license and permit-exempt in Ohio. Grandchildren are license-exempt, but must purchase deer permits.

2016-17 Seasons (all statewide)

Archery	Sep. 24, 2016 - Feb. 5, 2017
Youth	Nov. 19 - 20
Gun	Nov. 28 - Dec. 4
Bonus gun	Dec. 17 – 18
Muzzleloader	Jan. 7 - 10, 2017



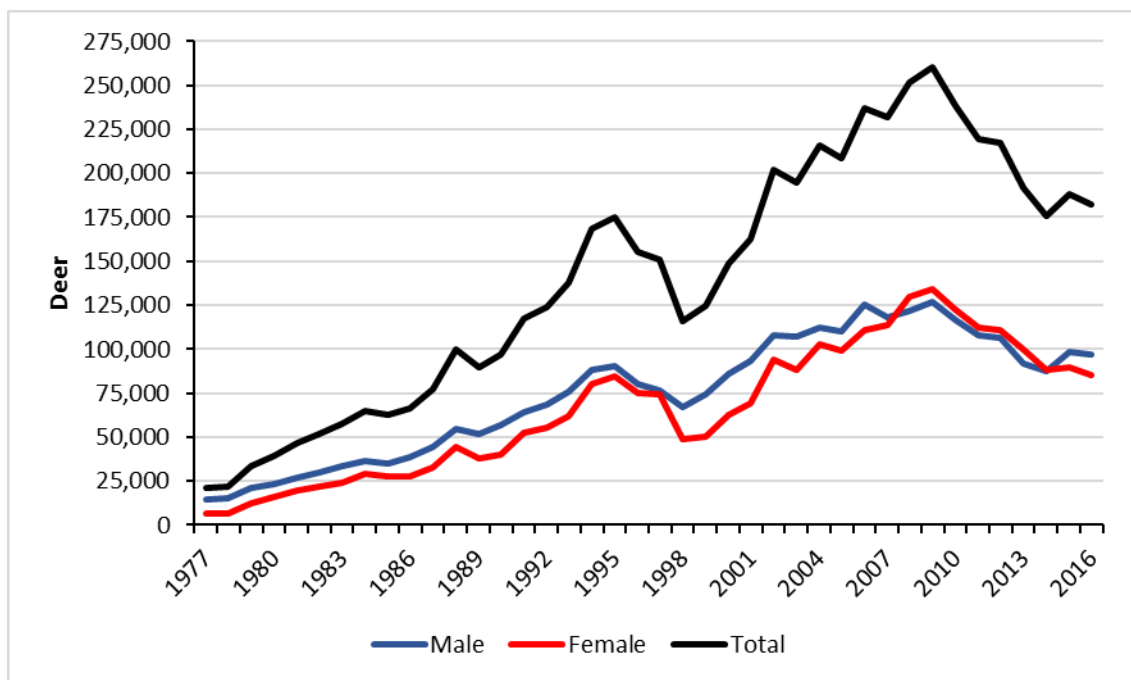


Approximate Number of Deer Hunters in 2016-17*

Type	Count
Adult Resident	216,200
Adult Nonresident	38,900
Youth Resident	39,700
Youth Nonresident	2,800
Reduced Cost Senior	18,500
Free Senior or Disabled Veteran	6,700
Total	322,300

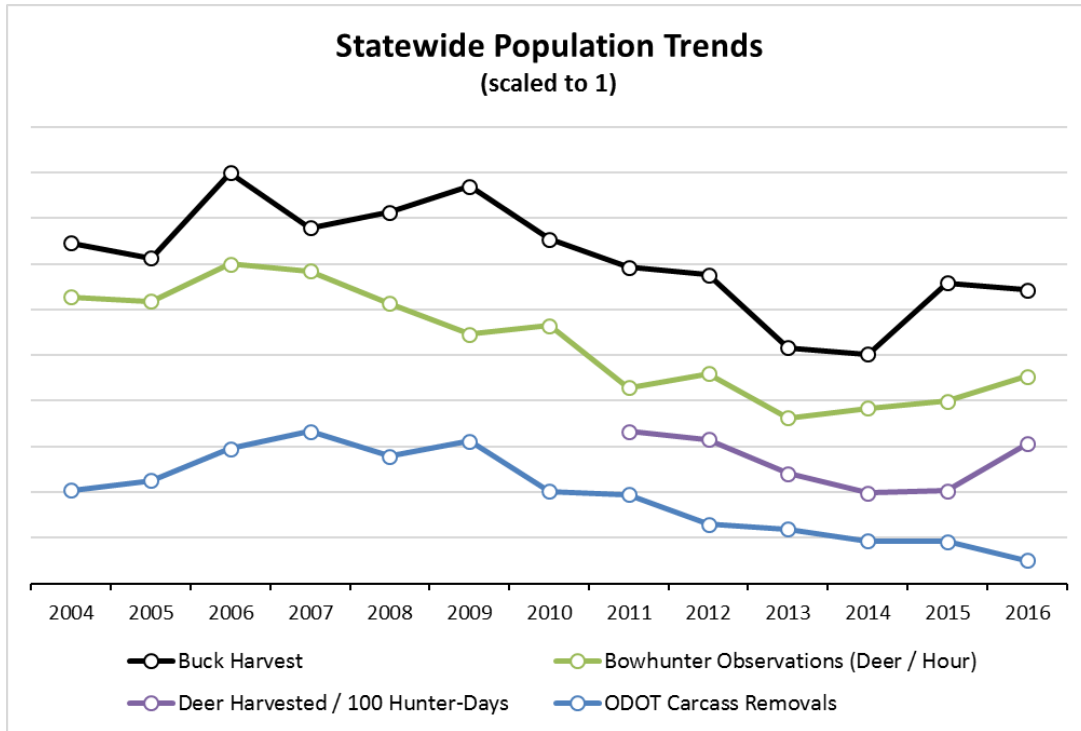
*Based on number of unique deer permit buyers. Does not include unknown number of landowners.

III. Historical Harvest

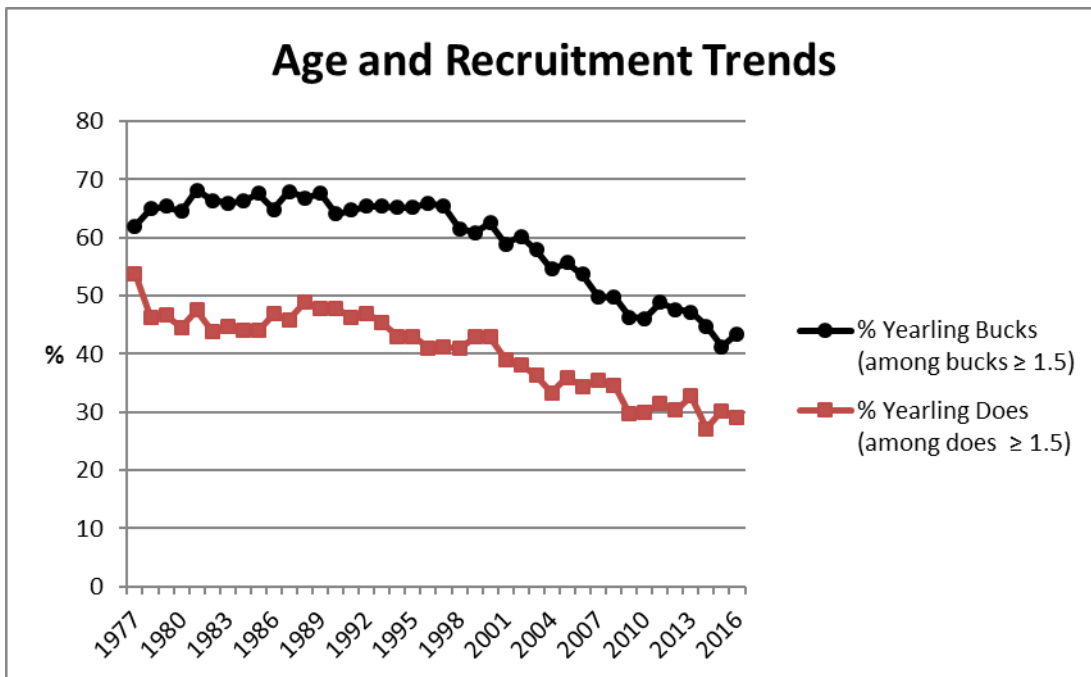


IV. Population Estimate/Trends

Population – Trend data suggest that our statewide population peaked in the mid- to late 2000s. With the introduction of the antlerless permit in 2007, significant progress was made in reducing deer populations to goal across much of the state. Recent focus across much of the state has shifted to allow limited herd growth – a population objective derived from the results of a 2015 survey of hunters and farmers (see ‘Hot Topics – Goal Setting’).



Demographics – The average age of antlered bucks in the harvest has increased steadily since the late '90s. The percent yearlings among does ≥ 1.5 has declined steadily since the late '80s, corroborating data from reproductive studies that show a decline in herd productivity.

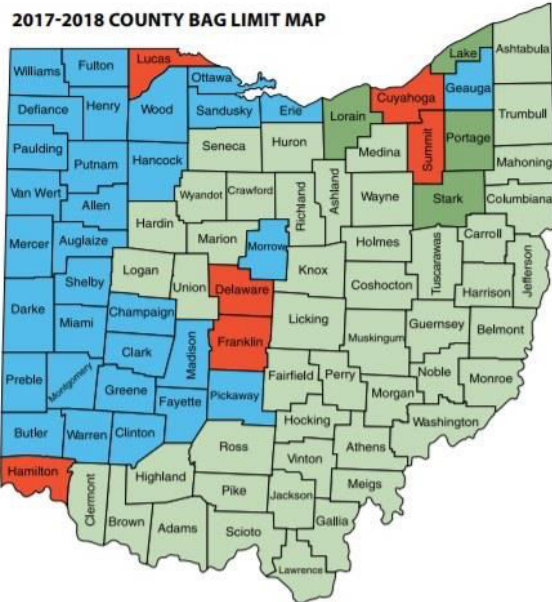




Ohio White-tailed Deer Report | 2016-17

V. Deer Management Zones: Each of Ohio's 88 counties is a deer management unit.

2017-2018 COUNTY BAG LIMIT MAP



TWO DEER COUNTY	THREE DEER COUNTY	THREE DEER COUNTY	FOUR DEER COUNTY
A hunter may kill no more than two deer in a two deer county during the 2016-2017 season.	A hunter may kill no more than three deer in a three deer county during the 2016-2017 season.	A hunter may kill no more than three deer in a three deer county during the 2016-2017 season.	A hunter may kill no more than four deer in a four deer county during the 2016-2017 season.
Up to two either-sex permits.	Up to three either-sex permits.	Up to two either-sex permits and one antlerless permit.	Up to three either-sex permits and one antlerless permit.
Antlerless permits are NOT valid.	Antlerless permits are NOT valid.	- OR - Up to three either-sex permits.	- OR - Up to four either-sex permits.

VI. Regulation/legislation

2015-2016 Season

1. The mid-October 2-day antlerless-only muzzleloader season was suspended.
2. The 2-day Bonus Gun season was reinstated between Christmas and New Year's.
3. Further reductions in bag limits and antlerless harvest opportunities to stabilize populations.
4. Non-resident license fee increase failed.

2016-2017 Season

1. The 2-day Bonus Gun season moved to mid-December (Dec. 17-18, 2016).
2. New directive concerning 'orphaned' or 'pet' deer originating from the wild. Effective June 1, 2016, those possessing deer taken from the wild will have a choice to keep it provided they: 1) apply for a free letter permit, 2) pay restitution value of the deer (\$250 for a doe, \$500 for a buck), 3) keep deer in an approved fenced enclosure (8-ft woven-wire).

2017-2018 Season

1. Bag limit adjustments to increase antlerless harvest in SE Ohio, and decrease antlerless harvest in NW Ohio.
2. Resident license fee increase failed, but non-resident fee increase successfully incorporated into budget bill. The increases will gradually occur over a 3-year period, and by 2020, will be \$175 for a hunting license and \$75 for each deer permit – a total cost of \$250 to hunt deer as a non-resident.



VII. Urban/Special Hunts

Thanks to the success of their urban deer management programs, specifically in their metro parks, Lucas County (Toledo) and Hamilton County (Cincinnati) ranked 4th and 6th (out of 88), respectively, in public land deer harvest as a percentage of the county's total harvest. In the spring of 2016, citizens voted in favor of using bowhunters to help control deer populations in six Cleveland suburbs: North Royalton, Broadview Heights, Parma, Parma Heights, Seven Hills and Strongsville. Potentially resulting from increased hunting access in these urban areas, hunters in Cuyahoga County reported harvesting 1,124 deer in the 2016-17 season – nearly a 30% increase over the prior season. Several additional cities in NE Ohio began culling operations recently (Lyndhurst, Bedford, and North Olmsted). The only national park in Ohio, Cuyahoga Valley National Park, also began deer control efforts in 2016. White Buffalo Inc. is conducting a 3-year white-tailed deer sterilization project in conjunction with Cincinnati Parks in southwest Ohio. The project started in December of 2015 with 44 deer captured (41 females, 3 male fawns). A 2nd field season in January 2017 saw an additional 10 females captured. All captured females were sterilized via ovariectomy, with two capture-related mortalities in year 1. Post-capture camera surveys estimated that 86% of the adult females in the study area were sterilized after year 1, and 89% after year 2. The stated goal of the study is to document the lowest achievable deer density using only nonlethal control methods.

VIII. Deer Management Assistance/Crop Damage

Landowners may be issued Deer Damage Control Permits (DDCP) at the time damage is occurring to kill deer during the dates and under the conditions specified on the permit. For most agricultural problems, these permits will be valid from January 1 until the start of the archery season. Under limited circumstances, permits may be extended until the start of the youth gun season (mid-November). Permits may be valid year-round to control damage at orchards, nurseries, inside municipalities, and airports. Except in the case of rub damage, permit holders are strongly encouraged to kill antlerless deer. The entire damage permitting procedure (aside from the initial field investigation) was moved to an online system in 2015 to improve efficiency. While efficiency in conducting the program (submitting complaints, scheduling site visits, distributing permits, etc.) has increased, it appears that data integrity has been compromised thus far. While complaints have dropped only 13% compared to 2014, the number of deer reported killed on damage permits has dropped 41%. Of the 6,414 permits authorized in 2016, only 2,560 deer were reported killed (40% permit fill rate). Under the new online system, damage permit recipients are supposed to “check” their kills, much like our hunters do during the hunting season. There appears to be an issue with compliance, and we are working to resolve it.



IX. Diseases - CWD

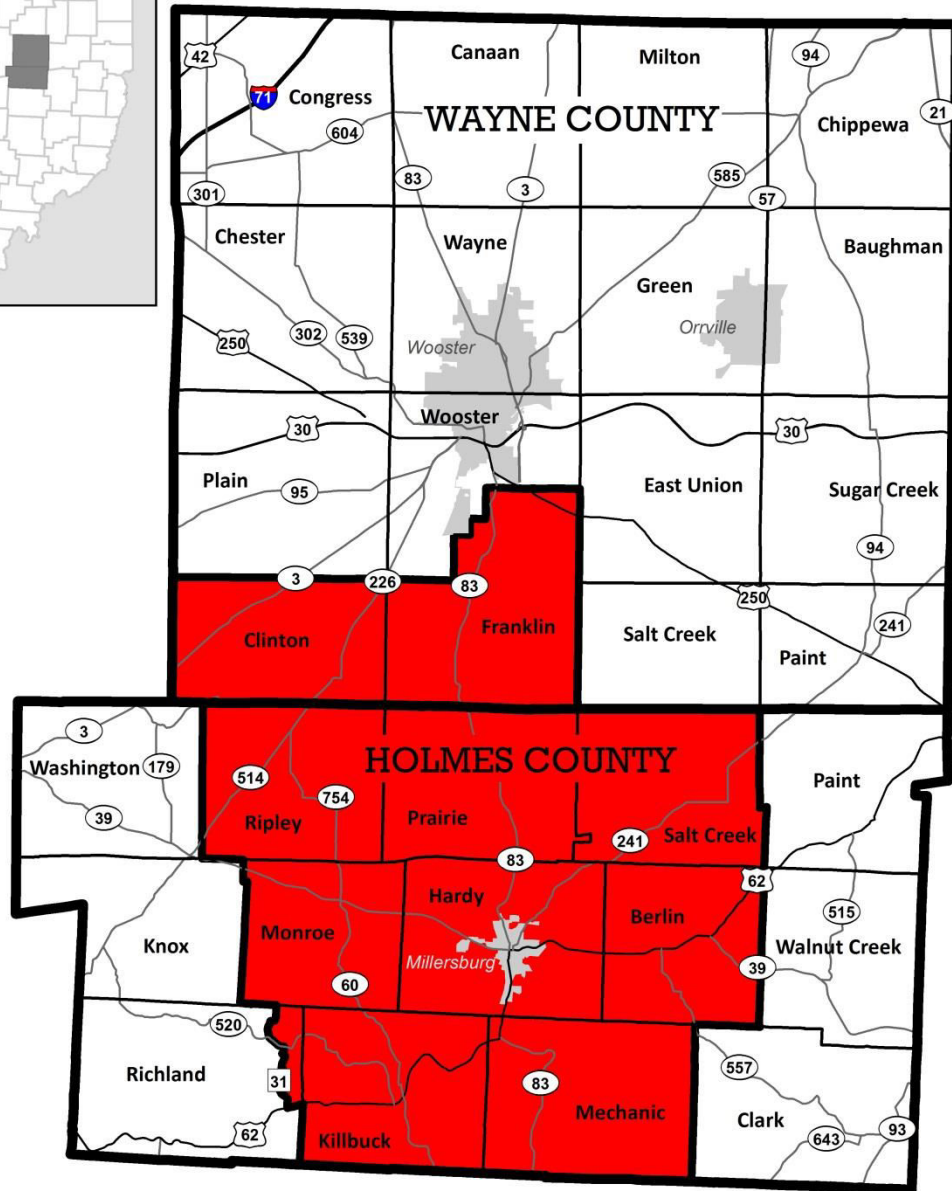
The Ohio Department of Agriculture (ODA) and the U.S. Department of Agriculture (USDA) are integral partners in all disease surveillance plans, and ODNR has worked with these partners to test more than 16,000 free-ranging deer since 2002. To date, there has yet to be a wild, free-ranging deer test positive for the disease in Ohio. During routine surveillance of road-killed deer in 57 of Ohio's 88 counties, Division of Wildlife personnel collected 837, 824, and 804 deer in 2014-2016, respectively. In addition to roadkills, from 2014-2016, we tested 284, 1,051, and 577 deer, respectively, by various means (hunter harvest, targeted surveillance, taxidermists, etc.). CWD was not detected in any of the wild deer tested.

In October of 2014, a mature buck from a shooting preserve in Holmes County tested positive for CWD, becoming the first-ever CWD-positive deer in Ohio. The shooting preserve was depopulated in April of 2015, and testing revealed no additional CWD-positive animals. Subsequent testing of nearly 300 free-ranging deer in an 8-township area around the shooting preserve failed to detect any CWD-positive deer as well. However, in spring of 2015, two more positives were reported from a captive breeding pen in Holmes County. This herd was depopulated in June 2015, and 16 additional deer tested positive, bringing the grand total of positives in Ohio to 19 (all in captive herds). In response to these findings, the Division of Wildlife conducted targeted surveillance in the immediate vicinity of the infected facility during the summer of 2015. Staff collected 18 deer, including two that had escaped from captive facilities, with none testing positive for CWD.

Additionally, the focus area in 2015 was expanded to include two townships in southern Wayne County, and the 10-township focus area (~300 square miles) was declared a Disease Surveillance Area. This DSA designation will remain in effect for a minimum of three years and the following regulations apply: 1) required submission of deer harvested within the DSA to Division of Wildlife inspection stations for sampling during the gun and muzzleloader seasons, 2) prohibit the placement of or use of salt, mineral supplement, grain, fruit, vegetables or other feed to attract or feed deer within the DSA boundaries, 3) prohibit the hunting of deer by the aid of salt, mineral supplement, grain, fruit, vegetables or other feed within the DSA boundaries, and 4) prohibit the removal of a deer carcass killed by motor vehicle within the DSA boundaries unless the carcass complies with the cervidae carcass regulations (see wildohio.gov for additional information on carcass regulations). Under the new rule requiring mandatory submission of deer harvested in the DSA, hunters presented 522 deer for testing at inspection stations during the gun, bonus gun, and muzzleloader seasons in 2015. Combining all methods of sample collection (roadkill, mandatory submission of hunter harvests during the gun seasons, voluntary submission of hunter harvests during the archery season, and targeted surveillance), 752 deer were tested from the DSA in 2015. During the 2016 season however, hunters only brought in 370 deer during the mandatory testing periods, a 29% decline from the 2015 season. Because harvest totals in Holmes and Wayne counties were similar in 2015 and 2016, we suspect a drop in hunter compliance likely contributed to the decline in number of deer presented for testing in 2016. Combining all methods of collection, 563 deer were tested from the DSA in 2016.



Ohio White-tailed Deer Report | 2016-17



 Disease Surveillance Area (DSA)



X. Research

Deer Management Units (DMUs)

A post-doc from The Ohio State University, Gabe Karns, completed a project in 2015 that divided Ohio into Deer Management Units. The intent of the project was to use empirical data to maximize the homogeneity of sociological, ecological, and biological factors affecting antlerless harvest. The project was designed so that deer populations within each DMU would respond similarly to harvest regulations. Additionally, reducing the number of management units would allow for more efficient collection of age, condition, and survey data while increasing precision of estimated parameters. Implementation of the proposed DMUs ($n = 26$) was originally scheduled for the 2017-18 season, but this will be delayed at least until a 10-year Deer Management Plan is completed with substantial constituent input (see 'Hot Topics').

Deer Hunter Surveys

We have conducted deer hunter surveys annually since 2011 to quantify hunter effort, participation and success rates, and to survey hunter opinions on various hot-button topics such as baiting, leasing, and restrictions on public land access. Further details and results can be found in the 2014-15, 2015-16, and 2016-17 Deer Season Summaries in the 'Relevant Links' section.

XI. Hot Topics

Quality vs. Quantity

We published *Quality vs. Quantity: A closer look at deer herd condition trends in Ohio*, a document that summarized trends in herd productivity, condition, and trophy buck entries for the past three decades. All three metrics – productivity, yearling beam diameter, and trophy buck entries – exhibited declines coincident with increases in the size of Ohio's deer herd and simultaneous loss of high quality, early successional habitats. A summary of our results was presented and a copy of the publication was distributed to participants at each of five "Deer Summits" held around the state in early February 2015. See 'Relevant Links' section for the complete publication.

Goal Setting

Population reduction measures from 2007-2013 were largely successful, but caused concern among some of the hunting public. Many opposed to these reductions pointed to the dated population goals, which were based on farmer attitude surveys, the last one being in 2000. Thus, we contracted with the National Agricultural Statistics Service (NASS) to conduct two separate surveys in the fall of 2015 – one for production landowners and one for deer hunters. We asked each group if there were too many, too few, or just about the right number of deer in the area they farm or hunt. With 50% of hunters responding "too few" and 29% of farmers reporting "too many" deer, survey results indicated a desire for slight population growth in most areas of the state. We anticipate repeating this survey periodically, with an ultimate goal of stabilizing populations at levels that result in equal dissatisfaction among hunters and farmers.



XI. Hot Topics (cont'd)

10-year Deer Management Plan

We have completed an internal draft of a 10-year Deer Management Plan. However, prior to finalizing a plan, a group of external stakeholders has been assembled to undergo a Structured Decision Making process to ensure that all stakeholder values, concerns, and objectives are considered in the final plan. This stakeholder engagement process will consist of five, two-day, workshops. Participants will become familiar with deer management in Ohio, develop deer management options, evaluate trade-offs between options, and ultimately make recommendations to the Division of Wildlife. We are seeking several improvements to our deer management program via this planning process including a move from 88 counties to 26 DMUs, the use of antlerless allocations to control harvest rather than bag limits, a Deer Management Assistance Program, and a requirement for landowners to acquire a deer permit prior to hunting.

XII. Relevant Links

Ohio Deer Hunting Regulations

<http://wildlife.ohiodnr.gov/hunting-trapping-and-shooting-sports/hunting-trapping-regulations/deer-hunting-regulations>

Deer Season Summaries

2014-15

http://wildlife.ohiodnr.gov/Portals/wildlife/pdfs/publications/hunting/Pub%205304_DeerSummary_FINAL.pdf

2015-16

http://wildlife.ohiodnr.gov/Portals/wildlife/pdfs/publications/hunting/Pub%205304_DeerSummary_R0916.pdf

2016-17 – update with link when available

Quality vs Quantity: A Closer Look at Deer Herd Condition Trends in Ohio

http://wildlife.ohiodnr.gov/Portals/wildlife/pdfs/hunting/OhioDeerHerdUpdate_Web.pdf

Stakeholder Engagement Process

<http://wildlife.ohiodnr.gov/species-and-habitats/fish-and-wildlife-research/deer-stakeholder-process>

APPENDIX L

ONTARIO

Ontario Northeast Deer Technical Committee Report 2017

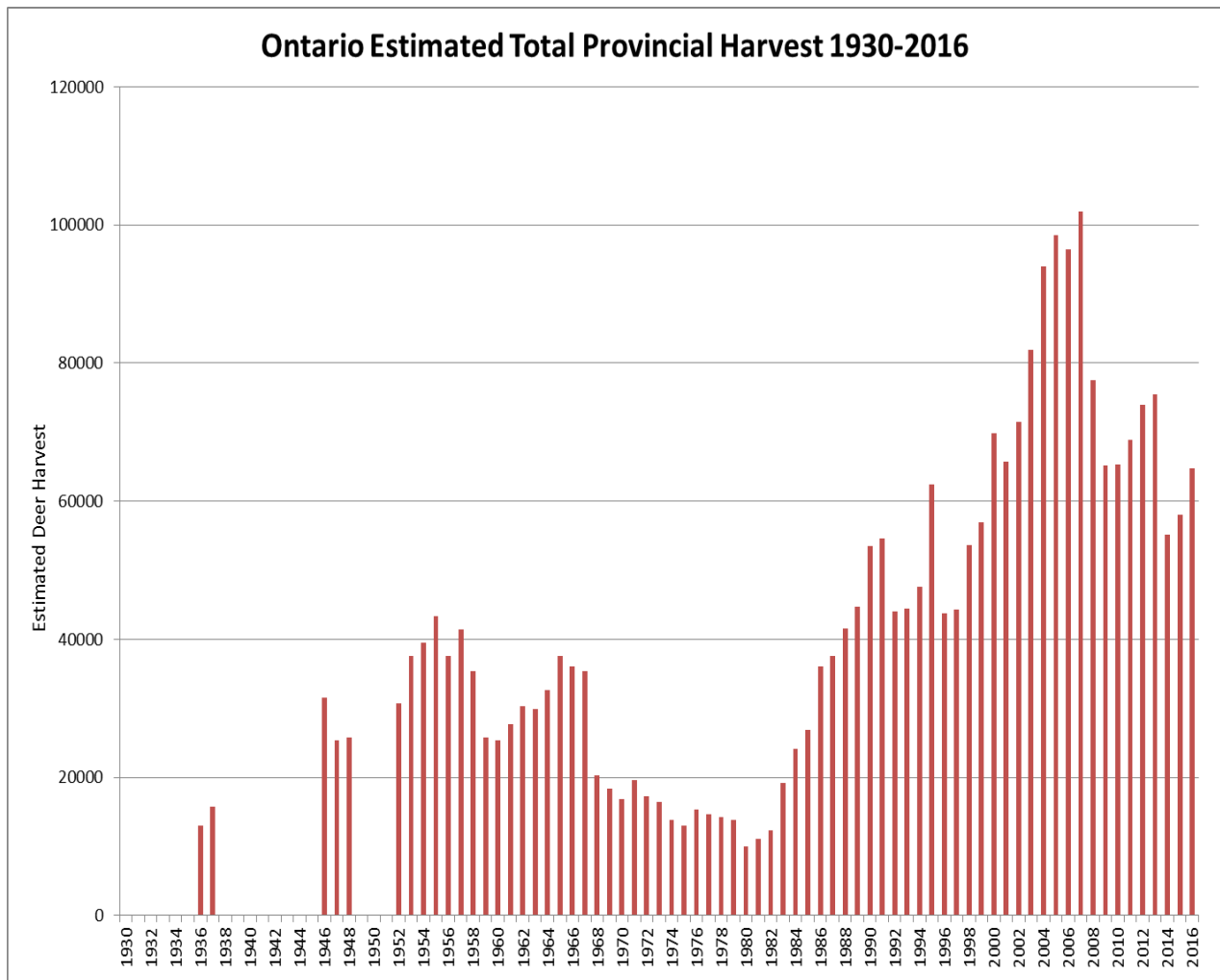
Prepared by Chris Godwin - Sept. 25, 2017

I. Current Harvest

During the 2016 deer hunting seasons, Ontario hunters harvested 64,787 deer. This represented a 12% increase from 2015.

Year	Number Hunters	Antlered Deer	Adult Female	Female Fawns	Male Fawns	Total Deer	% Change (Total)
2016	217,952	40,592	16,112	2,496	5,587	64,787	12
2015	197,184	33,661	16,177	2,906	5,288	58,032	5
2014	193,059	30,126	17,187	2,956	4,870	55,139	-27
2013	206,108	43,405	21,157	3,891	7,014	75,467	2
2012	199,625	42,058	21,435	3,796	6,610	73,899	7
2011	198,754	38,135	19,405	4,076	7,295	68,911	4
2010	199,060	36,014	19,787	3,792	6,550	66,143	-1

II. Historical Harvest

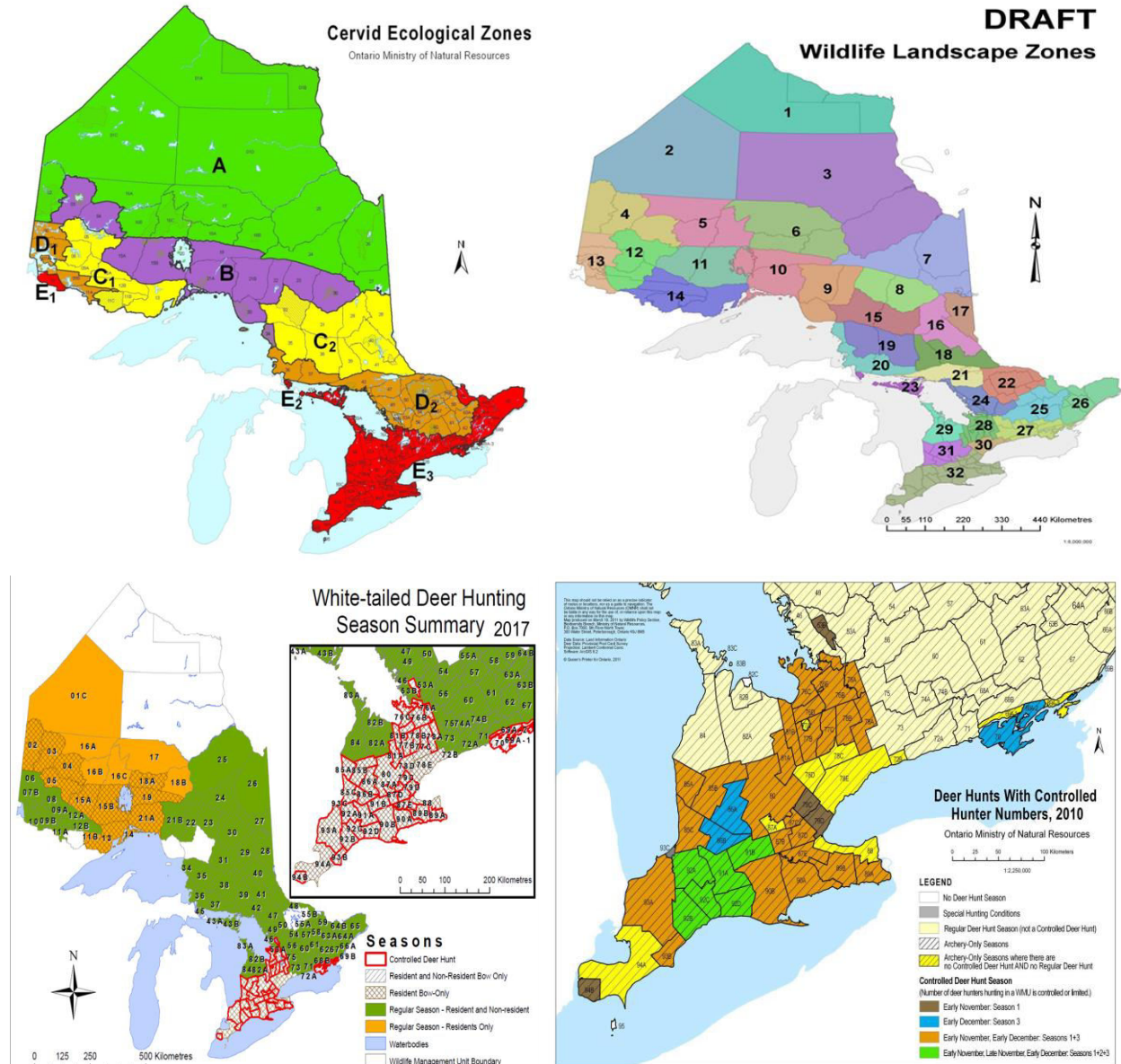


Ontario Northeast Deer Technical Committee Report 2017

Prepared by Chris Godwin - Sept. 25, 2017

IV. Deer Management Regions

Of the 151 Wildlife Management Units (WMU) in Ontario, deer can be hunted in 126.



Management Tools	Availability	Circumstances
Antlered Deer Tag (regular deer hunt)	Any hunter purchasing a deer licence can hunt an antlered deer anywhere with an open season	To allow all hunters an opportunity to hunt while protecting adult females and fawns
Antlerless Deer Tag (regular deer hunt)	Hunters enter a draw in order to hunt an antlerless deer in a specific WMU	To provide hunting opportunities for antlerless deer in specific WMUs when populations are stable or increasing
Controlled Deer Hunt (antlered or antlerless)	Hunters enter a draw to hunt in a specific season and WMU (generally throughout Southwestern Ontario)	To control the number of hunters to address trespass/safety concerns and to manage harvest levels
Additional Deer Seals	Hunters can purchase these for specific WMUs on a first come first served basis	To create additional hunting opportunities and where management objectives are to reduce deer populations

Ontario Northeast Deer Technical Committee Report 2017

Prepared by Chris Godwin - Sept. 25, 2017

III. Population Estimate

Deer are not managed based on population estimates or densities. Rather, deer population trends in combination with other social and climatic considerations are used for deer management recommendations. Based on the trends provincial antlerless tags increase by 4.5% , controlled deer hunt tags will decrease by less than 1% and additional seals will increase by 7% (mainly to meet hunter demand in Northwest Region) in 2017.

Considerations	Southern Region (SR)	Northeast Region (NER)	Northwest Region (NWR)
Trends in Deer Abundance	Stable to increasing	Stable to increasing	Stable to increasing
Hunter/Harvest Trends	Hunter demand high; harvest stable to increasing	Hunter demand increasing; harvests stable to increasing	Resident hunter numbers range from peak levels in some WMUs, to stable/decreasing in other WMUs. Resident harvest is low but increasing. Non-resident deer hunter numbers are low – stable and harvest is low and declining
Fall Body Condition	Excellent	Good	Good
Winter Severity	Mild to moderate	Mild to moderate	Mild to moderate (moderate/severe around Thunder Bay)
Non-hunt Information	Few crop damage complaints received Deer-motor vehicle collisions low and stable	No Deer Removal Authorizations issued in 2016	Urban deer population in Kenora, Dryden, Thunder Bay cause some public concern

V. Regulation/Legislation Changes

Modernizing Ontario’s Approach to Licensing, Game Seals and Hunter Activity Reporting

Ontario recently consulted on proposed significant changes to hunting licences, game seals and hunter reporting. If approved, the changes would lead to a single amalgamated licence document instead of separate licences for different species, affect how and when an individual must attach a tag/game seal to a harvested animal, and require all hunters holding a tag to hunt one or more species of game wildlife to report on their hunting activity and harvest. Other related aspects of the proposal included use of QR codes with embedded information on licences and tags, an option for hunters to print licences and tags at home, and automatic tracking and enforcement of hunter reporting penalties. MNR expects decisions on these proposals later this fall and construction of a new licensing system to deliver these changes by 2019.

VI. Urban/Special Hunts

There were no urban/special hunts in Ontario to report.

VII. Deer Management Assistance Program

Ontario does not have a deer management assistance program.

Ontario Northeast Deer Technical Committee Report 2017

Prepared by Chris Godwin - Sept. 25, 2017

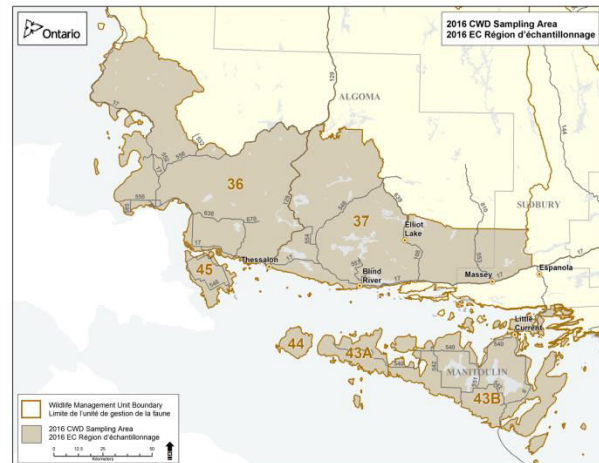
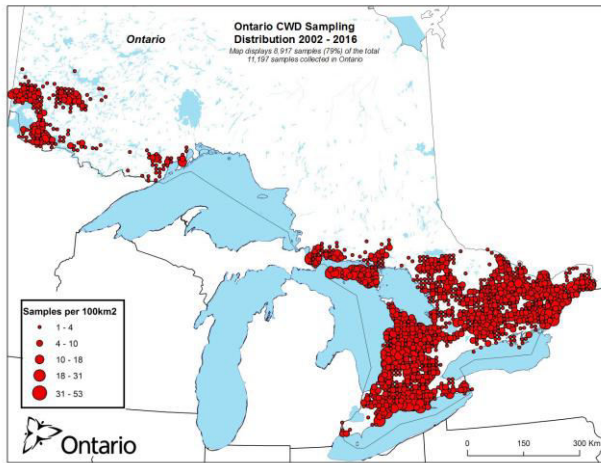
VIII. Disease Issues

Epizootic Hemorrhagic Diseases

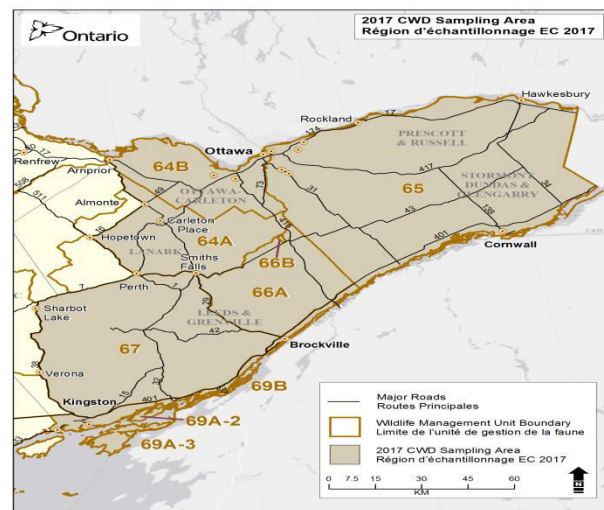
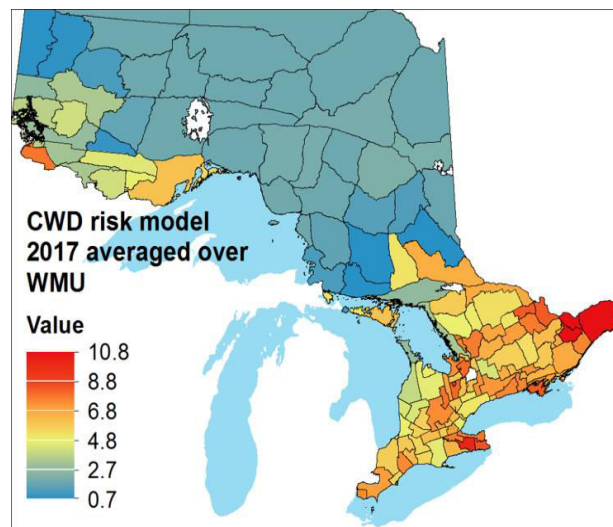
No reports as of September 25, 2017.

Chronic Wasting Disease

Ontario remains CWD free. The Ontario chronic wasting disease surveillance program completed its 14th operational year in 2016. There was a target sample size of 460 samples for 2016 to allow for 99% confidence to detect CWD at a prevalence rate of 1%. A total of 475 samples were collected with all samples testing negative for CWD.



Based on the results of the CWD risk model, 2017 sampling effort will target the Southeastern periphery of Ontario (Ottawa area).



Ontario Northeast Deer Technical Committee Report 2017

Prepared by Chris Godwin - Sept. 25, 2017

IX. Research

Influence of climate and land cover on white-tailed deer distribution in Ontario

Liam Kennedy-Slaney (MNRF), Dr. Jeff Bowman (MNRF), Aaron Walpole (MNRF), Dr. Bruce Pond (MNRF)

It is widely believed that the northern distribution of white-tailed deer is limited by cold winter temperatures and deep snow. Under all climate change scenarios, it is likely that the adverse effects of winter will diminish, which may result in changes to the distribution of deer. The goal of this project was a quantification of the drivers of deer distribution identified from a set of climate and land cover variables. We wanted to forecast changes to the northern limit on deer distribution under several climate change scenarios. We used an occupancy modeling approach to identify the variables or combination of variables that best estimated the occupancy of deer across a 152-camera observation network operating from 2013 to 2015. We validated our model using data from a mammal atlas from 1993. We used available data from climate change scenarios to predict and map changes to the northern limit on deer distribution for three time horizons up to 2100. While climate variables such as snow depth and cold temperatures had a strong impact on the occupancy of deer, the best models combined land cover and climate to explain the pattern of deer observations. Using an occupancy modeling approach, we evaluated the effects of climate and land cover on recent deer distribution in northern Ontario. Variables describing winter climate, in particular temperature and snow depth, were most closely associated with the northern edge of deer distribution, but land cover variables added explanatory power. We used our findings to generate potential deer distribution maps for three CO₂ emission scenarios across three climate normals. Our research suggested that deer distribution will expand northward, given the retreat of severe winters; management in favour of other ungulate species may have to consider controls on deer populations.

Regional variation in buck preference and the ability of managers to manipulate the antlerless deer kill

Dr. Kyle Morrison (MNRF)

Historically high white-tailed deer densities, range expansions, and predictions of future deer population growth call into question whether harvest management continues to be effective at maintaining ecologically and socially acceptable deer densities. As in many other jurisdictions, the selective harvest system utilized in Ontario, Canada assumes that controlling the number of tags issued to kill antlerless deer (does and fawns) is an effective means of regulating the number of antlerless deer killed. A previous study of Ontario hunter survey data from 1980—1997 concluded that when tags were issued to >40% of a given number of hunters, the antlerless kill did not increase, limiting management effectiveness. We analyzed 1999—2016 hunter survey data over a larger area of the province and identified regional variation in antlerless deer killed per tag issued, while controlling for hunter numbers, but no evidence of a saturation threshold in hunter demand for antlerless deer. Hunter preference to harvest antlered deer (bucks) was most often the mechanism causing antlerless tag fill rates to decline as the number of tags issued increased. Our study's analytical approach and management implications are likely relevant in the many jurisdictions where recreational hunting is relied upon to constrain expected deer population growth.

Ontario Northeast Deer Technical Committee Report 2017

Prepared by Chris Godwin - Sept. 25, 2017

Development of a Deer Quota Setting Support Tool

Dr. Kyle Morrison (MNRF)

Determining appropriate annual antlerless tag allocations requires predictions of future deer population change, however, predicting population change is a major challenge. A project was initiated to annually predict deer population change using 17 years (1999-2015) of hunter survey and weather data. The models examined the effect of harvest, relative abundance of deer and predators (i.e., wolves/coyotes), and a number of winter severity and summer habitat productivity indices on inter-annual change in deer population density (Deer Seen per Day). Data was used for 74 Wildlife Management Units (WMUs) to estimate the best-supported model for 17 draft Wildlife Landscape Zones (WLZs). The tool utilizes a landscape approach by modeling the WMUs within a given WLZ as responding to harvest and ecological factors in the same way. Quota setting occurs at the WMU-level, so WMU-specific input data was applied to the WLZ-level models to output WMU-specific predictions of deer population change. The most commonly supported effects lowering rate of population change were deer density, predator density, snow depth, and antlerless harvest. In seven WLZs summer growing degree days (warmth) had a positive effect on deer population growth. The explanatory power of the models (r^2) varied among WLZs from 0.27 (poor) to 0.75 (very good). The best-supported model for each WLZ can be rearranged to estimate the Antlerless Kill required for a given percentage population change. Estimates of antlerless tag fill rates, while controlling for the number of hunters, can in turn, be used to estimate the required tag quota change required to elicit the estimated change in Antlerless Kill. The tool will improve the MNRF's ability to predict deer population change and to make appropriate antlerless tag allocations.

Risk assessment for hemorrhagic disease viruses in Ontario: Surveillance in Wild & Farmed Cervids:

Dr. Samantha Allen (University of Guelph) & Dr. Nicole Nemeth (University of Guelph)

A risk assessment of two emerging viruses (epizootic hemorrhagic disease virus-EHDV & bluetongue virus-BTV) that can cause hemorrhagic disease in livestock and wildlife. These viruses are spread to deer and livestock by biting midge vectors (*Culicoides* spp.). These viruses and their vectors are moving northward, in part due to changing environmental factors (such as warming temperatures). Infections in deer have been documented in many areas just south of the Ontario-U.S. border. EHDV & BTV can cause serious illness and mass mortality in deer and sheep. This will be the first study in Ontario to characterize vector populations and assess for prior transmission (via blood testing). Recent evidence of BTV transmission was found in southern Ontario in cattle (2015). This project will help understand the risk these viruses pose to Ontario livestock and wildlife. Presently, 11 sheep/beef farms across southern Ontario are being sampled for vectors, and blood is being collected from livestock. Blood samples from cervids have been collected opportunistically to date (have managed to collect a few - hoping for more once hunting season begins).

Ontario Northeast Deer Technical Committee Report 2017

Prepared by Chris Godwin - Sept. 25, 2017

X. Hot Topics

White-tailed Deer Management Policy for Ontario

A White-tailed Deer Management Policy for Ontario was released in August 2017. The policy consolidates existing deer management goals, guiding principles, management objectives and strategies, while embracing the broader landscape approach to wildlife management. It addresses deer population management, habitat, health, benefits and human-deer conflicts. It also informs MNRF's deer management planning (e.g., population objective setting guidelines, harvest management guidelines), decision making (e.g., allocation), coordinates activities, communicates MNRF's deer management priorities to others and connects with other natural resource management initiatives. The policy does not propose any changes to the *Fish and Wildlife Conservation Act*, current deer allocations, or changes to Wildlife Management Units (WMUs).

Work has commenced on preparing:

- Draft Population Objective Setting Guidelines for White-tailed Deer in Ontario
- Draft Harvest Management Guidelines for White-tailed Deer in Ontario

XI. Relevant Links

- White-tailed Deer Management Policy - <https://www.ontario.ca/page/white-tailed-deer-management-policy-ontario>
- Cervid Ecological Framework (2009) - <https://www.ontario.ca/document/cervid-ecological-framework>
- Fish and Wildlife Conservation Act, 1997
<https://www.ontario.ca/laws/statute/97f41>
- Ontario Hunting Regulation Summary - <https://www.ontario.ca/document/ontario-hunting-regulations-summary>

APPENDIX M

WISCONSIN



2017 WISCONSIN DEER STATUS REPORT

41st Annual Midwest Deer & Wild Turkey Study Group
 August 28-30, 2017, Honey Creek Resort, Moravia, Iowa

Jennifer Stenglein, Dan Storm, Kevin Wallenfang

1. Current Reported Harvest

The Wisconsin deer harvest numbers can now be found online on the Wisconsin Department of Natural Resources (WDNR) website at:

<http://dnr.wi.gov/topic/wildlifehabitat/harvest/deerharvest.html>.

Total harvest was 2% higher in 2016 than in 2015. Antlered harvest increased 4% and antlerless harvest increased by 1% (Table 1). Limited antlerless harvests in 2016 were primarily due to “bucks-only” regulations in half of the Northern Forest and one of the Central Forest counties. In 2016, hunter success was 31% for gun and crossbow licenses and 24% for archery licenses.

Table 1. Wisconsin’s 2015 and 2016 antlered, antlerless and total deer harvest by season.

Season	Antlered		Antlerless		Total*	
	2015	2016	2015	2016	2015	2016
Bow	31,229	28,172	21,775	20,100	53,004	48,272
Crossbow	20,594	23,562	13,500	16,214	34,094	39,776
Youth Hunt	3,307	3,931	3,904	4,895	7,211	8,826
9-day Gun	94,268	98,538	110,855	103,770	205,125	202,338
Muzzleloader	2,158	2,670	3,320	3,730	5,478	6,400
Early Dec. Antlerless***	24	37	4,893	7,769	4,917	7,806
Holiday Antlerless***	**	10	**	3,346	**	3,356
Off-Reservation Tribal	491	582	787	886	1,278	1,469
Total	152,071	157,502	159,034	160,710	311,107	318,243

* Totals include deer of unknown type.

** The Dec. 24-Jan. 1 Holiday Hunt was not offered in the Southern Farmland Zone in 2015.

*** Disabled hunters and members of the armed forces on leave may harvest antlered deer during antlerless-only seasons.

2. Historical Harvest

During the 1960s and early 1970s, total harvest averaged about 90,000 (Fig. 1). Total harvest increased steadily during the late 1970s and 1980s, largely due to population growth in the farmland regions. An all-time record harvest of 618,274 was set in 2000. After a marked decrease in harvest in 2001 and 2002, harvest during 2003 – 2007 averaged about 500,000 deer, with about 64% of the harvest composed of antlerless deer. Total harvest decreased 42% between 2007 and 2009. During 2009 – 2015, total harvest averaged about 335,000 with approximately 55% of the harvest comprised of antlerless deer (Fig. 1). The proportion of harvest taken by archers has increased steadily during the past 50 years. In 2016, the proportion of deer harvested by archers and crossbows was 15% and 13%, respectively.

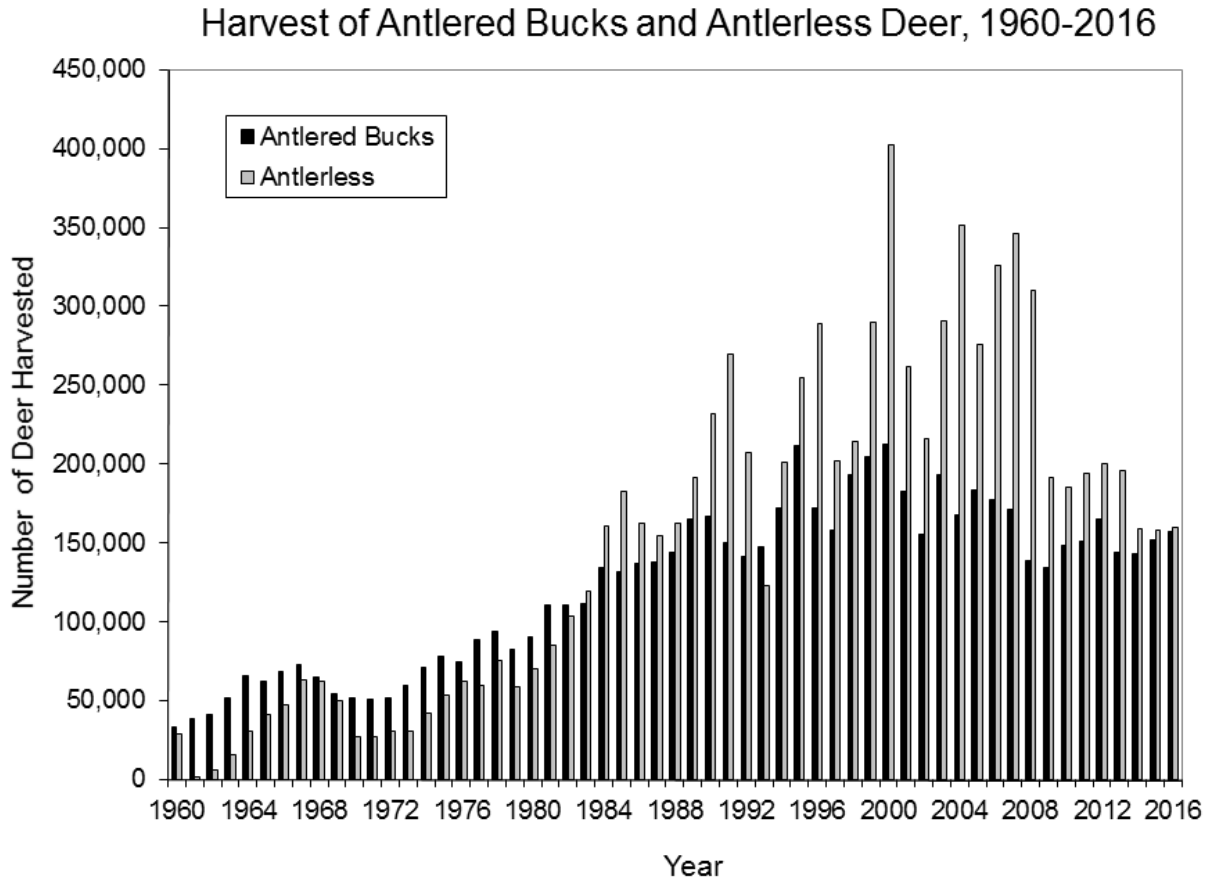


Figure 1. Antlered and antlerless deer harvest in Wisconsin from 1960 – 2016.

3. Population Estimates and Trend

Population estimates were based on Sex-Age-Kill calculations made at the Deer Management Unit level and summed for a statewide estimate. The 2016 prehunt population estimate was 1,710,500 deer and the posthunt estimate was 1,345,000 deer (Fig. 2). Posthunt deer populations in Wisconsin were around 500,000 during the 1960s and 1970s. During the 1980s and 1990s, the population generally increased with occasional short-term declines due to poor recruitment following severe winters and/or intensive antlerless harvests. Most of the statewide increase in deer populations over the past 40 years was due to herd growth in the farmland regions of the state. Higher antlerless harvests during the mid-2000s together with below average recruitment reduced populations in portions of the state. Reduced antlerless harvests since 2009 have resulted in renewed population growth, especially in the farmland zones. Several mild winters have led to increased herd growth in the northern forest region of Wisconsin as well (Fig. 2).

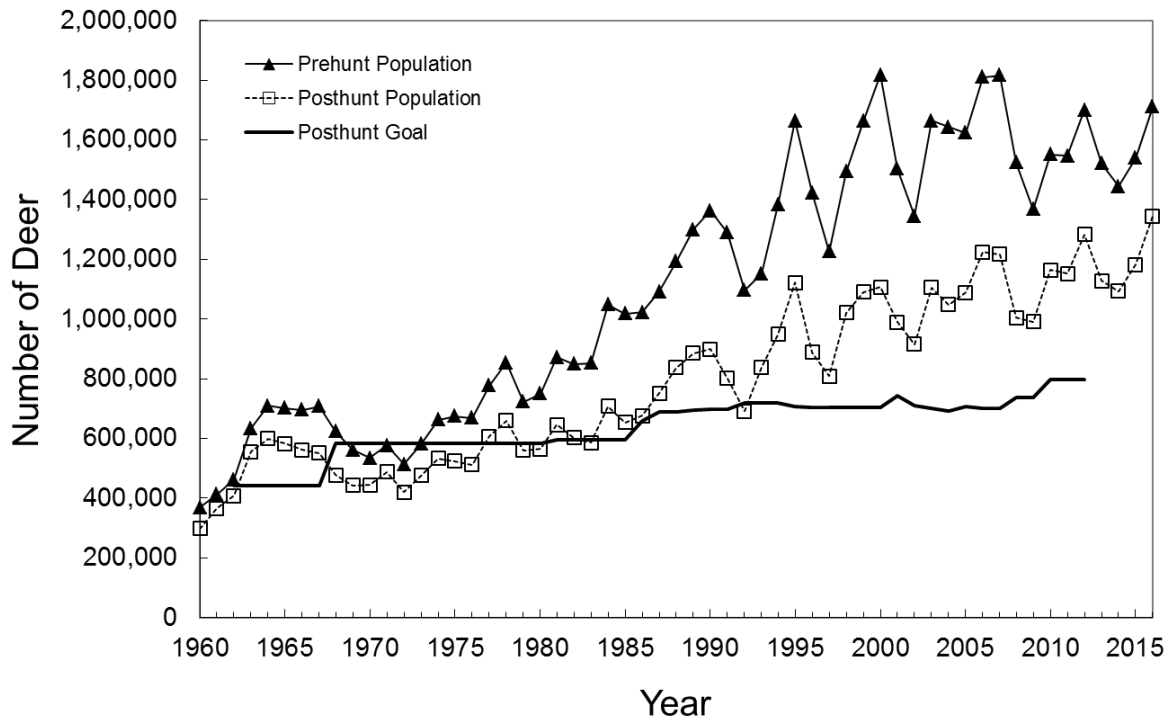


Figure 2. Statewide Wisconsin prehunt and posthunt deer population estimates and population objectives, 1960 – 2016. In 2013 numeric posthunt population goals were discontinued and replaced with population trend objectives.

4. License and Season Information

All residents and non-residents are required to purchase a license to hunt deer in Wisconsin. There were 827,141 deer licenses sold in 2016 (separate licenses are required to hunt with a gun and bow), and 95% of the licenses were sold to Wisconsin residents (Fig. 3).

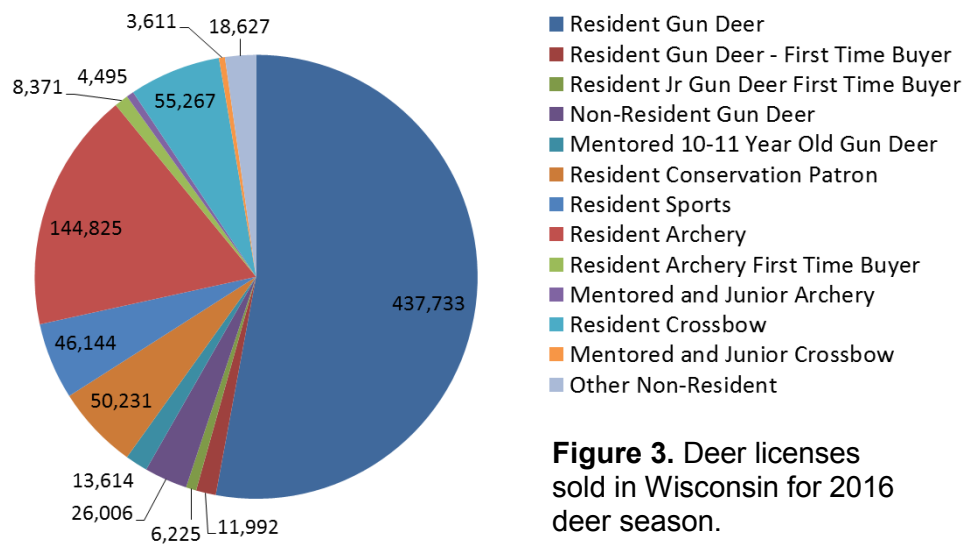


Figure 3. Deer licenses sold in Wisconsin for 2016 deer season.

Of the licenses sold, 66% were gun deer, 17% were vertical bow, 7% were crossbow, and the remainder were a combination of license types (Conservation Patrons, vertical and crossbow upgrades). Some of the specialized licenses included discounts or additional privileges for first time license buyers, non-resident students attending school in Wisconsin, and resident and non-resident armed forces members.

There were approximately the same number of licenses sold in 2016 compared to 2015, but proportionally fewer gun licenses and more crossbow licenses (Fig. 4). Sales of gun licenses increased rapidly during 1960 – 1990, were relative stable during the 1990s, but have declined 14% since 2000. Sales of archery licenses also increased substantially during 1960 – 2000, but have plateaued during the past decade. There have been more crossbow licenses sold each year since they were offered in 2014 (Fig. 4).

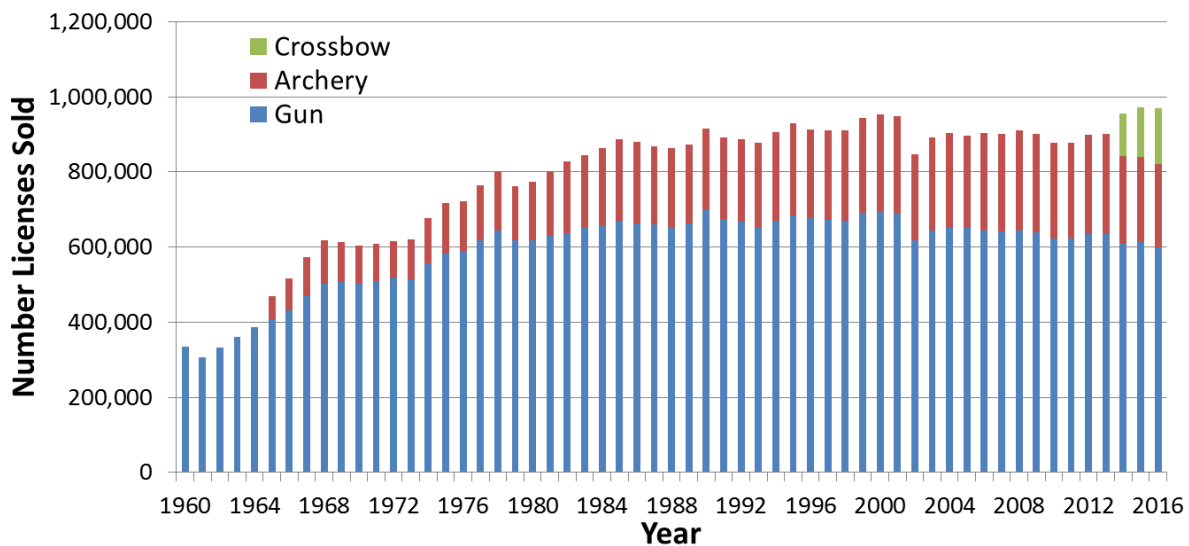


Figure 4. Wisconsin deer license sales, 1960 – 2016. Crossbow licenses were first sold in 2014.

Each hunter was allowed to harvest one buck statewide for each license weapon type they purchased, except only one buck was allowed to be harvested by archery or crossbow for hunters that purchased an archery or crossbow upgrade or Conservation Patrons license. In all except 2 Farmland Zone Deer Management Units, 1 – 3 Farmland Antlerless Deer Tags were available for each license purchased. Hunters specified which Deer Management Unit they would be hunting and whether the tag was going to be used on private or public land. In 2016, there were 882,469 Farmland Antlerless Tags issued and there was a 12% success rate on those tags. Some Deer Management Units in the Forest and Farmland also had Bonus Antlerless Deer Tags available for purchase. In the Farmland Zones there were 64,029 Bonus Antlerless Deer Tags issued and they had a success rate of 22%. In the Forest Zones there were 33,535 Bonus Antlerless Deer Tags issued and they had a success rate of 33%.

The deer license types and costs and season structure approved for the upcoming 2017 deer season was very consistent with the 2016 deer season (Tables 2 and 3).

Table 2. Upcoming 2017 Deer License Types and Costs

License	Resident	Non-resident
Conservation Patron ¹	\$165	\$600
Junior Conservation Patron (ages 12-17) ¹	\$75	\$77
Purple Heart Conservation Patron	\$10	\$161
Sports ²	\$60	\$275
Junior Sports (ages 12-17) ²	\$35	\$36
Gun Deer	\$24	\$160
Youth Mentored Only (ages 10-11)	\$7	\$7
Junior Gun Deer (ages 12-17)	\$20	\$36*
Archer ³ (does not include furbearers)	\$24	\$160
Junior Archer ³ (ages 12-17)	\$20	\$77**
Crossbow ³	\$24	\$160
Junior Crossbow ³	\$20	\$77**
Archer or Crossbow upgrade ⁴	\$3	\$3
First Time Buyer Archer or Firearm	\$5	\$79.75
Bonus Antlerless Deer Tag	\$12	\$20
Mentored Bonus Antlerless Deer Tag	\$5	\$5

¹ Conservation Patron license includes small game, spring and fall turkey licenses and stamp, pheasant stamp, deer firearm, archer, crossbow, general fishing, trapping, state fishing and waterfowl stamps, and most permit fees.

² Sports license includes general fishing, small game and gun deer.

³ Deer and small game.

⁴ Included with either an archer or crossbow license to use both license types.

* Non-residents aged 12-17 wishing to hunt with a gun may purchase a Junior Sports license

** Non-residents aged 12-17 wishing to hunt with bow or crossbow may purchase a Junior Conservation Patron license.

For the 2017 season (as in recent past seasons), one antlered buck may be harvested for each gun license and one antlered buck with an archery or crossbow license. One antlerless deer may be harvested per unused antlerless deer tag.

Table 3. Upcoming 2017 Deer Season Structure

Season	Dates
Archery and Crossbow	September 16, 2017 – January 7, 2018
Archery and Crossbow Metro Subunits	September 16, 2017 – January 31, 2018
Youth Firearm	October 7 – 8, 2017
Hunters with Disabilities Firearm	October 7 – 15, 2017
November Firearm	November 18 – 26, 2017
November and December Firearm Metro Subunits	November 18 – December 6, 2017
Muzzleloader	November 27 – December 6, 2017
December Antlerless only (all weapon types)	December 7 – 10, 2017
Antlerless only Holiday Hunt (all weapon types)	December 24, 2017 – January 1, 2018

5. Deer Management Units and Zones

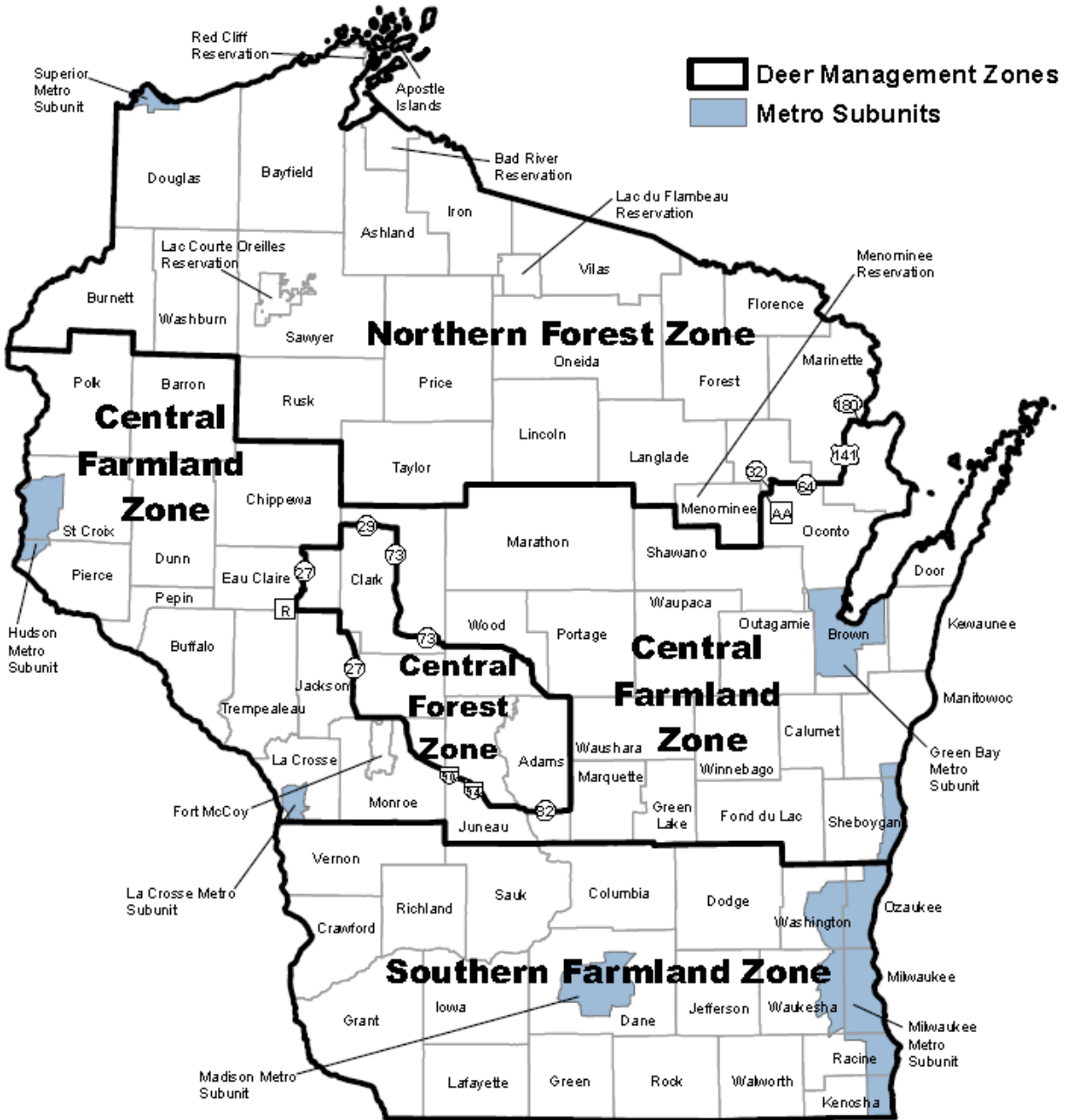


Figure 5. Wisconsin’s deer management units (DMUs) and deer management zones that have been in place since the 2014 deer season. Wisconsin’s 78 DMUs follow county boundaries and include four reservations, Apostle Islands National Lakeshore, and Madeline Island.

6. Regulation/Legislation Changes

The Natural Resources Board approved recommendations from 68 of the County Deer Advisory Councils (CDACs) for the 2017 deer season at its May meeting. In 3 of the counties, the WDNR recommended changes to the CDAC recommendations, which included:

- In Bayfield County, WDNR recommended the antlerless quota be reduced from 3,800 to 2,500 in response to hunter's concerns.
- In Vilas County, WDNR recommended that the CDAC's recommendation to close off the Youth Firearm hunt would be reversed. All other counties voted to make Junior Antlerless Tags valid in their counties.
- In Door County, WDNR recommended that the CDAC's recommendation to issue 10 Farmland Zone Antlerless Tags for each license be reduced to 5 tags. The printing costs for vendor's selling licenses as well as the suspected low success rate on these multiple tags led to this recommendation.

The Natural Resources Board approved the WDNR's recommended changes from the CDAC recommendations in these 3 counties.

The 2017 deer season framework approved by the Natural Resources Board differs from previous years:

- The number of buck-only units continues to decrease. In 2017 there are 4 buck only-units (3 in the Northern Forest and 1 in the Central Forest), compared to 10 buck-only units in 2016 and 12 buck-only units in 2015.
- Junior license buyers (age 17 or younger who receive a free antlerless tag with each license) can use their antlerless tag in any county. In 2016, Junior Antlerless Tags were invalid in 3 Northern Forest Counties.
- Seventeen counties in the Central and Southern Farmland Zones opted to offer a 9-day antlerless-only Holiday Hunt (December 24 – January 1). This is an increase from 13 counties offering the Holiday Hunt in 2016.
- CDACs in the farmland zones were able to offer a variable number of free farmland zone permits per license sold. One county will offer 0 free permits (2 counties in 2016), 27 counties will offer 1 (38 counties in 2016), 19 counties will offer 2 (11 counties in 2016), 6 counties will offer 3 (4 counties in 2016), and 1 county each with offer 4 and 5 free permits per license. These permits are county and land-type (public or private land) specific.
- CDACs and WDNR recommended a total of 200,155 bonus antlerless permits for purchase (84% on private land, 16% on public land). This was 25% higher than in 2016, and 39% higher than in 2015.

Carcass tags will again be printed on plain white paper and are now validated by removing the bottom portion rather than writing on them (2016) or slitting them (prior to 2016). North of Highway 64 (Northern Wisconsin), ground blinds and tree stands can be left out overnight on WDNR managed lands.

The Governor signed a bill that removes baiting and feeding bans from counties that have not had a positive CWD test in 2 (neighboring counties) or 3 years (counties with a CWD positive deer). With this legislation, 15 counties have bans lifted and 28 counties continue to have bans.

7. Special Hunts

Disabled deer hunts – Eighty-two individuals and organizations will sponsor disabled deer hunts during October 7 – 15 on 81,800 acres in 2017. Hunters must possess a valid disabled hunting permit. Shooting from a stationary vehicle, use of laser sights, and use of adaptive devices on firearms are authorized for hunters with specific disabilities.

Fort McCoy Military Reservation – Fort McCoy is a 60,000 acre military training center that allows limited entry public deer hunting during the early bow and firearm seasons. Hunters must apply for a random drawing to obtain a permit.

Learn to hunt deer – The WDNR in cooperation with various partners conducted 14 Learn to Hunt Deer events in fall 2016 and included 151 participants. There were 5 were Learn to Hunt for Food classes with 75 participants. There were more Learn to Hunt for Food classes and more participants in 2016 compared with 2015. These classes are longer and continue to have a higher percentage of women compared with traditional Learn to Hunt events.

Metro sub-units – There are 6 metro sub-units (Fig. 5) that are located in portions of 14 counties and have longer deer hunting seasons (Table 3). In the 2017 deer season, 5 counties (Dane, La Crosse, Pierce, St. Croix and Sheboygan Counties) allow deer license buyers to request a Metro Sub-unit Antlerless Deer Tag at no cost and 6 counties (Brown, Douglas, La Crosse, Pierce, St. Croix and Sheboygan Counties) have Bonus Antlerless Deer Tags that are available for purchase for a specific metro sub-unit. In addition, a Farmland Zone Antlerless Deer Tag specific to a county with a metro sub-unit may be used anywhere in that county (specific to public or private land) including within the metro sub-unit.

8. Management Assistance/Crop Damage

Deer Management Assistance Program (DMAP) – DMAP provides habitat and herd management assistance to landowners interested in managing their property for deer and other wildlife. Now in its fourth year, there are >1,200 landowners, 803 properties and 233,000 acres enrolled in DMAP. Approximately 61% of properties are enrolled in Level 1, 33% in Level 2, and 6% in Level 3. There were 955 reduced-cost antlerless tags allotted and 764 tags distributed to Level 2 and 3 enrollees in 2016.

Wildlife Damage Abatement and Claims Program (WDACP) – In 2016, WDNR issued 506 agricultural deer damage shooting permits in 64 counties which was a 7% reduction in the number of permits issued in 2015. Of the 2016 permits, 45% of them required public hunting access and the remainder did not. A total of 4,134 deer were removed under this program and 96% of them were antlerless.

9. Disease Issues/Updates

Chronic Wasting Disease – There have not been any new counties with wild deer CWD detections since the 2016 report. CWD has been detected in wild deer in 19 of Wisconsin's 72 counties and 43 counties in Wisconsin are considered affected counties for being within 10 miles of any captive or free roaming deer that tests positive for CWD. These 43 counties have

bans on baiting and feeding of wildlife. Surveillance activities in 2016 focused on the long-term monitoring areas in southern Wisconsin, selected counties along the outer edge of the CWD affected area, and areas in central and northern Wisconsin where outlying positives or CWD positive captive cervid facilities have been identified. Approximately 6,127 deer were tested during 2016, which was a 95% increase in the number of deer tested in 2015.

CWD prevalence continues to increase in southern Wisconsin. In northcentral Iowa County, prevalence in adult males (≥ 2.5 years old) has risen to approximately 50%. In southwest Sauk County, estimated prevalence in adult males exceeds 45%, and in southeast Richland county estimated prevalence in adult males exceeds 40%.

In 2016, WDNR and partners conducted the first 5-year review of the 2010 – 2025 Wisconsin CWD Response Plan and created a list of 62 recommended action items across the plan's 6 objectives. The implementation of these recommendations is ongoing.

10. Deer Research Update

The WDNR in cooperation with UW-Madison has an ongoing research project to examine roadside surveys for estimating late summer/early fall fawn to doe ratios.

2016 was the first year of the new Southwest Wisconsin CWD, Deer and Predator Study with the goals of determining the role of CWD, predation, hunter harvest, and habitat on deer population dynamics in southwestern Wisconsin. As of July 2017 there were 91 fawns collared. Over winter 2016 – 2017, there were 138 deer, 7 bobcats and 7 coyotes collared and monitored.

Snapshot Wisconsin, a statewide trail camera project to monitor deer, predators of deer, and other wildlife, enrolled its first volunteer trail camera monitors in 2016. As of July 2017, Snapshot Wisconsin was open in 18 counties with 604 enrolled volunteers monitoring 726 trail cameras that have captured >12 million photos.

11. Hot Topics

County Deer Advisory Councils (CDACs) – In fall 2017, CDACs will review their 3-year recommendations on county population objectives and have the opportunity to split their counties into additional Deer Management Units.

Deer Registration – 2016 was the second year of electronic registration of all deer killed. In 2016, hunters used plain paper carcass tags that they printed out at their home computers or from license sale vendors. Tags were validated by writing the date of the kill on the tag and the registration number was to be written on the tag once the deer kill was registered. Hunters were not required to attach the tag to the deer immediately and needed to only once they left their deer kill.

Meat Locker Collections – WDNR staff aged 15,418 deer at meat processors and for CWD sampling during the gun and archery seasons. About 14% more deer were aged in 2016 than in 2015, but 5% fewer deer were aged compared to 2014 when deer were aged at in person

registration stations.

Deer Hunting Accidents – There were 5 non-fatal accidents during the 2016 deer season and all occurred during the 9-day deer gun season.

Winter 2016–2017 – The average winter severity index (WSI) in 2016 – 2017 for the northern Wisconsin recording stations with complete records was 30. Typically mild winters are associated with population growth in northern Wisconsin.

12. Relevant Links

WDNR Deer Hunting Webpage: <http://dnr.wi.gov/topic/hunt/deer.html>

WDNR Deer Harvest Summary: <http://dnr.wi.gov/topic/wildlifehabitat/harvest/deerharvest.html>

WDNR Deer Hunting Regulations Booklet: <http://dnr.wi.gov/files/PDF/pubs/wm/WM0431.pdf>

WDNR Big Game Harvest Summary: <http://dnr.wi.gov/files/PDF/pubs/wm/WM0284.pdf>

WDNR Chronic Wasting Disease Webpage:

<http://dnr.wi.gov/topic/wildlifehabitat/regulations.html>

Common health issues for Wisconsin deer: <http://dnr.wi.gov/topic/wildlifehabitat/deerhealth.html>

Deer Management Assistance Program (DMAP):

<http://dnr.wi.gov/topic/wildlifehabitat/DMAP.html>

County Deer Advisory Councils (CDACs): <http://dnr.wi.gov/topic/hunt/cdac.html>

WDNR Deer Research Webpage:

<http://dnr.wi.gov/topic/wildlifehabitat/research/whitetaileddeer.html>

Southwest Wisconsin CWD, Deer and Predator Study:

<http://dnr.wi.gov/topic/research/projects/dpp/>

Snapshot Wisconsin: <http://dnr.wi.gov/topic/research/projects/snapshot/>

WDNR Wildlife Survey Reports Webpage: <http://dnr.wi.gov/topic/wildlifehabitat/reports.html>

APPENDICES

2017

MIDWEST DEER & WILD TURKEY STUDY GROUP

STATE TURKEY REPORTS

APPENDIX N

ILLINOIS

ILLINOIS WILD TURKEY POPULATION STATUS REPORT – 2017

41st Midwest Deer and Turkey Study Group Meeting – August 28th-30th, 2017
 Honey Creek Resort – Moravia, IA

Luke Garver – Wild Turkey Project Manager
 Illinois Department of Natural Resources
 One Natural Resources Way
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POPULATION STATUS

When checking in a harvested deer, successful deer hunters are asked to report the number of wild turkeys they saw while hunting. Data from successful archery deer hunters (SAH) is shown below. When used as an index, these data indicate a relatively stable population.

Table 1 – 2016 Turkey Sightings by Successful Archery Deer Hunters (SAH)

Administrative Region	Total SAH	SAH Seeing Turkeys	Total Turkeys Observed	Average No. Turkeys/Sighting	Percent SAH Seeing Turkeys
1	12,933	4,086	80,501	19.7	31.6%
2	2,672	5,03	7,232	14.4	18.8%
3	6,104	1,409	22,743	16.1	23.1%
4	15,765	5,225	79,585	15.2	33.1%
5	15,994	5,803	122,076	21.0	36.3%
Statewide	53,468	17,026	312,137	18.3	31.8%

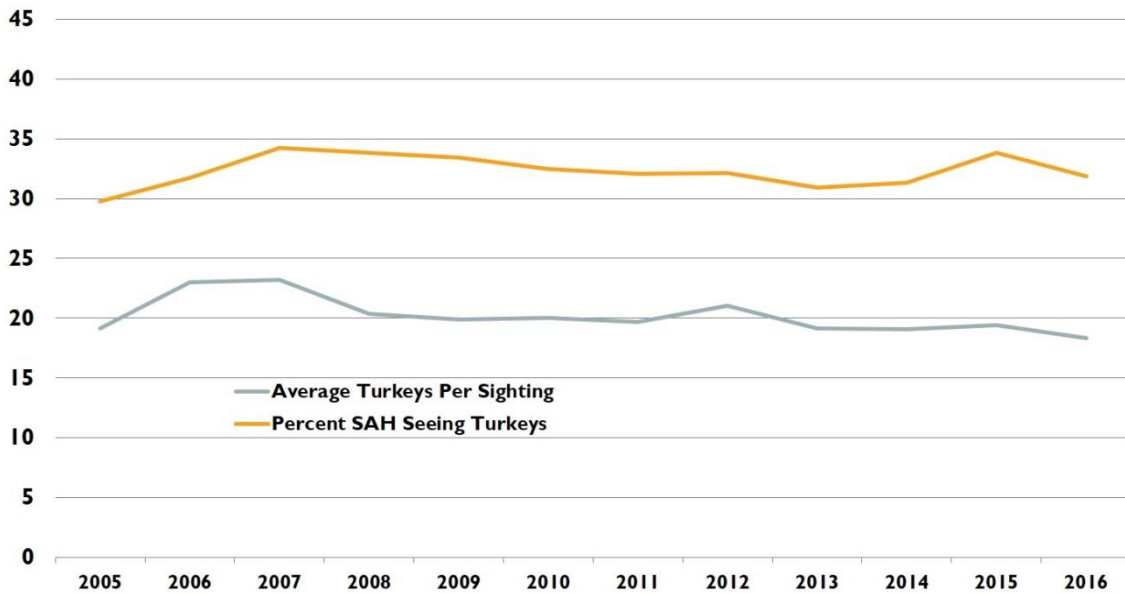


Fig. 1 – Historical Statewide Turkey Sightings by SAH

REPRODUCTION

Data for the 2017 Wild Turkey Brood Survey is currently being collected and evaluated. Survey postcards are mailed to approximately 2400 participants annually with the request they report observations of every hen and poult during June, July, and August. In addition to total number of hens and poults counted during each observation, other pertinent information is requested including date, county, number of solitary hens, size of poults, and a general estimation of the number of turkeys compared to the previous year.

The Brood Index (BI) is calculated by dividing the total number of poults observed by the total number of hens observed. Solitary hens are included in the calculation. BI is aggregated statewide and by IDNR Administrative Region. In 2016 the BI was the second lowest on record, but was preceded by two consecutive years of above average indices in 2014 and 2015.

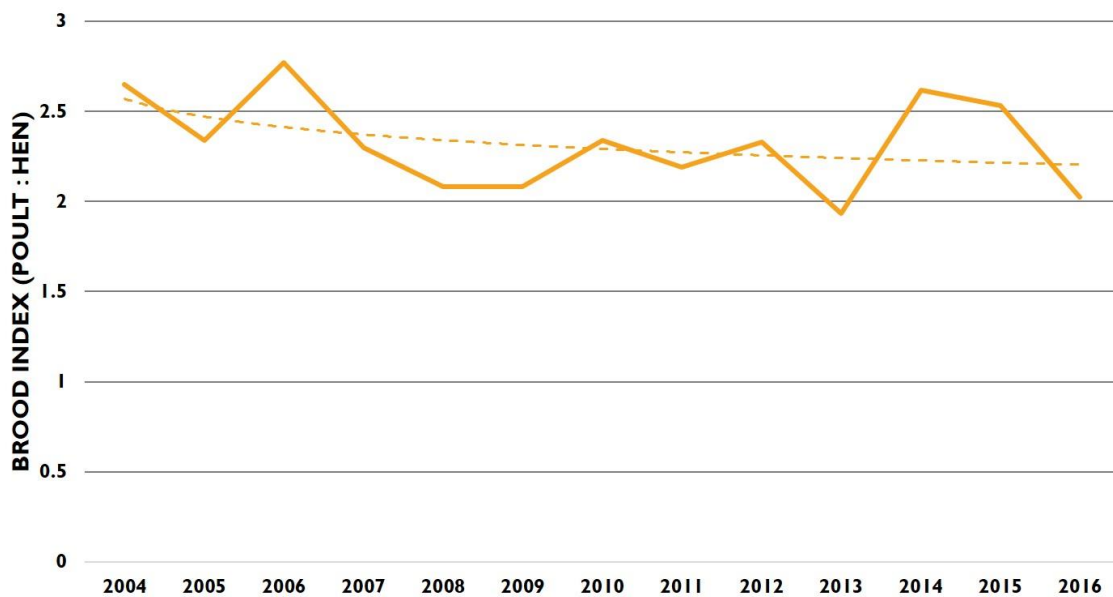


Fig. 2 – Historical Statewide Brood Index (BI)

Table 2 – 2016 BI by Illinois Administrative Region

Admin. Region	Solitary Hens	Hens with Poults	Poults	Brood Index
1	262	303	1265	2.24
2	88	39	178	1.40
3	129	89	353	1.62
4	292	269	1030	1.84
5	479	456	2040	2.18
Statewide	1250	1156	4866	2.02

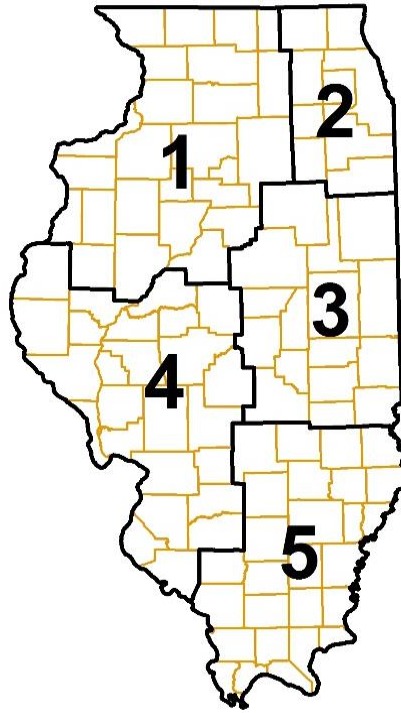


Fig. 3 – Illinois Administrative Regions

HARVEST

2017 Spring Turkey Season

Hunters in Illinois harvested 15,719 wild turkeys during the 2017 Spring Turkey Season, including the Youth Season. The 2017 total compares with the statewide harvest of 15,484 in 2016. The Youth Turkey Season harvest was 1,541, compared with 1,045 turkeys harvested in 2016.

The spring season was open in 100 of Illinois' 102 counties. The 2017 seasons were April 3-May 4 in the South Zone and April 10-May 11 in the North Zone. The Youth Spring Turkey Season was March 25-26 and April 1-2. This was the first year two weekends were open for each of the zones, rather than one weekend for the North Zone and one for the South.

Turkey hunters this spring took a total of 6,842 wild turkeys during all season segments in the South Zone, a slight increase over the harvest of 6,694 last year in the south. The North Zone harvest total of 8,878 wild turkeys was also higher than the 2016 total of 8,790 in the north.

The top five counties for spring wild turkey harvest in the South Zone in 2017 were Jefferson (412), Jackson (359), Union (359), Randolph (349), Pope (348). The top five North Zone counties for spring turkey harvest this year were Jo Daviess (610), Pike (404), Adams (395), Fulton (378), and Hancock (325)

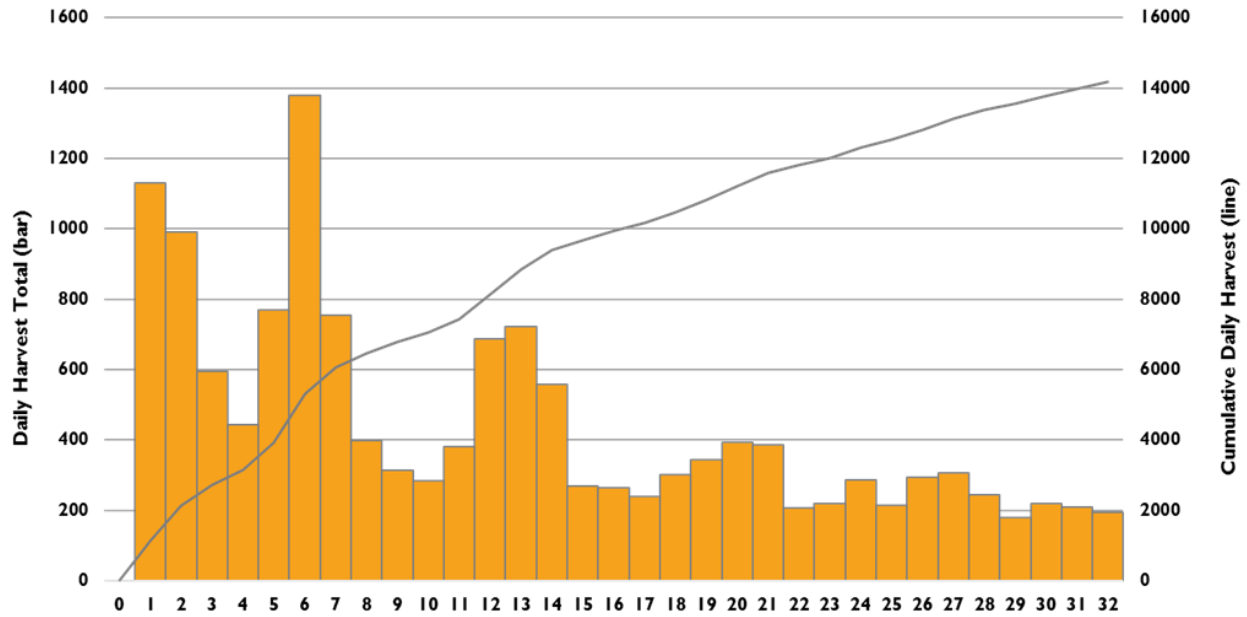


Fig. 4 – 2017 Spring Season Daily Total and Daily Cumulative Harvest



Fig. 5 – Spring Season Counties and Zones

2016 Fall Turkey Season

Hunters in Illinois harvested a preliminary 897 wild turkeys during the 2016 Fall Turkey Season, combining both the Fall Gun and Archery Seasons. The 2016 total compares with the statewide turkey harvest of 1,386 in 2015.

The preliminary 2016 Fall Gun Season total harvest total was 388 compared with the previous year’s total of 534. The 2016 season dates were October 22nd - 30th and hunting was open in 56 of Illinois’ 102 counties. The top five counties for the Fall Gun Season harvest were Jo Daviess (37), Union (37), Marion (29), Williamson (29), and Wayne (23).

The preliminary Fall Archery Season harvest total 507 compared with the previous year’s total of 851. The 2016 season dates were October 1st, 2016 – January 15th, 2017 and ran concurrently with the Archery Deer Season. Archery turkey hunting is permitted in all 102 Illinois counties. The top five counties for the Fall Archery Season harvest were Fulton (40), Fayette (24), Brown (19), Cass (29), and Jackson (19).

The top counties for spring wild turkey harvest in the South Zone in 2017 were Jefferson (412), Jackson (359), Union (359), Randolph (349), Pope (348). The top five North Zone counties for spring turkey harvest this year were Jo Daviess (610), Pike (404), Adams (395), Fulton (378), and Hancock (325).



Fig. 1 – Fall Gun Season Counties

HUNTING INCIDENTS

No incidents related to turkey hunting have been reported since 2014.

Table 3 – Recent Reports of Turkey Hunting Related Incidents

Year	Firearm Related	Injury	Self-Inflicted	Season
2014	Yes	Major	No	Spring
2013	Yes	Major	Yes	Spring
2013	Yes	Major	No	Spring
2012	Yes	Minor	No	Spring
2011	Yes	Major	No	Spring
2011	Yes	Minor	Yes	Spring
2011	Yes	Minor	No	Spring
2011	No	Major	Yes	Spring
2011	No	Major	Yes	Fall

REGULATION/LEGISLATION CHANGES

The 2017 Spring Youth Season was expanded to include two, 2-day weekends preceding the Regular Spring Season. Previously there was one weekend allocated for the North Zone and one for the South Zone.

Beginning with the 2018 Regular Spring Season, there will be three lotteries for permit allocation, rather than four as in the previous two years. All remaining permits after the third lottery will be available over-the-counter. For the last two years, remaining permits were not available for allocation after the fourth and final lottery.

RESEARCH

Wild Turkey Responses to Forest Management
PhD Student: Christine Parker; PI: Jeff Hover
Illinois Natural History Survey
University of Illinois

Overview

Lack of disturbance has led to the degradation of Illinois forests and open woodlands. As with forests throughout the Midwest, these historically oak-dominated systems are transitioning into closed-canopy forests that are dominated by shade-tolerant species such as maples. Much of this transition has been attributed to the exclusion of both anthropogenic and natural fires from contemporary landscapes (Nowacki and Abrams 2008). Beyond encroachment of shade-tolerant native species, the understory layers of many Midwestern forests and open woodlands have become encroached with exotic species such as honeysuckle (*Lonicera* spp.) or buckthorn (*Rhamnus* spp.). These large-scale alterations of forest and woodland ecosystems have adversely impacted numerous conservation-priority wildlife species that have historically depended on relatively open oak-dominated systems, including Red-headed Woodpeckers, Whip-poor-wills, and Wild Turkeys.

Aside from being potential indicators of ecosystem health, Wild Turkeys are an economically important game species. Accordingly, considerable research attention has focused on understanding broad-scale habitat associations of turkeys and estimating demographic parameters. Forests or woodlands with mature trees are known to provide habitat that is preferred by turkeys for parts of their annual cycle (Miller et al. 1999), but turkeys have extensive and seasonally variable home ranges (e.g., <1 to 32 km²; Porter 1977, Badyaev et al. 1996a, Thogmartin 2001). The importance of different habitat components is likely seasonally dependent, with food availability and safety from predators being important year-round, but with quality nesting and brood-rearing habitat being important during spring and summer. Aspects of vegetation structure and composition, including understory density, are known to influence nest-site selection and reproductive success (e.g., Badyaev 1995, Badyaev et al. 1996b, Locke et al. 2013), but quantitative information on important habitat characteristics during other stages of the annual cycle is generally lacking. Beyond influencing habitat use, the structure and composition of vegetation may influence the frequency and distance of movements, quantities negatively

associated with survival (Hubbard et al. 1999). However, despite the numerous links between vegetation structure and aspects of Wild Turkey habitat use and demography, information on turkey responses to management actions is generally lacking.

To better understand the response of Wild Turkeys to forest management activities, the objectives of Segment 2 of the Wild Turkey Responses to Forest Management research project were to:

1. Use a combination of conventional and more-advanced telemetry to examine the effects of forest management, habitat and landscape features on Wild Turkey habitat use, survival and reproductive success in east-central and western Illinois (at least 2 study areas);
2. Use Global Positioning Systems (GPS) telemetry to understand variation in fine-scale movements and habitat use of up to 40 Wild Turkey hens (split among study areas) throughout their annual cycle;
3. Use these results to inform/modify stand- and landscape-level forest and open woodland management plans and actions to benefit turkey populations in Illinois.

Summary of Progress and Preliminary Results:

1. During the winter/spring of 2016 46 Wild Turkeys were captured and banded across two study locations and every hen (n=38; 21 at Forbes and 17 at Lake Shelbyville) fitted with a μ GPS transmitter.
2. On average, each transmitter has recorded over a thousand locations to date that are accurate enough to provide knowledge where and when hens were nesting, the fates of those nests, and seasonal habitat use at finer- and larger-scales. Models of how land use and habitat (i.e. forest) management affect the nesting success, survival, and habitat selection of hen turkeys will be derived from this data.
3. Of the 2016 cohort of new hens, 8 of the 9 known mortality events resulted from predation following the onset of incubation because the carcasses were found near nest locations. This pattern has repeated for 2 consecutive years and demonstrates that hen turkeys are particularly vulnerable to predation during the incubation phase of the nesting period. Predators are primarily responsible are not known.
4. Accelerometer data (index of hen turkey motion collected every 5 minutes) from the radios on hens has allowed the determination of 19 hen mortality events, 7 of which occurred during overnight hours and 12 during daylight hours.
5. Six of 25 nests successfully made it to the poult stage and determination of the predator(s) responsible for predation of hens and/or nests during the incubation phase is being investigate.
6. Preliminary results indicate that turkeys may select nest locations based on stand-level characteristics, rather than local-scale factors (i.e. there was little difference between the various measures of vegetation associated with nests compared to paired random non-nest locations 80 m away from nests). Additional analyses will be forthcoming.
7. Finally, the programming and database structure are now in place to allow the use of the data collected from the μ GPS transmitters to create Brownian Bridge Movement Models

to assess the effects of land-cover and burn/management history on seasonal and annual home range sizes and habitat use.

EMERGING OR EVOLVING ISSUES

In coordination with the Illinois Natural History Survey at the University of Illinois, IDNR will be surveying resident and non-resident Illinois turkey hunters for a Hunter Satisfaction Survey. A variety of topics will be presented to constituents. The goal will be to gather information regarding turkey hunter demographics, preferences, and opinions for or against alterations to Illinois' current season structure. Surveys will be submitted following the 2018 Regular Spring Season. The last two Hunter Satisfaction Surveys were conducted in 2009 and 2001.

APPENDIX O

INDIANA



INDIANA WILD TURKEY STATUS REPORT



41th Midwest Deer & Wild Turkey Study Group Meeting
Honey Creek State Park Resort, Moravia, Iowa
August 28-31, 2017

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WILD TURKEY HARVESTS

Fall Season Results, 2016-17

Hunters harvested 542 wild turkeys during the 12th fall turkey hunting season, 375 (-41%) less than the 917 birds harvested in 2015-16 but similar to the 2014-15 harvest of 548. An estimated 10,688 hunters participated in the 2016-17 fall turkey season with an estimated 5% hunter success. The combined shotgun and archery portion of the season accounted for 60% of the harvest. Archery hunters accounted for 59% of the total harvest. Adult birds made up 80% of the harvest with a juvenile to adult ratio of 1:4. Adult males composed the largest proportion (46%) of the harvest, followed by adult females (34%). The proportion of adults in the fall harvest is relatively high and likely reflects a combination of low summer brood success, hunter selection for larger adult birds, and age determination errors.

Ninety-five percent of the harvest occurred on private land with 3% and 2%, respectively, on Federal and State lands. Compared to 2015-16 fall harvest, 13 counties had increased harvests, 15 indicated no change, and 64 of the 92 counties experienced decreases. Sixteen counties open to archery only hunting did not harvest a single bird. The proportion of the fall to spring harvest by county ranged from 0% to 20% and the statewide fall to spring harvest proportion was 4% due to the conservative season structure and relatively low hunter interest.

The decline in the harvest and hunter success rate in 2016-17 was likely influenced by a combination of factors. The 2016-2017 fall harvest was similar to the 2014-15 harvest of 548. In 2015-16, an additional five days of firearm hunting (including a second weekend) were added to the northern counties, possibly attracting more hunter interest that may have dissipated after the initial year. Summer brood production in 2016 was down statewide, especially along river drainages in southern and west-central Indiana. Overall, interest in fall turkey hunting in Indiana continues to remain relatively low compared to the spring season. Hunter participation has yet to return to the level of participation observed in the first “novelty” season of 2005 despite increases in potential hunter opportunity.

Fall wild turkey harvest by portion of the season - Indiana, 2016-17.

	Portion of the fall wild turkey season						Total
	Early archery ^a		Combined shotgun & archery ^b		Late archery ^c		
	No.	%	No.	%	No.	%	
Turkeys Harvested	139	26%	326	60%	77	14%	542

^a Early archery only portion of fall turkey season. Dates 1-18 October 2016 (18 days); open statewide (92 counties).

^b Combined shotgun and archery portion: Dates: 19-30 October 2016 (12 days) in 43 counties in south and seven counties in the north.

^c Late archery only portion 3 December 2016 - 1 January 2017 (30 days); statewide. Total days of archery opportunity for fall season = 60.

Fall wild turkey harvest by permit type - Indiana, 2016-17.

Type of Permit	Harvest by Permit	% of Harvest	No. Licenses Sold by Season End Date ^a	Differences in Licenses Sold from Prior Year (%)
Resident Fall Turkey	175	32.3%	3,572	+84 (+2%)
Non-Resident Fall Turkey	5	0.9%	44	+2 (+4.8%)
Comprehensive Lifetime	245	45.2%	43,032 ^b	---- ^b
Comprehensive Youth	37	6.8%	32,960	-477 (-1.4%)
Landowner/active military	80	14.8%	Exempt	Exempt
Harvest Subtotal	542			

^a Apprentices licenses (new in 2008) included in respective license type totals.

^b Comprehensive lifetime hunt and hunt & fish licenses as of 2016. Value represents the number of lifetime license holders who could potentially hunt.

Age and sex structure of the fall wild turkey harvest - Indiana, 2016-17.

	Juvenile ^a		Adult ^b		Total	
	No.	%	No.	%	No.	%
Male	39	7.2%	249	45.9%	288	53.1%
Female	69	12.7%	185	34.1%	254	46.9%
Total ^c	108	19.9%	434	80.1%	542	

Juvenile : Adult 1 : 4.0

^a Juvenile were birds estimated to be < 6 months old.

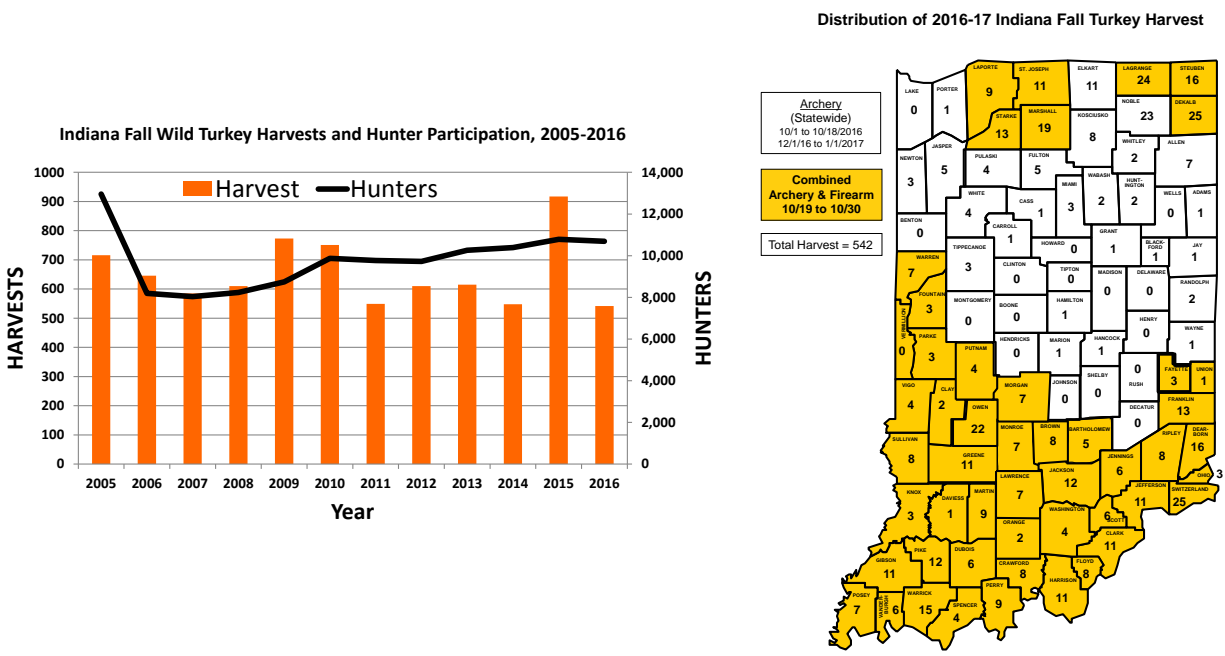
^b Adults were birds estimated to be ≥ 14 months old.

Indiana Fall Wild Turkey Season Summaries, 2005-2016.

	YEAR											
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Annual Harvest	716	646	585	610	773	751	549	610	615	548	917	542
Counties Open to Archery Hunting Only	60	74	74	74	74	92	92	92	92	92	92	92
Days of Archery Only	18	17	16	14	20	61	65	52	45	56	50	50
Counties Open to Shotgun and Archery	26	26	26	34	34	43S/7N	43S/7N	43S/7N	43S/7N	43S/7N	43S/7N	43S/7N
Days of Combined Shotgun and Archery	5	5	5	5	5	12S/5N	12S/5N	12S/5N	12S/5N	12S/5N	12	12
Statewide Fall/Spring Ratio in %	6%	5%	5%	5%	6%	6%	5%	5%	5%	5%	8%	4%
County F:S Ratios (range of values)*	0-15%	0-17%	0-18%	0-11%	0-17%	0-12%	0-25%	0-25%	0-25%	0-63%	0-50%	0-20%
No. Resident Fall Licenses Sold	2,225	1,682	1,557	1,689	2,054	2,591	2,476	2,411	2,824	2,890	3,488	3,572
Estimate of Fall Turkey Hunters**	12,954	8,193	8,035	8,234	8,742	9,869	9,767	9,725	10,256	10,390	10,789	10,688
Estimate of Fall Hunting Success	6%	8%	7%	7%	9%	8%	6%	6%	6%	5%	8%	5%

* High side of range related to counties with low spring harvests e.g., 1 fall/4 spring

** Estimate based on rough extrapolation of prior participation rates of lifetime license holders, youth hunters resident and nonresidents permittees, and an estimated exempt landowners/active military.



Spring Season Results - 2017

Hunters harvested 13,069 wild turkeys in 90 of 92 Indiana counties during the 48th spring wild turkey season as reported to the “Check-IN-Game” harvest reporting system (98% on-line and 2% tele-check). The 2017 harvest was an 8% increase over the 2016 harvest of 12,081. There were 30 counties with harvests ≥ 200 birds compared to 25 in 2016. Overall, 60 counties showed increased harvests, 26 decreased, and six experienced no change in turkeys harvested.

A total of 1,455 birds (11% of harvest) was taken during the youth-only weekend (4/22 & 4/23/2017) with 58% of the regular season harvest (11,614 birds occurring during the first five days of the 19-day season and 42% occurring on the three weekends. Approximately 63% of the harvest occurred by 10 am, 73% by noon, 13% from noon to 5 pm, and 14% occurring from 5 pm to sunset. Resident spring turkey licensees harvested 47% of the birds, followed by Lifetime (32%), Youth (15%), license exempt Landowners/Military (7%), and Non-Resident

spring turkey licensees (3%). The harvest primarily occurred on private land (91%), followed by State lands (5%), Federal lands (4%), and Military areas (0.5%).

Male gobblers made up 98.4% (12,855) of the harvest with 1.6% (214) bearded hens. The age structure of the male harvest was 13% juvenile gobblers (1 year old birds; "jakes"), 39% 2-year-olds, and 48% were 3-year olds. The 13% juvenile proportion was a new low, although similar to the 14% in 2006 and 2012. The age structure reflected the variation in brood production from 2014-2016 and the greater vulnerability of adult gobblers to harvest. Summer brood production in 2016 was extremely poor in many regions of the state, especially in the southern regions with the lowest proportion of adult males in the spring harvest (8%) in south-central Indiana, likely reflecting lower brood survival from abnormal, severe flooding in July, 2016.

The shift toward older gobbler age classes in Indiana's spring harvests began about 10-12 years ago, when summer brood production levels dropped off from the higher mean levels during the wild turkey restoration era (1956-2004 in Indiana) to post restoration "new normal" characterized by reduced brood productivity and declining or stabilized spring harvests. The mean proportion of juveniles in Indiana's spring harvest from 1988-2005 was 28% and has since declined substantially to a mean of 19% ($F_{1,28} = 15.4$; $P = 0.0005$). The 13% juvenile proportion in 2017 spring harvest was also less than the 20% of the previous 10 years ($P < 0.001$).

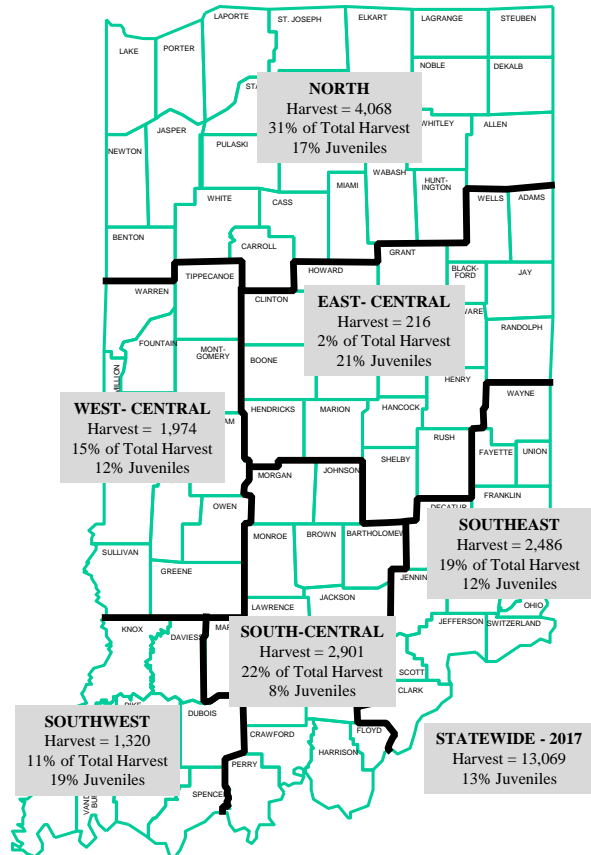
Although overall harvests increased for the second consecutive year, the low proportion of juveniles in 2017 raises concern for future hunter success and satisfaction. The 2017 harvest age structure would suggest even fewer 2-year-old gobblers in 2018 than the 39% in 2017, which was also lower than the previous 10-year mean of 48%. Poor summer production in 2016, apparently manifested in the 2017 spring harvest age structure, also suggests a decrease in the adult hen cohort next year that could influence production for several years, even if weather and habitat conditions are conducive to poult survival.

Annual statewide spring harvests have generally stabilized since the peak harvest in 2010 (13,742) with totals during the previous decade ranging from 11,000 to 12,000 birds and 56,000 to 61,000 hunters in the field experiencing success rates from 18 to 24%. The 2017 spring harvest was the third highest with an estimated 58,980 hunters afield with an estimated success rate of 22%, which was the third consecutive year of slightly improved hunter success with the 5-year mean trend leveling off just above 20%.

Regional spring turkey harvest and age structure in Indiana, 2007-2017.

	Region						Statewide
	North	East-central	West-central	South-central	Southeast	Southwest	
2007							
Harvest	1,788	51	2,104	2,919	2,831	1,500	11,163
% of Total Harvest	16%	0.5%	19%	26%	25%	13%	---
Juvenile %	32%	38%	23%	18%	18%	22%	22%
2008							
Harvest	2,166	60	2,233	3,172	3,057	1,516	12,204
% of Total Harvest	18%	0.5%	18%	26%	25%	12%	---
Juvenile %	34%	25%	22%	19%	18%	18%	22%
2009							
Harvest	2,561	61	2,072	3,314	3,233	1,752	12,993
% of Total Harvest	20%	0.5%	16%	26%	25%	14%	---
Juvenile %	27%	22%	16%	25%	25%	14%	19%
2010							
Harvest	3,088	94	2,021	3,406	3,340	1,793	13,742
% of Total Harvest	23%	0.7%	15%	25%	24%	13%	---
Juvenile %	25%	28%	20%	15%	14%	17%	18%
2011							
Harvest	2,589	77	1,739	2,902	2,800	1,562	11,669
% of Total Harvest	22%	0.7%	15%	25%	24%	13%	---
Juvenile %	25%	27%	24%	20%	19%	16%	21%
2012							
Harvest	3,007	110	2,008	3,069	2,868	1,593	12,655
% of Total Harvest	24%	0.9%	16%	24%	23%	13%	---
Juvenile %	22%	20%	15%	11%	11%	12%	14%
2013							
Harvest	2,834	106	1,742	2,669	2,592	1,431	11,374
% of Total Harvest	25%	1%	15%	24%	23%	13%	---
Juvenile %	25%	31%	29%	22%	22%	24%	24%
2014							
Harvest	2,733	142	1,658	2,510	2,517	1,312	10,872
% of Total Harvest	25%	1%	15%	23%	23%	12%	---
Juvenile %	22%	28%	18%	14%	15%	15%	17%
2015							
Harvest	3,297	167	1,742	2,712	2,485	1,450	11,853
% of Total Harvest	28%	1%	15%	23%	21%	12%	---
Juvenile %	28%	24%	24%	18%	18%	17%	21%
2016							
Harvest	3,727	215	1,855	2,574	2,390	1,320	12,081
% of Total Harvest	31%	2%	15%	21%	20%	11%	---
Juvenile %	20%	22%	18%	18%	18%	19%	19%
Previous 10-Year Means							
Harvest	2,776	108	1,917	2,925	2,811	1,523	12,061
% of Total Harvest	23%	1%	16%	24%	23%	13%	---
Juvenile %	26%	26%	21%	18%	18%	17%	20%
2017							
Harvest	4,068	216	1,974	2,901	2,486	1,424	13,069
% of Total Harvest	31%	2%	15%	22%	19%	11%	---
Juvenile %	17%	21%	12%	8%	12%	10%	13%
2016 to 2017 Differences							
Change in Harvest	341	1	119	327	96	104	988
Percent change in Harvest	9%	0%	6%	13%	4%	8%	8%

Indiana spring wild turkey harvest and age structure by region.



Indiana's spring wild turkey hunting seasons, 1970 to 2017.

Year	Regular Season Dates	Season Length (Days)	No. of Counties	No. of Permits Sold*	Est. No. of Hunters**	Reported Harvest	Hunter Success
1970	5/2-5/5	4	3	75	62	6	9.7%
1971	5/1-5/5	5	9	298	224	11	4.9%
1972	4/26-4/30	5	9	585	422	12	2.8%
1973	4/25-4/29	5	11	625	503	27	5.4%
1974	4/24-4/28	5	11	665	496	26	5.2%
1975	4/29-5/5	7	11	722	501	15	3.0%
1976	4/29-5/5	7	13	666	500	32	6.4%
1977	4/28-5/5	8	16	668	520	46	8.8%
1978	4/26-5/7	12	18	852	619	33	5.3%
1979	4/25-5/6	12	19	932	860	48	5.6%
1980	4/23-5/4	12	17	706	670	54	8.1%
1981	4/22-5/3	12	18	922	814	90	11.1%
1982	4/21-5/2	12	18	1,125	696	73	10.5%
1983	4/20-5/1	12	18	1,218	984	93	9.5%
1984	4/25-5/6	12	18	1,320	1,205	104	8.6%
1985	4/24-5/5	12	25	1,882	1,302	255	19.6%
1986	4/23-5/4	12	25	2,523	1,648	293	17.8%
1987	4/22-5/6	15	33	3,348	2,619	741	28.3%
1988	4/27-5/11	15	33	10,894	4,677	905	19.4%
1989	4/26-5/10	15	39	11,442	6,068	1,359	22.4%
1990	4/25-5/9	15	39	14,379	7,860	1,505	19.1%
1991	4/24-5/8	15	43	16,387	9,643	2,318	24.0%
1992	4/22-5/6	15	43	18,735	13,110	2,531	19.3%
1993	4/28-5/16	19	48	21,078	15,673	3,500	22.3%
1994	4/27-5/15	19	48	23,357	18,622	3,741	20.1%
1995	4/26-5/14	19	52	28,858	20,861	4,706	22.6%
1996	4/24-5/12	19	52	28,733	21,442	4,859	22.6%
1997	4/23-5/11	19	74	32,703	23,085	5,790	25.1%
1998	4/22-5/10	19	74	32,889	22,876	6,384	27.9%
1999	4/21-5/9	19	74	38,730	27,285	6,548	24.0%
2000	4/26-5/14	19	74	40,801	28,615	7,822	27%
2001	4/25-5/13	19	74	43,815	36,103	9,975	28%
2002	4/24-5/12 [†]	19	90	44,333	37,919	10,575	28%
2003	4/23-5/11	19	90	48,857	40,110	10,366	26%
2004	4/21-5/9	19	90	50,839	41,996	10,765	26%
2005	4/27-5/15	19	88	50,839	49,684	11,159	22%
2006	4/26-5/14	19	88	67,290	50,880	13,193	26%
2007	4/25-5/13 ^{††}	19	91	69,861	53,402	11,163	21%
2008	4/23-5/11	19	91	71,052	55,022	12,204	22%
2009	4/22-5/10	19	92	75,161	59,000	12,993	22%
2010	4/21-5/9	19	92	73,089	56,891	13,742	24%
2011	4/27-5/15	19	92	72,323	56,220	11,669	21%
2012	4/25-5/13	19	92	71,836	57,631	12,655	22%
2013	4/24-5/12	19	92	74,966	60,889	11,374	19%
2014	4/23-5/11	19	92	73,279	59,237	10,872	18%
2015	4/22-5/10	19	92	69,192	55,531	11,853	21%
2016	4/27-5/15	19	92	70,484	57,332	12,081	21%
2017	4/26-5/14	19	92	72,775	58,980	13,069	22%
2018	4/25-5/13	19	92				

* Includes all allowable license types (e.g., lifetime, youth licenses sold by May, non-residents, and apprentice).

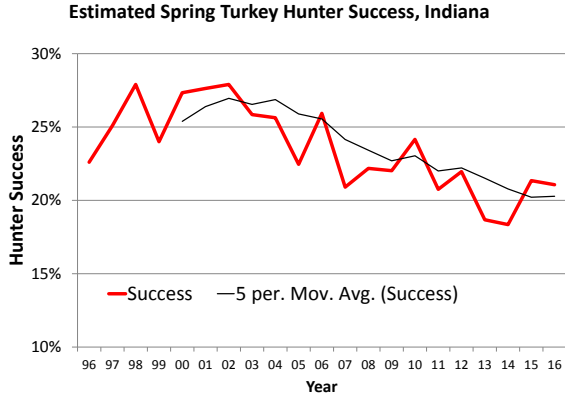
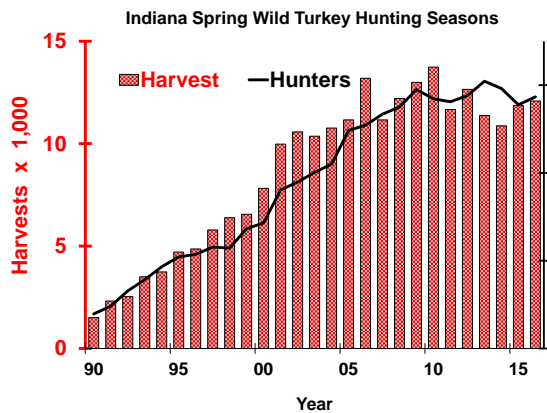
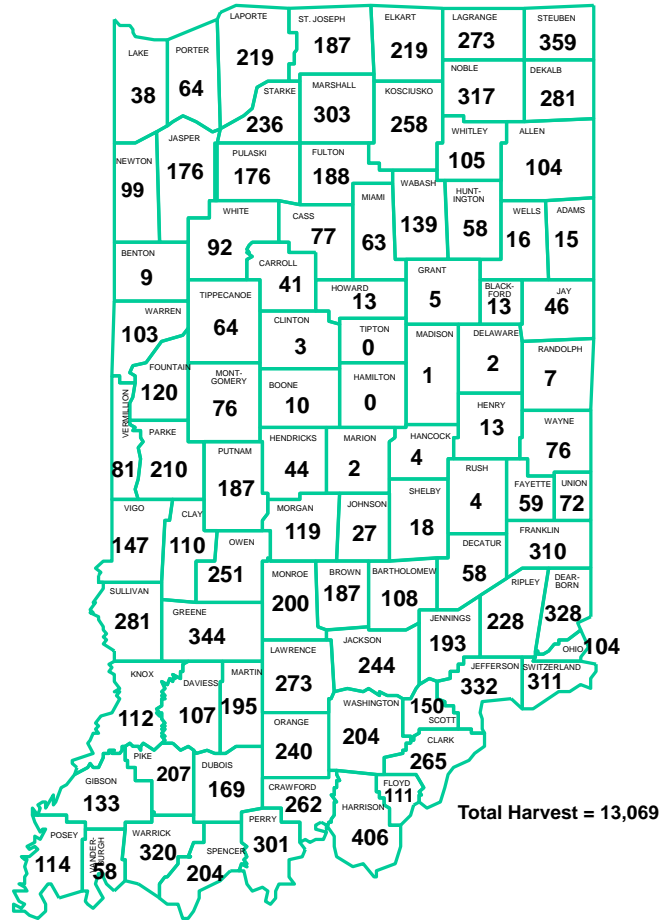
** No. of hunters includes those permit holders who hunted ≥1 day. Since 1986, the number of hunters includes an estimate of license exempt landowners or military hunters on active leave participating in the spring season.

[†] "All-day" turkey hunting initiated: 1/2 hr prior to sunrise to sunset.

^{††} Beginning with the spring 2007 season, a special 2-day youth-only season is held the weekend prior to the regular season opening.

Bold italics = preliminary estimates based on projecting previous years' trends or means

Distribution of Indiana's 2017 Spring Turkey Harvest



LICENSE AND SEASON INFORMATION

Complete rules, regulations and licensing information: <http://www.in.gov/dnr/fishwild/2344.htm>

Fall Season (2017)

Early Archery Oct. 1-29; Combined Shotgun/Archery Oct. 18-29; Late Archery Dec. 9 – Jan. 7, 2018.

Bag Limit: 1 bird of either sex no matter what portion of the fall season.

Licenses: Res. \$25 + \$6.75 game bird stamp; Non-Res. \$120 + \$6.75 game bird stamp

Res. Comprehensive Youth \$7; Non-Res. Youth \$25.

Exempt: landowners hunting on own land (no acreage requirement)/active military on leave.

Shooting Hours: “all-day” ½ hour before sunrise to sunset.

Various types of apprentice license options available.

Spring (2018)

Regular Season April 25 – May 13, 2018; Youth Weekend April 21-22, 2018.

Bag Limit: one bearded or male turkey.

License Fees: Separate licenses required for Spring and Fall seasons except for Res. Comp. Youth. Same prices as above.

Shooting Hours: “all-day” ½ hour prior to sunrise to sunset except DFW properties close at noon in spring.

POPULATION TRENDS

Summer Brood Survey - 2016

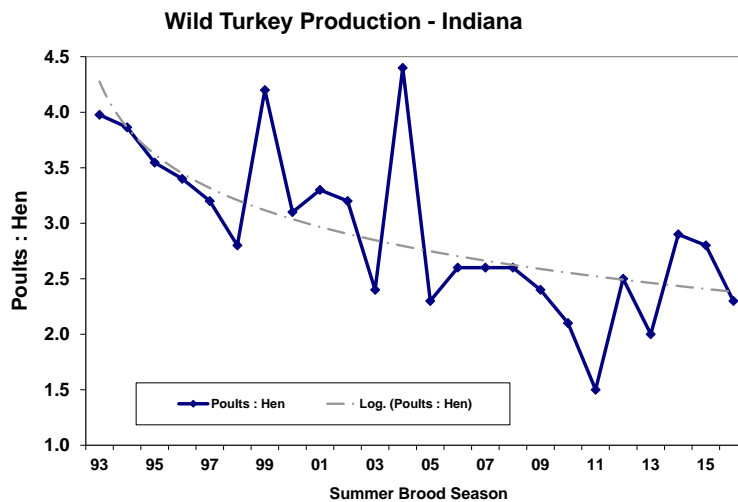
In 2016, a new web-based brood reporting system (<http://www.in.gov/dnr/fishwild/8641.htm>) was initiated using a “caspio™” on-line data entry software platform (<https://www.caspio.com/>). This system allowed both natural resource agency personnel and interested publics to submit observations of wild turkeys during the summer months. The 2016 statewide mean wild turkey production index was 2.3 poults:hen (PI = total poults:total adult hens), with 89% of the hens observed with at least one poults. The 2016 PI was 7% lower than the 2015 PI (2.8) but equal to the mean 2.3 PI of the previous five years (2011-2015; $\alpha = 0.05$). Since 1993, the average PI has progressively declined, reaching a lower level indicative of a post-restoration, stabilizing turkey population. Annual fluctuations in the PI around the long term average are expected and are also characteristic of a stabilized population that has settled to a generally lower level. Future production will likely reflect the amount of suitable habitat conditions across the landscape.

Climatically, the spring/early summer of 2016 had above normal precipitation and below normal temperatures in southern Indiana, marking the 11th consecutive year of above normal precipitation in this region during the early brood rearing periods of June-July. Bottomlands in much of southern Indiana experienced rare “corn high” flooding in July. In contrast, some areas in northern Indiana were exceptionally dry during the early brood period and potentially had

better production. Regional inferences about the 2016 summer production indices are limited due to the scarcity and the uneven distribution of observations across the state.

Inferences from the regional production summaries should be viewed with caution due to the scarcity of brood reports in regions of the state that traditionally support higher spring harvests (e.g. southeast Indiana). For example, 70 (39%) of the total 178 observations in south-central Indiana came from one county (Monroe) that contributes < 2% of the total annual spring harvest. Conversely, there were only 16 observations in the 13-county southeast region that typically accounts for $\geq 20\%$ of the total annual spring harvest. Other potential biases included differences in the number of observers and brood detection rates among regions due to differences in vegetation, road density and topography.

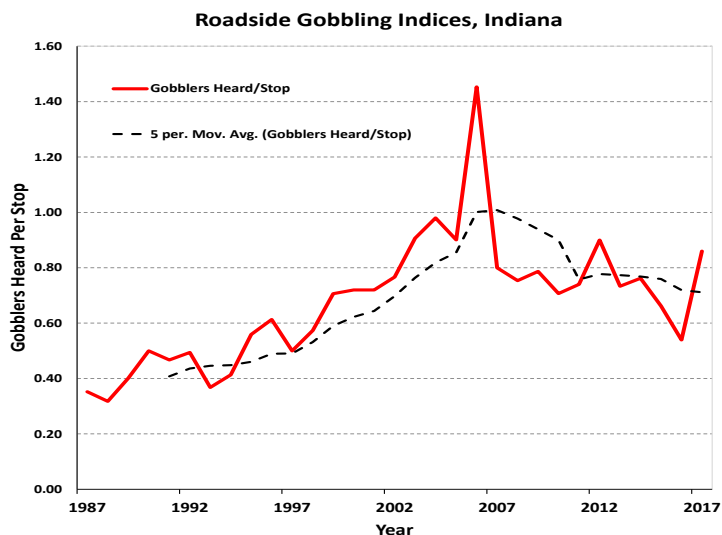
An effort to increase participation of obtaining turkey brood reports across the state was made 2017. Data collection was restricted to July and August, observation reports were limited to those of adult hens (with and without broods), poults, and county where observed. Inclusion of illustrative pictures of wild turkey broods with reporting instructions will hopefully improve brood reporting accuracy. The summer of 2017 has again been characterized, especially in the southern regions of the state been characterized by frequent, often heavy rainfalls (≥ 3 in/24 hrs)



Roadside Gobbling Counts- 2017

Roadside gobbler counts are conducted annually from late March to April to determine relative abundance of wild turkey populations in the areas surveyed. In 2017, 14 roadside routes were surveyed in portions of 19 counties; these surveys were conducted in conjunction with traditional roadside counts of drumming male ruffed grouse. Each route has 15 predetermined listening stops along 10-20 miles of rural roadways. Routes are driven at least twice, in opposite directions, and the highest gobbler count per stop is used to determine the Gobbling Index (GI). The average number of gobblers heard per stop on the 14 routes in 2017 ranged from 0.33 to 1.73. The statewide GI of 0.86 gobblers heard per stop was 51% more than the 0.57 GI in 2016.

Although roadside gobbling counts are not accurate indicators of annual trends in wild turkey populations, they do provide long-term (i.e., ≥ 5 years) trends and information to compare areas relative to one other. The 5-year moving average showed a general increase from 1987 to 2006, followed by a general decrease since the 2006 peak. The 2017 statewide gobbling index of 0.86 was greater than the 5-year mean of 0.7, but within the 5-year confidence limit interval ($CI = 0.55-0.88$; $P < 0.05$).



Regulation Changes

A proposal to add Elkhart, Kosciusko, and Noble counties (northern tier counties) to the county list for the firearms (shotgun) portion of the fall wild turkey hunting season was submitted and approved in 2016 with an intended implementation in fall 2017-18. However, many new regulation proposals have been put on hold under the new Administration.

Indiana fully implemented its “Check-IN-Game” web-based and telephone harvest registration system in 2016. Under the prior check station system hunters were required to transport their harvested game to a mandatory check station for registration within 48 hours post-harvest. An examination of the reported times of harvest and registration from the “Check-IN-Game” system for the spring 2017 wild turkey and fall 2016-17 deer and turkey seasons indicates a shorter reporting requirement of 12 hours would accommodate 82% of turkey hunters and 71% of deer hunters (24 hours; 91 and 98% turkey and deer respectively), assuming no changes in human behavior (procrastination) as observed under the current 48 hour allowable time period.

Crop or Nuisance Issues

Crop depredation complaints in row crops continue to diminish each year. Reports of “perceived crop damage” complaints by wild turkeys are occasionally received by district biologists during deer or goose damage investigations. Nuisance complaints are more common than crop complaints on a year to year basis; most nuisance complaints involve “backyard” situations and

wildlife feeding. General recommendations are to remove food sources, apply abatement techniques, and/or allow fall hunting. Nuisance take permits for taking nuisance wild turkeys are only issued if the situation involves a “human health and safety issue” and if prescribed abatement techniques have failed.

One recent complainant, who runs a commercial blueberry farm and enjoys seeing wild turkey broods using their blueberry fields for bugging, expressed concerns that their farm may run into compliance issues with recently proposed Food and Drug Administration (FDA) regulations for commercial fruit and vegetable growers:

<https://www.fda.gov/food/guidanceregulation/fsma/ucm334114.htm> .

Apparently, the interpretation among some commercial growers is to reduce the probability of wild animals defecating on crops, that encouraging or attracting wildlife use would be considered out of compliance, and commercial growers are expected to develop wildlife management plans to reduce or minimize wildlife use on their properties. Further investigation is ongoing.

Disease Issues

No notable disease issues related to wild turkeys to report.

Research

No specific research projects ongoing. An examination of hunter effort (“catch per unit effort”) information by county and regions from the 2002, 2007, 2012 and 2016 wild turkey hunter questionnaires is underway. This examination is a follow up to the findings of the Midwest Wild Turkey Research Consortium’s findings that assessment of hunter effort parameters are crucial to accurately determine harvest and as a surrogate index to wild turkey population trends.

Relevant Links

Complete results of turkey population and harvest surveys found at:
<http://www.in.gov/dnr/fishwild/3352.htm>

Note: Under key words only use the word “turkey” not “wild turkey”.

APPENDIX P

IOWA

IOWA WILD TURKEY POPULATION STATUS REPORT – 2017

41th Midwest Wild Turkey Working Group Meeting – August 28-31, 2017
Honey Creek State Park Resort Moravia, Iowa

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Iowa Department of Natural Resources
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Chariton, Iowa
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POPULATION STATUS

Iowa continues to have robust turkey populations in areas with good turkey habitat. Being the transition from Eastern deciduous forest to tall grass prairie means Iowa's turkeys are not evenly distributed across the state. A large portion of Iowa's woodlands are found in the eastern and southern 1/3 of the state. These habitats range from the driftless regions of Northeast Iowa to the oak/hickory timber of the south. Much of the turkey habitat in the central and western parts of the state is relinquished to woodlots and riparian areas (Figure 1). With a noticeable exception along the western boarder in the Loess Hills region.

The wild turkey population most likely peaked in the early 2000's as indicated by the number of license holders and the harvest (Figure 2). Current estimates place Iowa's wild turkey population at approximately 160,000 birds. This is down significantly from historical projections.

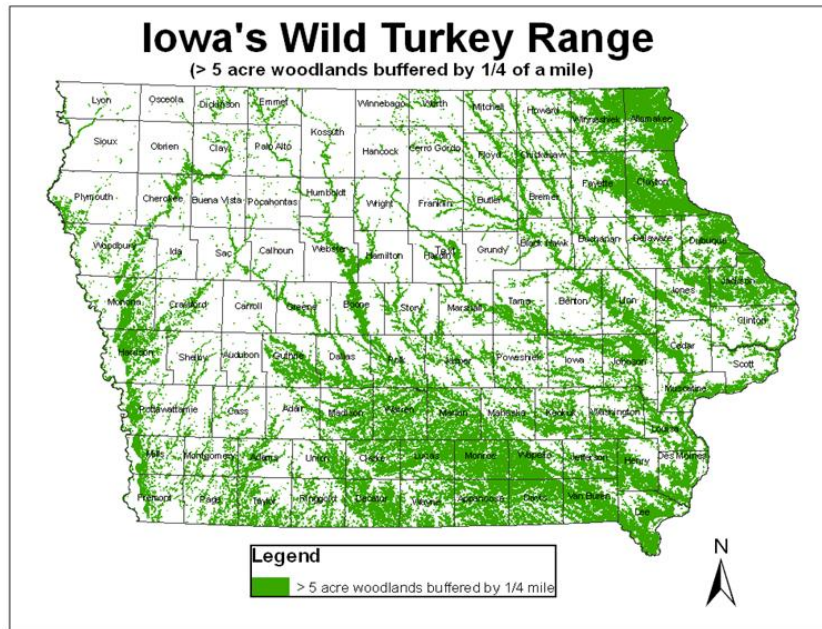


Figure 1. Iowa's wild turkey range (5 acre and greater woodlands buffered by 1/4 mile).

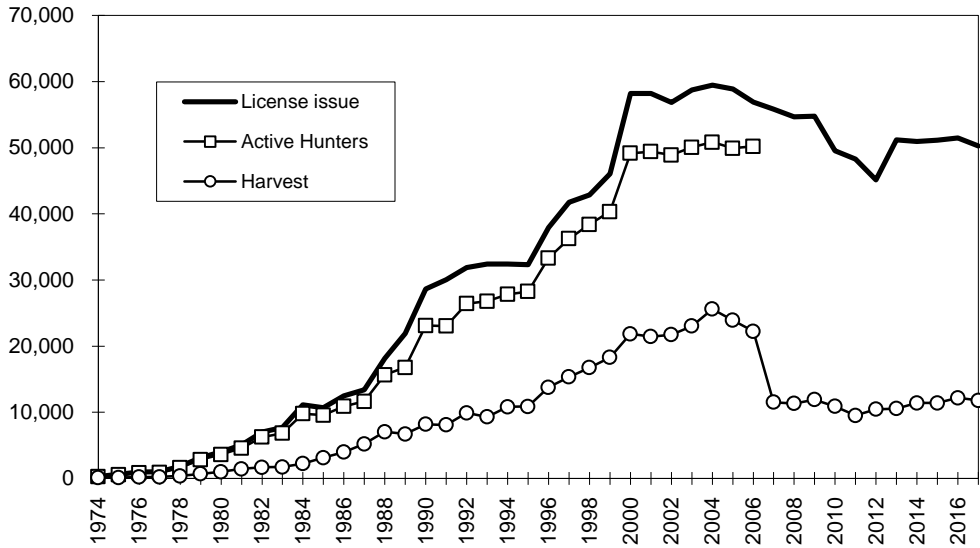


Figure 2. Iowa spring turkey hunting statewide estimates 1974-2017. Active hunters unknown after 2006 due to survey changes. Harvest estimation methods changed from mail surveys to mandatory reporting in 2007.

The Iowa bow hunter survey (Figure 3) along with the July/August brood survey (Figure 4) are the two techniques that allow for the direct estimation of wild turkeys by observation. Both allow for regional population trend information to be gathered.

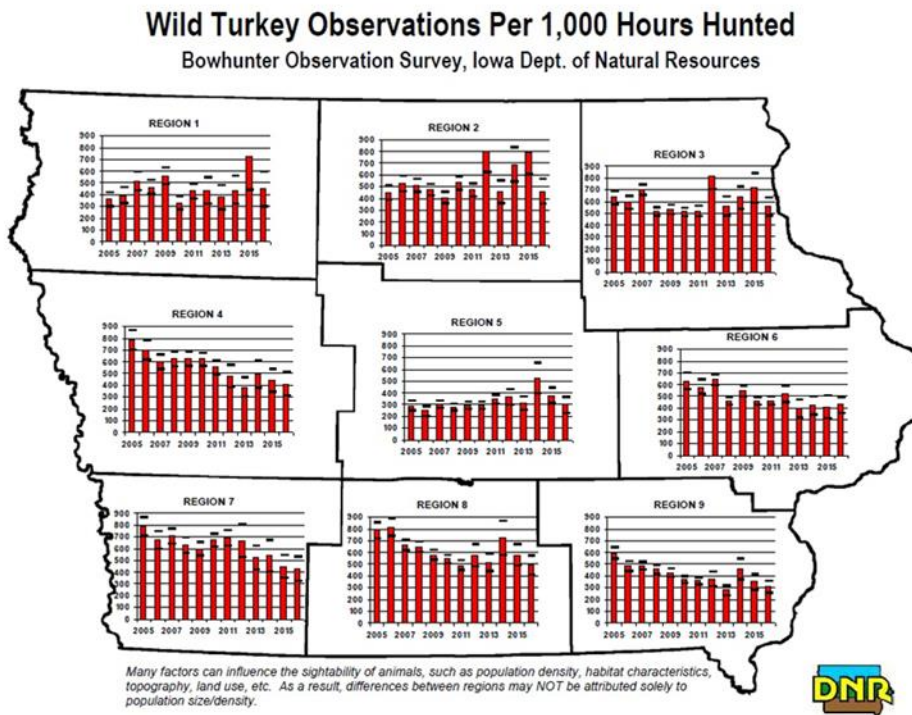


Figure 3. Annual Bowhunter Observation Survey for Wild Turkey

REPRODUCTION

The Iowa Department of Natural Resources has conducted a July/August wild turkey brood production survey since 1976. In 2014 the traditional rural mail carrier survey was replaced with a bimodal survey that uses postcards and a web based survey. Postcards are mailed to department personnel as well as selected turkey hunters in each of the 9 agricultural regions. Observers then record their sightings by month and day and return the postcard at the end of the survey (July1-August31). Each person has a unique identifier so they can choose to enter their data via the web instead of by traditional mail. Other citizen scientists are encouraged through press release and known email addresses to also survey wild turkeys and report via the web as a guest observer. This information is then compiled into a statewide (Figure 4) and regional (Figure 5) information. 2016 young per adult and birds per flock brood information is not available at the time of writing this document.

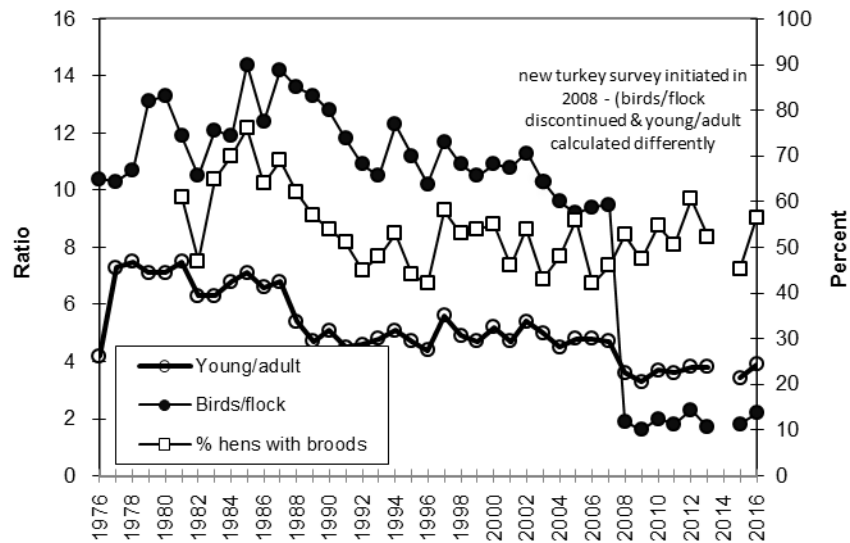
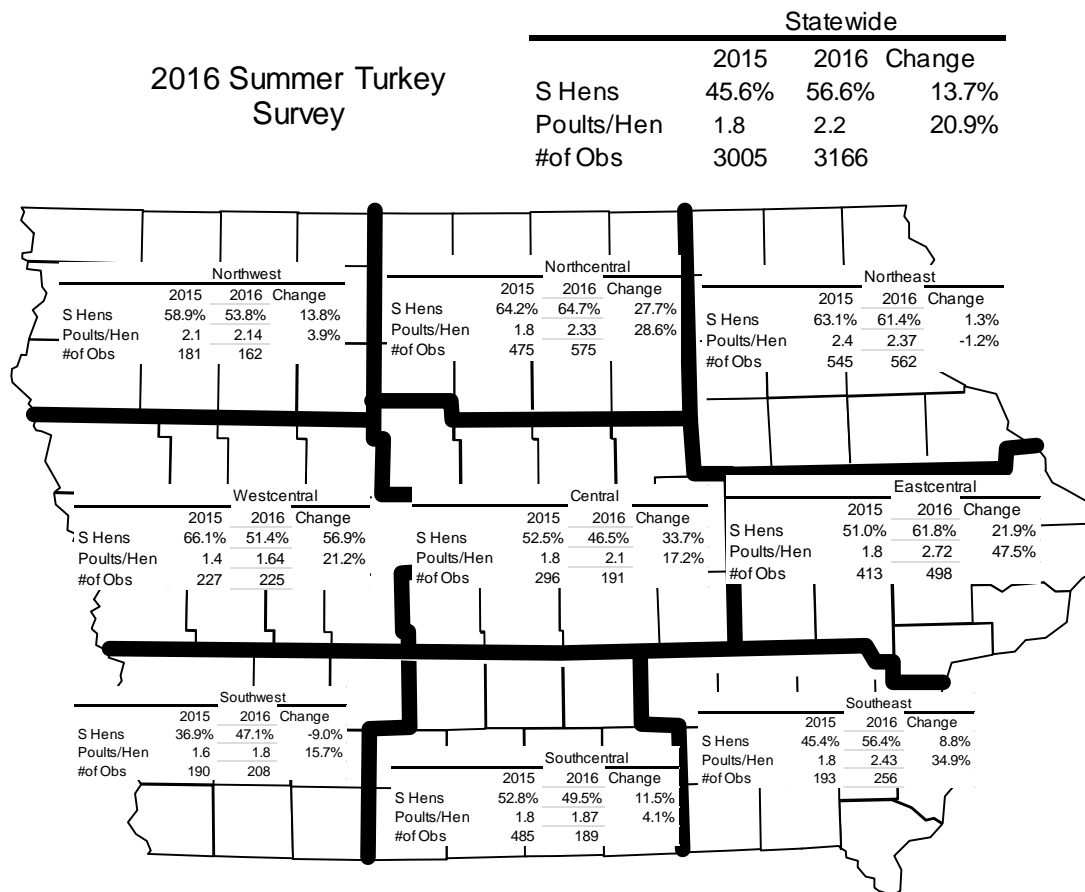


Figure 4. Iowa Turkey Brood Survey Statewide Results 1976-2016.



S hens = percent of successful hens observed with a brood.
 Poult/Hen = number poult observed per all hens.
 # of Obs = number times turkeys were observed by cooperators.

Figure 5. Regional Wild Turkey Production Data.

2016 saw an overall statewide increase (20%) in the number of hens with poults. Poults/per all hens observed ratio was 2.2. However we are unable at this time to calculate the poults per successful hen were 3.8 statewide. This data was variable across the 9 agriculture regions (Fig 5). The bowhunter survey information from 2016 (Fig. 6.), indicates trends of poorer reproduction across much of the state. With much of the state's habitat located along riparian corridors, populations located in these areas can be quite susceptible to spring flooding. Greater acreage of CRP exists in the southern portion of the state which provides additional nesting cover option.

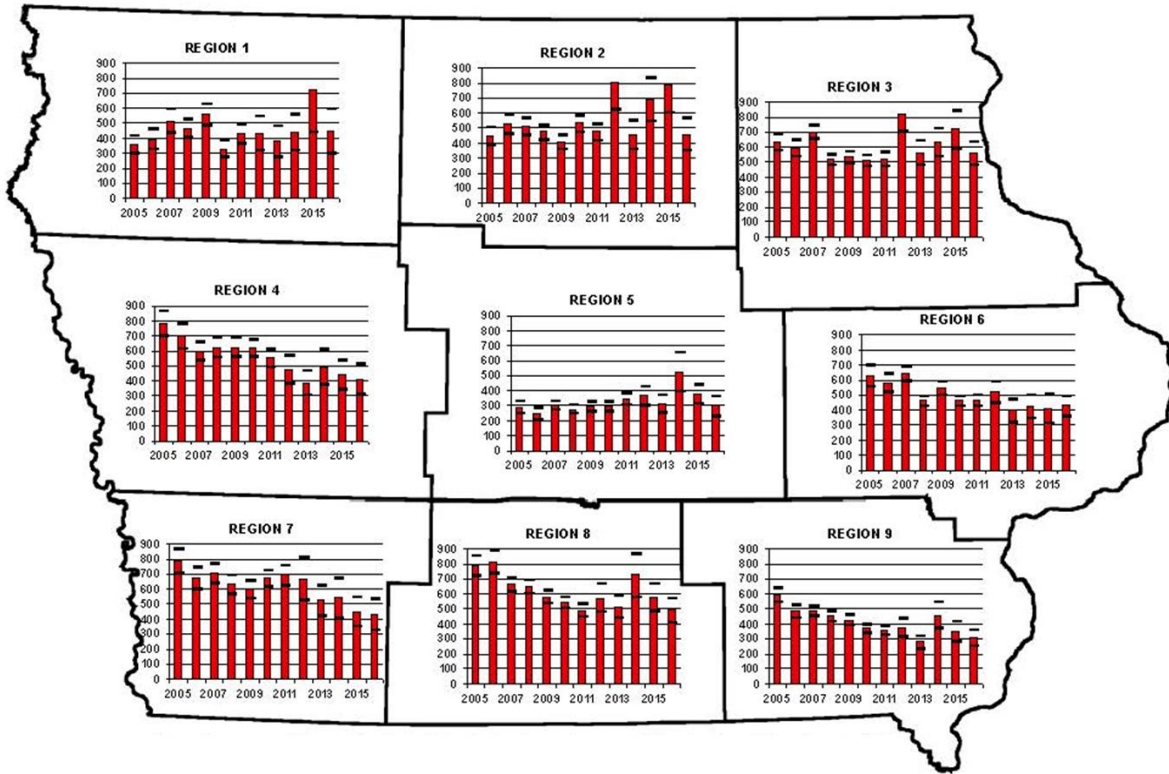


Fig.6. 2016 Wild turkey Observation by Deer Bowhunters per 1000 hours

HARVEST

2016 Fall Turkey Season

Fall turkey hunter success rates dropped slightly in 2016 (7.9%) from 2015 (8.8 %), but are still well below the 2005 and prior estimates. This significant change is most likely due to the change in harvest estimation technique. Mandatory reporting replaced a post card survey in 2006. Total fall licenses issued decreased in 2016 to 7,919 from 8,537 in 2015. Bow licenses dropped by 910 overall tags. Bow-only season started October 1st and ran until January 10th 2016 with December 5th-20nd excluded for the shotgun deer season. Gun/bow season was 54 days from October 10th - December 2th. Forty-six percent of the fall licenses were issued free to landowners, which was the same percentage as in 2015. Estimated numbers of active hunters were undeterminable since there was no post card survey after the season. The 5.7% success rate for 2016 archery only licenses was lower than 2015 (6.6%) but falls into line with previous years. Nonresidents have not been permitted to hunt fall turkeys in Iowa since 1990. Residents must apply for limited number of licenses by picking a zone when fall hunting (Fig.7). Dogs are legal to use for turkey hunting during the fall season, although we have never survey our fall hunters to see how/when they hunt with dogs.

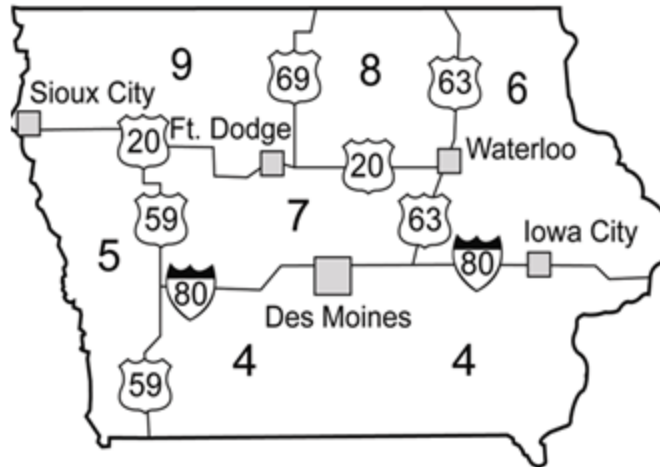


Fig. 7 Iowa Fall Resident Hunting Zones

2016 Spring Turkey Season

Iowa's 44th modern spring hunting season recorded an estimated 11,779 turkeys harvested, with 52,068 licenses sold. This was the 29th year the entire state was open to spring turkey hunting. The 44-day season (8 April through 21 May, 2017) was partitioned into 5 separate seasons: a 9-day youth-only season, and 4 regular seasons (4,5,7 and 19-days). The 5 season format, with unlimited license quota for all the periods, resulted in 41,123 resident shotgun licenses issued, which was a decrease of 1172 from 2016. An additional 6,902 (7,170-2016) archery-only licenses were issued in 2017. Archery-only licenses harvested 1,188 turkeys, resulting in a 17.2% success rate. Twenty-four percent of the resident gun hunters were successful in harvesting a gobbler in 2017. Turkeys were harvested in all of Iowa's 99 counties.

This was the 28th spring that nonresidents were allowed to hunt turkeys in Iowa. Non-resident hunters harvested 843 turkeys. Nonresidents reported a higher success rate for spring gobblers than did residents (41% versus 23% respectively). Nonresidents are partitioned across the state to spread out perceived hunting pressure. [Link 1](#)

In spring of 2017, known jakes (spurs < 1/2") harvested were 15% of the total harvest (15% 2016). Turkeys harvested with spurs 1/2" – 3/4" were 20% (25% in 2016) of the total harvest. The majority (64%) of turkeys harvested in 2017 had spurs greater than 3/4 of an inch in length.

HUNTING INCIDENTS

There were no reported turkey hunting related injuries during the spring 2017 season. Iowa continues to have very little incidence of accidents during either the spring or fall seasons. Most injuries reported are self-inflicted due to poor gun handling.

REGULATION/LEGISLATION CHANGES

No major changes occurred during the 2016-2017 turkey seasons. The most recent major change was allowing an unfilled youth tag to remain valid until filled during any other season. Legislation was passed during the 2016 legislative session to allow an apprentice hunting license. The rules have been written and went into effect during the fall of 2016. This license allows anyone without a hunter safety certificate to hunt with an apprentice license while being mentored by a legally licensed hunter. This is part of the departments R3 campaign.

RESEARCH

Iowa is not currently conducting any active field research.

EMERGING OR EVOLVING ISSUES

The Iowa DNR will be evaluating the impact of the early youth hunting season dates. With the current legislation allowing the use of an unfilled tag we may reduce the youth season from 9 days back to the previous 3 day structure.

Hunters often state they have no place to hunt this year the Iowa DNR private lands biologist have enrolled over 24,000 acres of private lands that are available as walk in hunting areas. This program is in the third year of being evaluated for usage and cost efficiencies. Known as IHAP this program is gaining in popularity. Iowa has also initiated an interactive map that shows all public lands available for hunting. ([Link 2](#)).

RELEVANT LINKS

Link 1 <http://www.iowadnr.gov/Hunting/Nonresident-Hunting#13018104-nonresident-turkey>

Link 2 <http://programs.iowadnr.gov/maps/huntingatlas/default.html>

MISCELLANEOUS

Sixty turkeys were successfully transferred to Texas last winter. We will support The Texas effort again this year. All transferred turkeys have been part of our depredation program. An additional 57 depredation turkeys were relocated inside the state.

APPENDIX Q

KANSAS



2016-2017 Kansas Wild Turkey Program Report



Kent Fricke, Small Game Coordinator

Midwest Deer and Wild Turkey Study Group

I. Current Harvest

Spring Turkey Harvest Comparison: 2016 v 2017

Weapon / Sex	2016	2017	% Difference
Crossbow	837	1,142	36
Archery	3,515	3,681	5
Firearm	25,858	25,581	-1
Estimated Total Harvest	30,298	30,441	0.5
Adult Males	26,548	27,556	4
Juvenile Males	3,628	2,574	-30
Bearded Females	123	312	154

Spring Turkey Hunter Success Rates, among active hunters (≥ 1 bird harvested)

Year	Overall Hunters	Overall Hunter Success (%)	Resident Hunters	Resident Success (%)	Non-Resident Hunters	Non-Resident Success (%)
2013	44,803	57.1	30,422	51.8	14,253	66.1
2014	43,050	54.5	28,686	49.3	14,245	62.2
2015	46,225	54.8	30,938	46.3	15,391	61.6
2016	44,940	47.3	29,014	43.0	15,926	53.0
2017	40,994	50.7	24,998	44.4	15,996	59.5

Spring Turkey Hunter Success Rates of Active Hunters

# of Turkey Killed	Successful Hunters	% of Successful Hunters
1	20,799	50.7
2	11,480	46.2

Fall Turkey Harvest Comparison: 2014/2015 v 2015/2016

Weapon / Sex	2015-2016	2016-2017	% Difference
Estimated Total Harvest	2,093	1,471	-30
Adult Males	836	449	-46
Juvenile Males	387	170	-56
Adult Females	612	286	-53
Juvenile Females	143	34	-76

Fall Turkey Hunter Success Rates: 2016/2017

# of Turkey Killed*	Successful Hunters	% of Successful Hunters
1	1,413	19
2	23	2
3	22	18
4	12	23

* Game tags (3) were only available in the Northcentral hunting unit (Unit 2) for the fall 2016/2017 season.

II. License and Season Information

Kansas License and Sales Information (Fall 2016 and Spring 2017)

Residency	Permit Type	Fall 2016		Spring 2017	
		Cost (\$)*	Number Sold	Cost (\$)*	Number Sold
Resident	General Permit	22.50	4,154	27.50	13,485
	Game Tag	12.50	751	37.50	6,194
	Combo**	--	--	17.50	3,030
	Youth Permit	7.50	614	7.50	3,132
	Youth Game Tag	7.50	92	7.50	850
	Youth Combo	--	--	12.50	1,183
	Landowner / Tenant Permit	12.50	1,338	15.00	3,317
	Landowner / Tenant Combo	12.50	--	20.00	811
Non-Resident	General Permit	32.50	1,361	62.50	11,597
	Game Tag	22.50	233	32.50	8,328
	Combo**	--	--	87.50	2,530
	Youth Permit	12.50	92	12.50	842
	Youth Game Tag	12.50	28	12.50	494
	Youth Combo	--	--	22.50	319
	Tenant Permit	--	78	32.50	202
	Tenant Combo	--	--	45.00	40

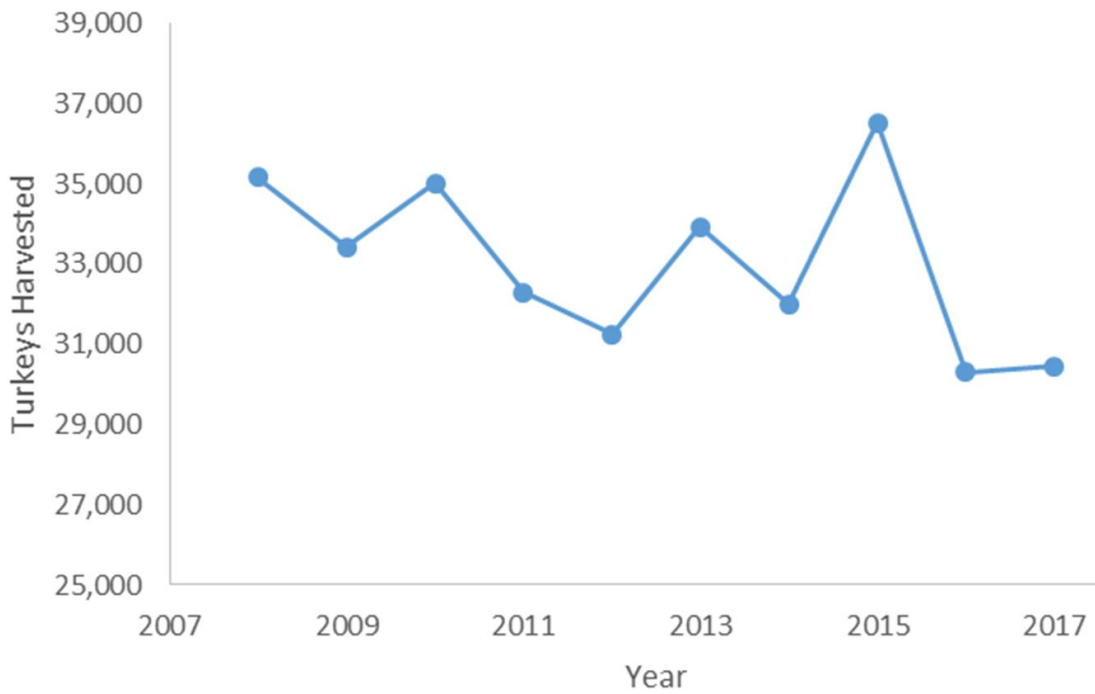
* Hunters must also buy an annual small game license (resident = \$, non-resident = \$, and non-resident youth = \$).

** Combos include initial permit and one game tag (2 permits, total). Combos are available for purchase only through March 31.

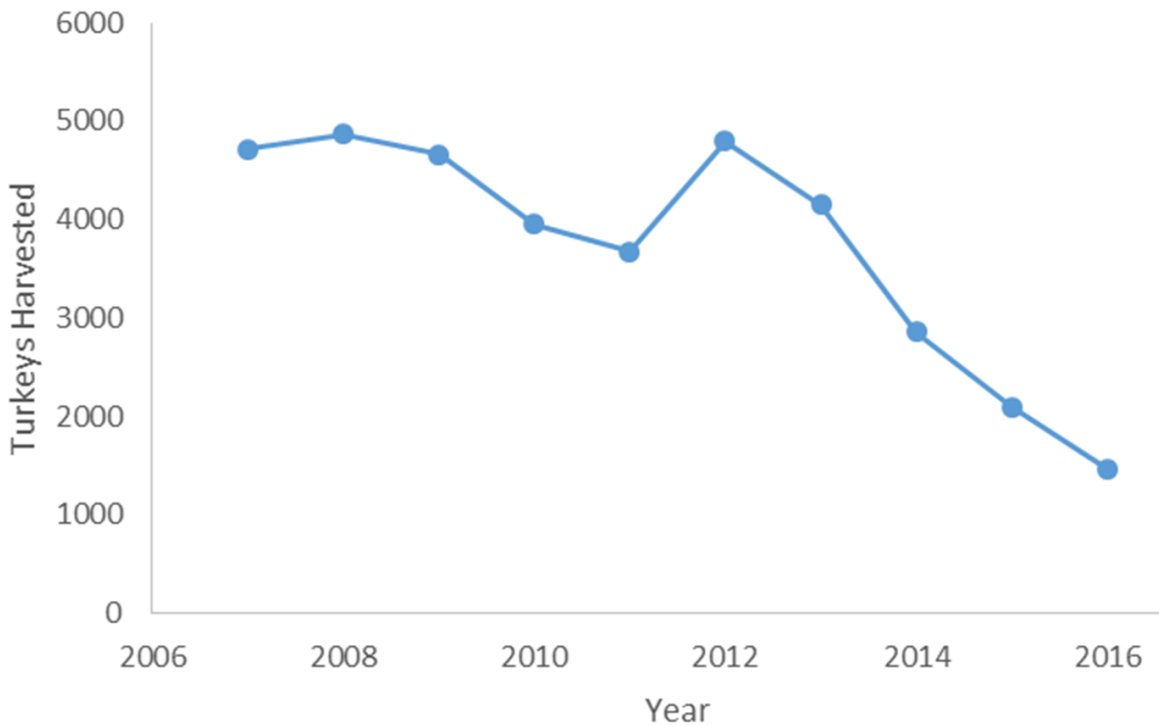
Kansas Season Dates

Season	2016 Fall Dates	2017 Spring Dates
Youth / Disabled	--	April 1-11
Archery	--	April 3-11
Any Legal Weapon	October 1-November 29, and December 12-January 31	April 12-May 31 (includes firearm)

III. Historical Harvest

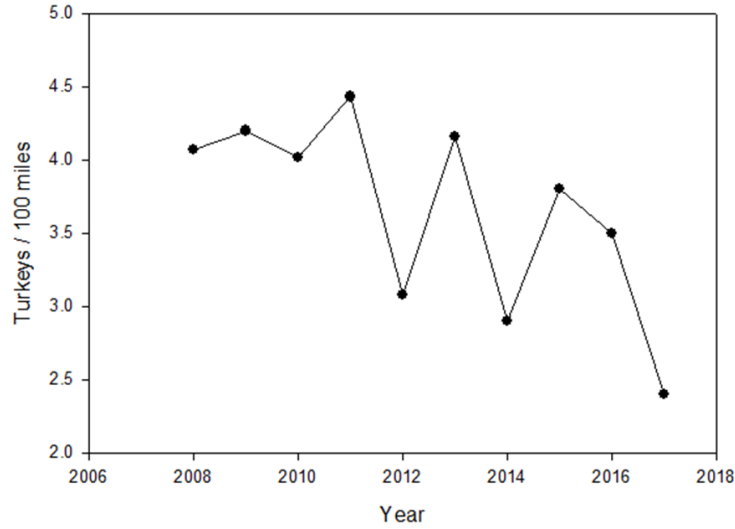


Estimated number of turkeys harvested statewide in Kansas during the spring season, from 2008-2018.

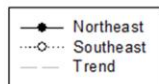
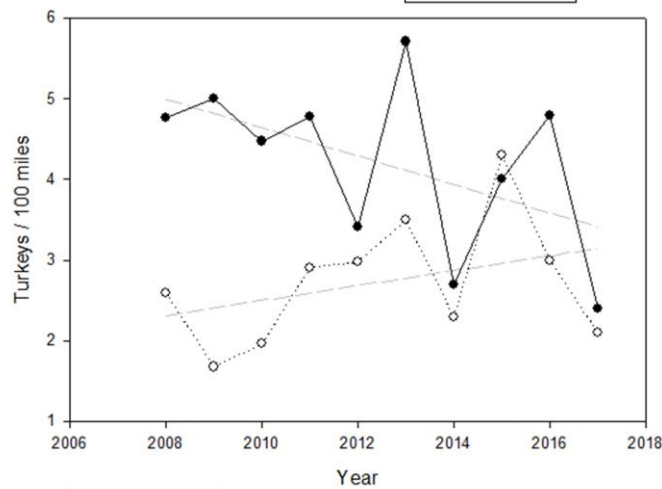
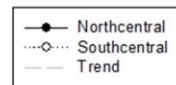
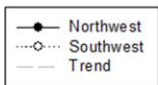
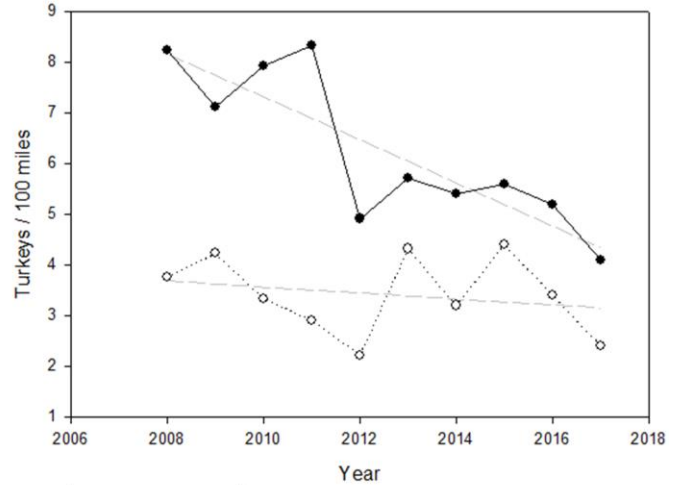
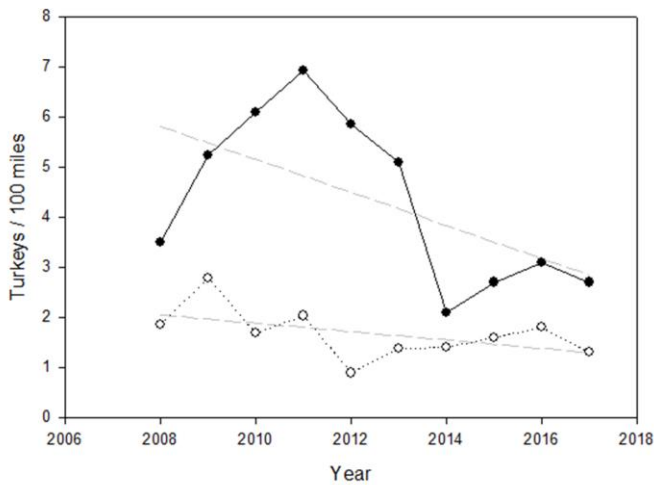


Estimated number of turkeys harvested statewide in Kansas during the fall season, from 2007-2016.

IV. Population Trends

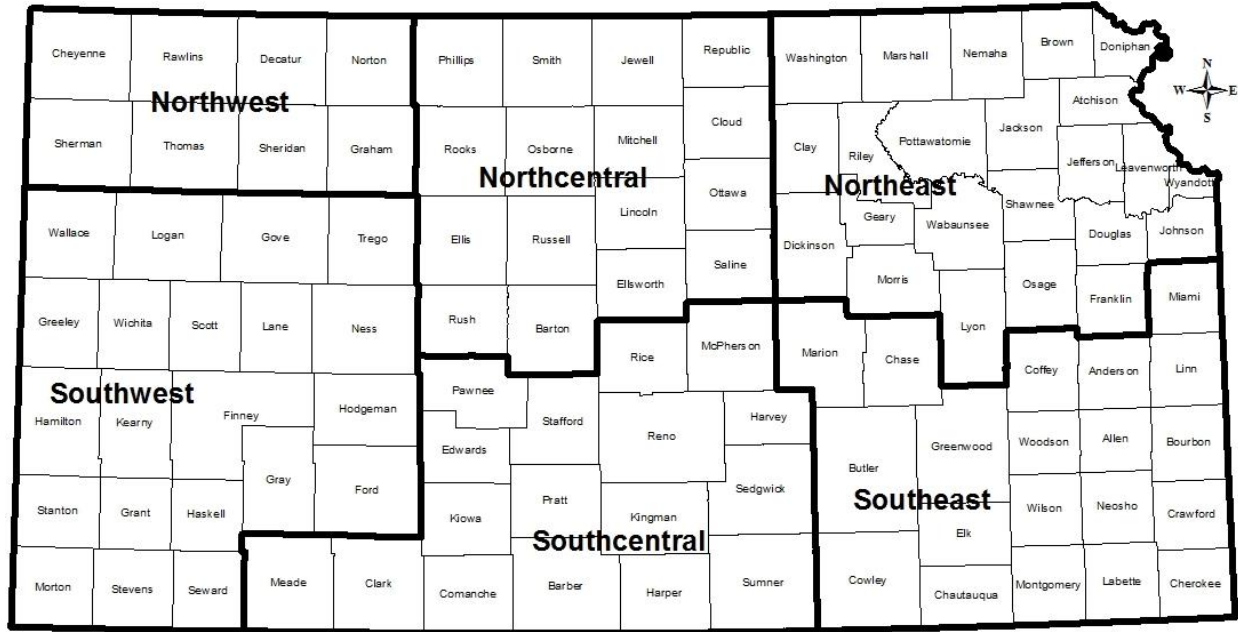


Statewide spring turkey index for Kansas, based on spring (April) rural mail carrier survey, 2008-2017. Spring 2017 index is 31% below the previous 5-year average, and 39% below the previous 10-year average.



Regional spring turkey indices for Kansas, based on spring (April) rural mail carrier survey, 2008-2017.

Kansas Turkey Management Units



VI. Regulation / Legislation Changes

No regulation or legislation changes have occurred for wild turkeys in Kansas.

VII. Urban / Special Hunts

No special hunts of note.

VIII. Management Assistance/Crop Damage

No nuisance or damage complaints of note have been reported in the past year.

IX. Disease Issues / Updates

No disease issues were reported in the past year.

X. Research

No research is currently ongoing or proposed in Kansas.

XI. Hot Topics

The Kansas Statewide Turkey Committee is currently assessing the Turkey Harvest Strategy for the state, with recommendations to be brought forth in spring 2018.

XII. Relevant Links

General Kansas turkey information: <http://ksoutdoors.com/Hunting/What-to-Hunt/Turkey>

Hunting regulations summary:

<http://ksoutdoors.com/content/download/14625/100362/file/Kansas%20Hunting%20Regulations%2013.pdf>

Fall Hunting Atlas: <http://ksoutdoors.com/KDWPT-Info/Locations/Hunting-Fishing-Atlas/Fall-Hunting-Atlas>

Spring Hunting Atlas: <http://ksoutdoors.com/KDWPT-Info/Locations/Hunting-Fishing-Atlas/Spring-Hunting-Atlas>

APPENDIX R

KENTUCKY

KENTUCKY WILD TURKEY POPULATION STATUS REPORT – 2017

Midwest Deer & Turkey Study Group Meeting – August 28-31, 2017
Honey Creek State Resort, Iowa

Zak Danks – Wild Turkey Program Coordinator
Kentucky Department of Fish and Wildlife Resources
1 Sportsman’s Lane
Frankfort, KY 40601
502-564-7109 ext. 4544 / zak.danks@ky.gov

POPULATION STATUS

The wild turkey population in Kentucky is approximately 330,000. This estimate uses spring harvest to index abundance and assumes 10% of the population is harvested during the spring season. Populations are stable to increasing in most counties, but some show decline (Figure 1).

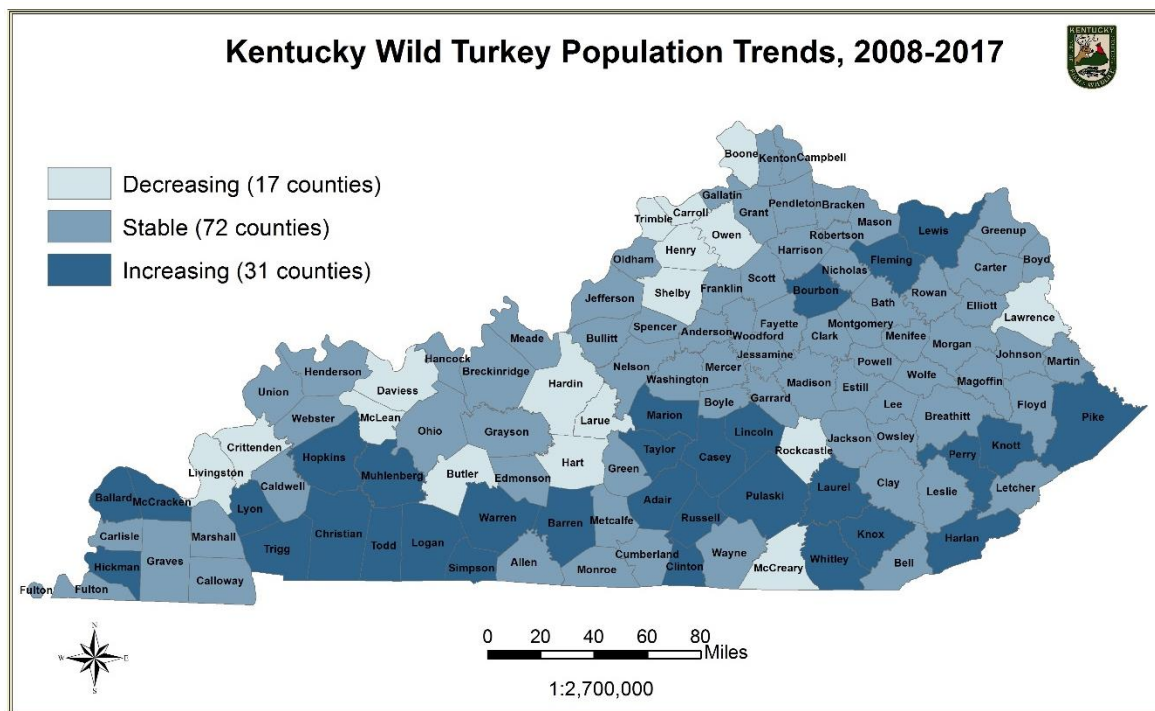


Figure 1. Ten-year (2008-2017) county-level wild turkey population trends in Kentucky based on spring harvest as an index to abundance. Categories based on the spring harvest-year regression slope (decreasing: <-5 ; stable: -5 – 5 ; increasing: >5).

REPRODUCTION

Since 1984, the Kentucky Department of Fish and Wildlife Resources (KDFWR) has conducted turkey brood surveys during July and August. KDFWR personnel and volunteers record survey data during routine travels. Observations include number of hens and poults per brood, number

of hens without broods, and number of adult gobblers. A categorical description of poult size (¼, ½, Grown) also is recorded. Observations of hens with poults are recorded by month and day (i.e., as individual events), while observation of hens without poults and of gobblers are each grouped as monthly totals (i.e., not recorded as individual events). Beginning with the 2017 survey, observers will be instructed to record the specific date for all turkey observations to allow sample size calculation and promote standardization with other SEWTWG states.

The 2016 brood survey concluded with 262 turkey observations. This included 1,074 hens, of which 49.4% were observed with ≥ 1 poult (i.e., a brood) (Table 1). Regionally, hens with broods varied from 45.1% to 55.1%. The number of poults per brood was 3.80 overall, varying regionally from 3.23 to 4.22. The poults-per-hen ratio (PPH) was 1.62, down 28.7% from 2015 and below the 10-year average (2.2) (Figures 2 and 3). Heavy, sustained rainfall across much of the state during late spring and summer likely reduced nest success and brood survival. The gobbler-to-hen ratio was 0.57 overall, varying regionally from 0.33 to 0.98.

Table 1. Data obtained during Kentucky’s wild turkey brood survey conducted 1 July – 31 August, 2016. Analysis courtesy of J. Isabelle, Missouri Department of Conservation.

Region	Hens	Poults	Males	Unidentified	Total Turkeys	PPH ^a	PPB ^b (n ^c)	% Hens w/ Brood ^d	Male:Female Ratio ^e
Central	441	692	144	0	1,247	1.68	3.88 (101)	49.4	0.35
Eastern	386	601	379	0	1,366	1.56	4.22 (83)	45.3	0.98
Western	276	438	91	0	805	1.59	3.23 (77)	55.1	0.33
Statewide^f	1,074	1,735	614	0	3,423	1.62	3.80 (262)	49.4	0.57

^aPoults-per-hen (Total number of poults observed during survey divided by total number of hens observed during survey).

^bPoults-per-brood (Number of poults divided by number of hens for each observation where ≥ 1 hen and ≥ 1 poult was observed; PPB is the mean of all individual observations).

^cNumber of observations where ≥ 1 hen and ≥ 1 poult was observed.

^dPercentage of hens that were observed with ≥ 1 poult during the survey.

^eTotal number of males observed during survey divided by total number of females observed during survey.

^fMay include observations in which region was not recorded on survey card.

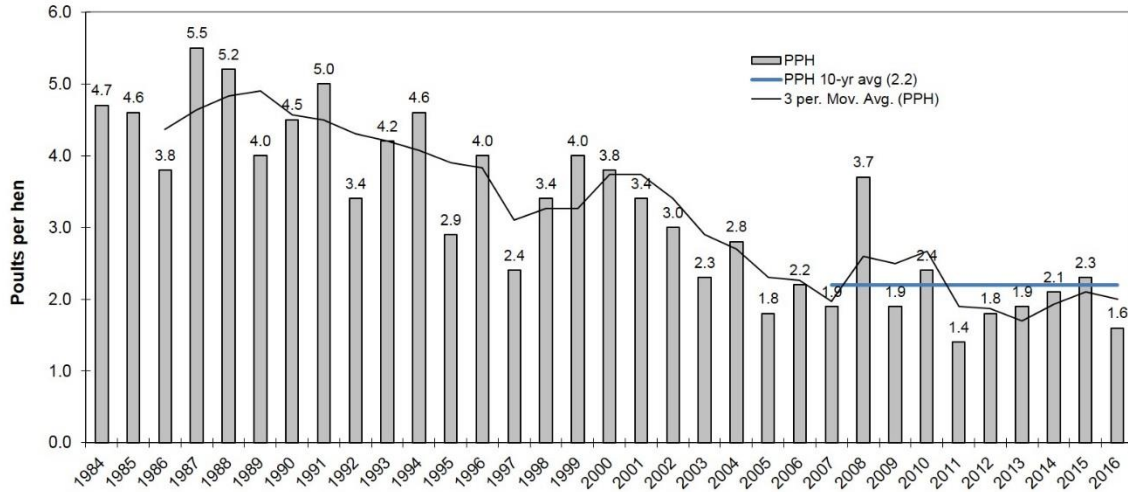


Figure 2. Poults-per-hen (PPH) ratios from annual brood surveys in Kentucky conducted in July and August, 1984-2016. Three-year moving average and 10-year average shown.

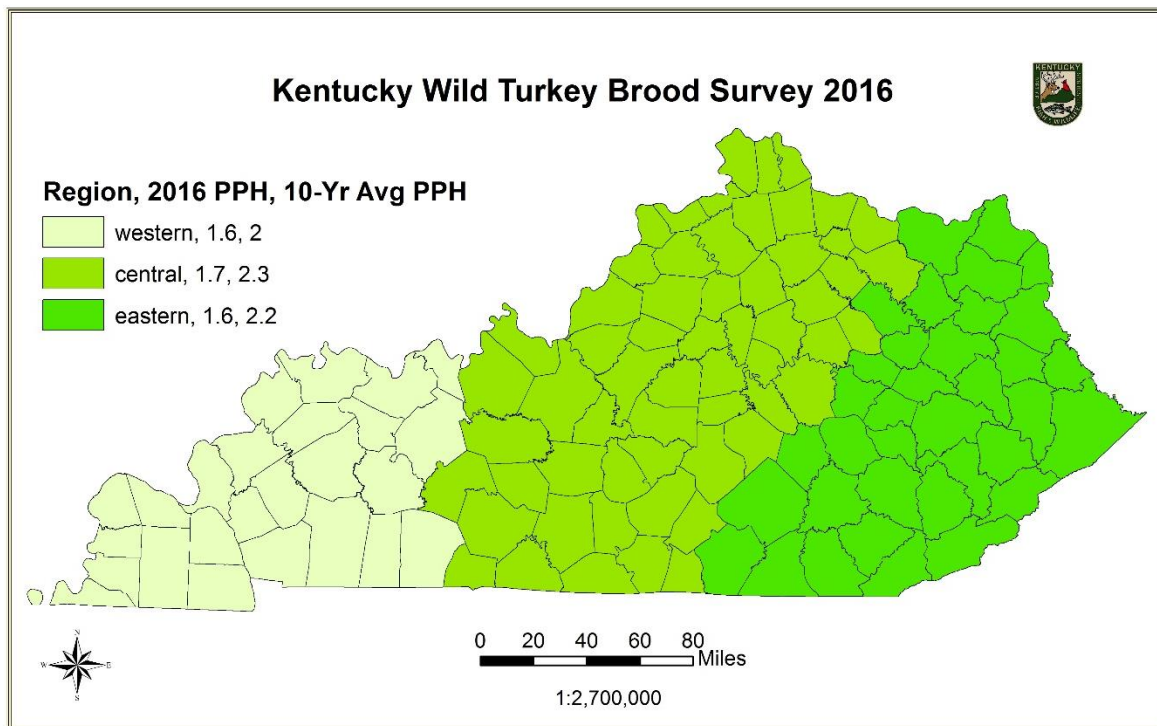


Figure 3. Regional poults-per-hen (PPH) ratios from annual brood survey in Kentucky conducted in July and August, 2016. PPH for 2016 and 10-year average shown. Regions reflect general differences in climate and land form, cover, and use.

HARVEST

Turkey hunting in Kentucky includes spring and fall seasons. Shooting hours are one-half hour before sunrise to one-half hour after sunset. Harvest reporting is mandatory for all Kentucky turkey hunters via phone or internet through the Telecheck Harvest Reporting System.

Spring Turkey Season

The 2017 spring turkey season in Kentucky included a youth-only weekend season (April 2–3) and a 23-day general season (April 15–May 7). A spring turkey permit is required of residents and nonresidents in addition to a standard hunting license, except for landowners. The spring season bag limit is 2 male turkeys or turkeys with visible beards, and the daily bag limit is 1 bird, harvested by shotgun, bow, or crossbow.

The total reported spring turkey harvest, including youth and statewide seasons, was 33,061. This was 6% higher than in 2016 and was the third highest total ever (Table 2, Figure 4).

Table 2. Spring turkey harvest in Kentucky, 2016 and 2017.

Period	Year		% change
	2016	2017	
Youth Season (2 Days)	1,856	1,693	-8.8%
Statewide Opening Weekend	9,205	10,388	+12.9%
Remaining 21 Days of season	19,986	20,975	+4.9%
Total	31,047	33,061	+6.5%

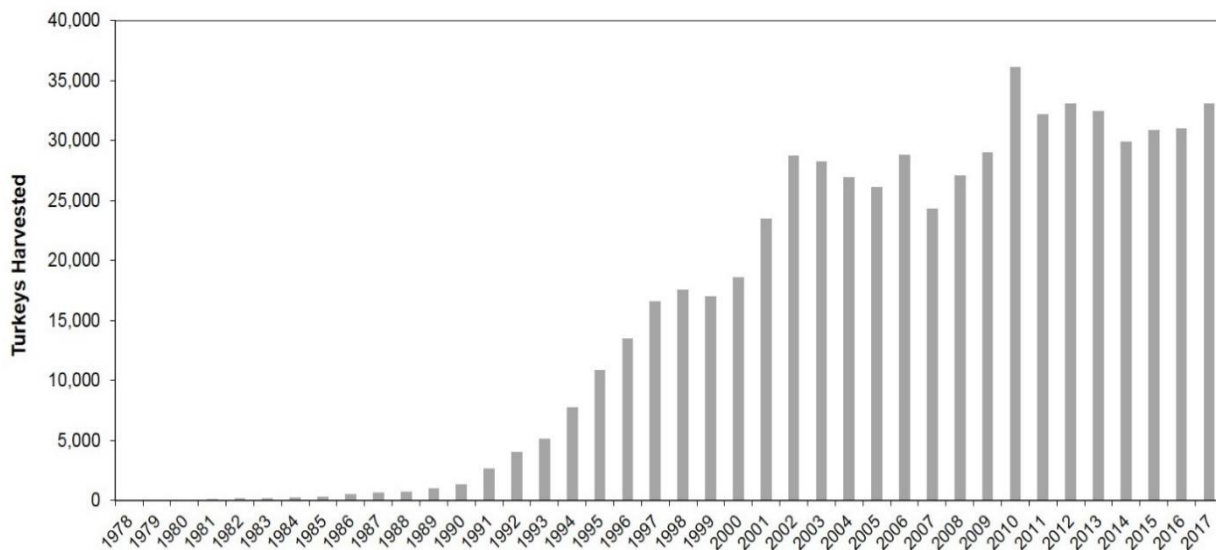


Figure 4. Spring turkey harvest in Kentucky, 1978–2017.

Spring harvest has been relatively stable since a peak of over 36,000 in 2010, which followed a periodic cicada hatch in 2008 that contributed to the highest poult production in the past decade (Figure 2). Harvest totals exceeded 200 birds in 82 of 120 counties and ranged from 84 to 663 (Figure 5). Harvest per square mile ranged from 0.2 to 1.8. Jakes made up only 9% of the harvest, compared to 17% in 2016. Harvest on public lands was 1,918, which was 6% of the statewide total. Most harvested turkeys were checked by statewide or youth permit holders (81%), compared to 10% checked by landowners and 9% by senior/disabled permit holders. Ten-year harvest trends are stable to increasing for all 5 KDFWR Wildlife Division Regions and all 9 KDFWR Commission Districts.

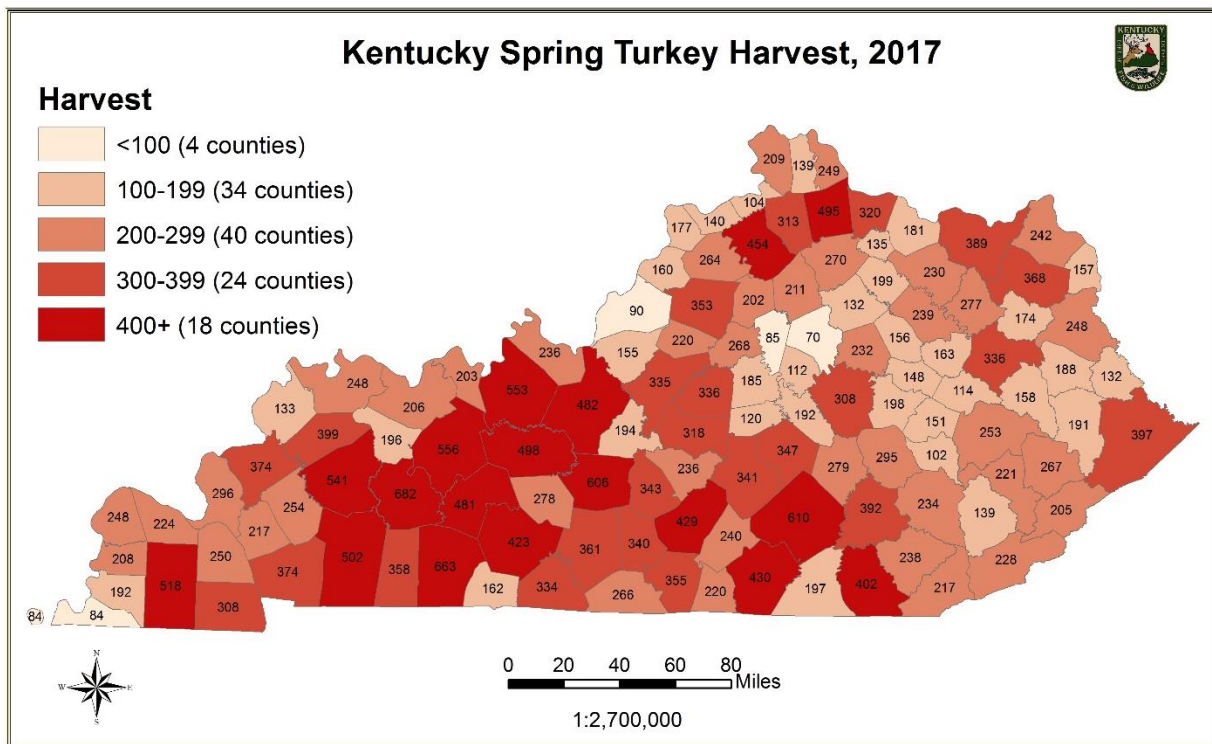


Figure 5. Spring turkey harvest by county in Kentucky, 2017.

Fall Turkey Season

Fall turkey hunting in Kentucky included an archery season concurrent with archery deer season (September 3–January 16), 2 one-week-long shotgun seasons (October 22–28 and December 3–11), and 2 crossbow seasons (October 1–16 and November 12–December 31). A fall turkey permit is required of residents and nonresidents in addition to a standard hunting license and spring turkey permit, except for landowners. Fall season bag limit is 4 turkeys, only 2 of which may be taken during shotgun seasons, regardless of weapon used, and only 1 male bird having a beard length of ≥ 3 inches may be harvested.

The reported 2016-17 fall season harvest was 2,606 birds. This was down 39.5% from fall 2015-16, but was similar to the preceding 2 seasons (Figure 6). Shotgun, archery, and crossbow

harvests were 1,608, 694, and 296, respectively. The lower harvest likely was a product of last summer’s lower production coupled with an above-average crop of red and white oak acorns, making for tougher hunting of turkeys concentrated in forested habitats.

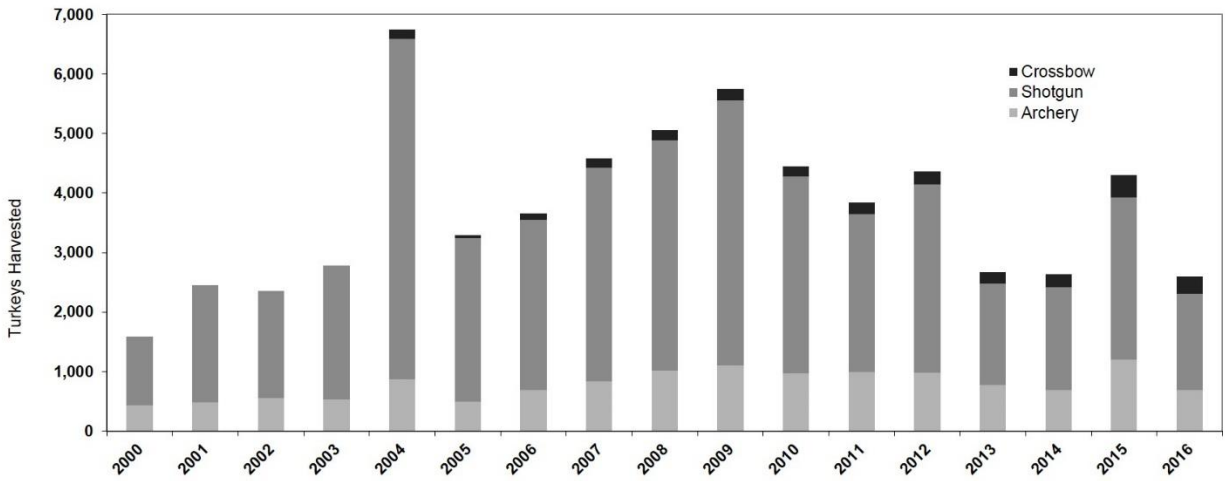


Figure 6. Fall turkey harvest by weapon type in Kentucky, 2000–2016.

EMERGING OR EVOLVING ISSUES

Despite apparently healthy turkey populations statewide, KDFWR receives reports of low turkey abundance in local areas. Anecdotal speculation about disease is common, particularly as related to poultry litter. Concurrently, we receive complaints regarding spring season timing, with suggestions of earlier seasons and harvest zones. The KDFWR turkey program recommends maintaining our current spring season structure, including timing, which we consider to fall within the SEWTWG-recommended timeframe (Isabelle et al., in prep.).

APPENDIX S

MICHIGAN



Michigan Department of Natural Resources
Wildlife Division Report No. 3644
September 2017

2015 MICHIGAN FALL TURKEY HUNTER SURVEY

Brian J. Frawley

ABSTRACT

A survey of turkey hunters was conducted following the 2015 fall hunting season to determine turkey harvest and hunter participation. Overall, 29,337 people purchased 30,657 licenses in 2015 (versus 31,823 people purchased 33,313 licenses in 2013, and 30,408 people purchased 31,614 licenses in 2014). The number of licenses sold in 2015 decreased 8% from 2013 and 3% from 2014. Excluding the Mentored Youth Hunt licenses, 17,906 hunters purchased 19,261 licenses in 2015, which was nearly 10% fewer licenses sold than in 2013 but nearly the same number of licenses sold in 2014 (20,078 hunters purchased 21,483 licenses in 2013, and 18,013 hunters purchased 19,124 licenses in 2014). Most license buyers (97%) purchased a single hunting license in 2015. During the 2015 fall hunt, an estimated 15,275 hunters harvested about 4,751 turkeys. Hunter numbers and their hunting effort decreased significantly by 14% and 16%, respectively, from 2013. The 2015 harvest decreased significantly by 13% from 2013 (5,430 turkeys harvested in 2013). Hunter success was 29% in 2015 (versus 28% success in 2013). About 61% of the hunters in 2015 rated their hunting experience as excellent, very good, or good (versus 59% satisfaction in 2013). Although the number of turkeys harvested in 2015 decreased significantly from 2013, hunting success and hunter satisfaction did not change significantly from 2013.

INTRODUCTION

Fall wild turkey (*Meleagris gallopavo*) hunting seasons were implemented in Michigan to help maintain turkey populations at levels matching biological and social carrying capacities. In 2015, 11 management units totaling about 44,943 square miles were open for fall turkey hunting during September 15 through November 14 (Figure 1). The area



A contribution of Federal Aid in Wildlife Restoration, Michigan Project W-147-R

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Michigan Department of Civil Rights, Cadillac Place, 3054 West Grand Blvd, Suite 3-600, Detroit, MI 48202, or
Division of Federal Assistance, U.S. Fish & Wildlife Service, 4401 North Fairfax Drive, Mail Stop MBSP-4020, Arlington, VA 22203.

For information or assistance on this publication, contact Michigan Department of Natural Resources, Wildlife Division, P.O. Box 30444, Lansing MI 48909.
This publication is available in alternative formats upon request.

open to hunting in 2015 increased by 25% from 2012 (an additional 8,865 square miles), and three new management units were created (units J, T, and WA).

Most people interested in obtaining a turkey hunting license could enter into a random drawing (lottery) conducted by the Department of Natural Resources (DNR) or purchase a license for Hunt 501 without going through the lottery. Applicants could choose one hunt area for the drawing. Any licenses available after the drawing was completed were made available on a first-come, first-served basis to applicants unsuccessful in the drawing. Beginning one week after licenses were available to unsuccessful applicants, all remaining licenses were made available to nonapplicants. Licenses were available for six management units (units HA, J, L, M, W, and YY) after the drawing was completed (Table 1). Hunters could purchase one of these remaining licenses per day until quotas were met.

Licenses for Hunt 410 (Unit HA) and Hunt 501 (Unit YY) were valid on private lands only, while licenses for hunts 401, 402, 403, 404, 405, 406, 407, 408, and 409 (units G, GB, GC, J, L, M, T, W, and WA) were valid on either land ownership types (i.e., public or private land). Hunters were allowed to take one turkey of either sex with the harvest tag issued with each license. Turkey could be harvested with a shotgun, crossbow, or archery equipment. Hunters 12-years-old or older could use a crossbow to hunt turkeys. Hunters using a crossbow were required to obtain a free crossbow stamp, except hunters with a disability already hunting under a DNR-issued crossbow permit did not need the stamp.

A mentored youth hunting program started in 2012. Under this program, a mentored youth hunting license was created and could be purchased by youth hunters aged 9 and younger. The youth hunter had to participate with a mentor who was at least 21 years old. The mentored youth hunting license allowed the youth hunter to hunt small game, turkey, deer, trap furbearers, and fish for all species. A turkey kill tag issued under the mentored youth hunting license was valid for one turkey during any hunt period, in any open hunt unit, on private or public land. No application was required to purchase the mentored youth license.

The Pure Michigan Hunt (PMH) was a unique multi-species hunting opportunity offered for the first time in 2010. Individuals could purchase an unlimited number of applications for the PMH. Three individuals were randomly chosen from all applications, and winners received elk, bear, spring turkey, fall turkey, and antlerless deer hunting licenses and could participate in a reserved waterfowl hunt on a managed waterfowl area. The fall turkey hunting licenses were valid for all areas open for hunting turkey.

The Natural Resources Commission and DNR have the authority and responsibility to protect and manage the wildlife resources of the state of Michigan. Harvest surveys are one of the management tools used to meet their statutory responsibility. Estimating harvest, hunting effort, and hunter satisfaction are among the primary objectives of these surveys.

METHODS

The DNR provided hunters the option to voluntarily report information about their turkey hunting activity via the internet. This option was advertised in the hunting regulations booklet, on the DNR website, and in an email message that was sent to licensees that had provided an email address to the DNR. Hunters could report information anytime during the hunting season. Hunters reported whether they hunted, number of days spent afield, and how many turkeys they harvested. Successful hunters also were asked to report where their turkeys were taken (public or private land) and beard length of harvested birds. Birds with a beard <4 inches long were classified as juveniles (<1 year old), while birds with longer beards were adults (≥ 1 year old) (Kelly 1975). In addition, hunters were asked what type of hunting equipment was used to hunt turkeys and kill turkeys. Finally, hunters rated their overall hunting experience (excellent, very good, good, fair, or poor).

Following the 2015 fall turkey hunting season, a questionnaire was sent to 11,226 randomly selected people that had purchased a 2015 turkey hunting license (resident turkey, senior resident turkey, nonresident turkey, Mentored Youth Hunt, Pure Michigan licenses) and had not already voluntarily reported harvest information via the internet. Hunters receiving the questionnaire were asked to report the same information that was collected from hunters that reported voluntarily on the internet.

Estimates were calculated using a stratified random sampling design that included 15 strata (Cochran 1977). Strata 1-11 consisted of hunters with licenses for a single management unit ($N_G=136$; $N_{GB}=177$; $N_{GC}=133$; $N_{HA}=1,187$; $N_J=940$; $N_L=800$; $N_M=1,183$; $N_T=132$; $N_W=142$; $N_{WA}=81$; and $N_{YY}=12,297$). The twelfth stratum included hunters obtaining only a Mentored Youth Hunt license ($N=11,430$). The thirteenth stratum included hunters obtaining only a Pure Michigan Hunt license ($N=2$). The fourteenth stratum consisted of hunters having licenses for multiple management units ($N=156$). Finally, hunters that had voluntarily reported information about their hunting activity via the internet before the mail survey sample was selected were treated as the fifteenth stratum ($N=541$).

Because estimates were based on information collected from random samples of hunting license buyers, these estimates were subject to sampling errors (Cochran 1977). Thus, a 95% confidence limit (CL) was calculated for each estimate. In theory, this CL can be added and subtracted from the estimate to calculate the 95% confidence interval. The confidence interval is a measure of the precision associated with the estimate and implies the true value would be within this interval 95 times out of 100. Unfortunately, there are several other possible sources of error in surveys that are probably more serious than theoretical calculations of sampling error. They include failure of participants to provide answers (nonresponse bias), question wording, and question order. It is very difficult to measure these biases; thus, estimates were not adjusted for these possible biases.

Statistical tests are used routinely to determine the likelihood that the differences among estimates are larger than expected by chance alone. The overlap of 95% confidence intervals was used to determine whether estimates differed. Non-overlapping

95% confidence intervals was equivalent to stating the difference between the means was larger than would be expected 995 out of 1,000 times, if the study had been repeated (Payton et al. 2003).

Questionnaires were mailed initially during mid-December 2015, and up to two follow-up questionnaires were mailed to nonrespondents. Although 11,226 people were sent the questionnaire, 218 surveys were undeliverable resulting in an adjusted sample size of 11,008. Questionnaires were returned by 6,245 people, yielding a 57% adjusted response rate. In addition, 541 people voluntarily reported information about their hunting activity via the internet.

RESULTS

In 2015, the DNR offered 51,850 licenses for sale (same quota as in 2013 and 2014), excluding Pure Michigan Hunt and Mentored Youth Hunt licenses (Table 1). A total of 3,741 licenses were purchased by 4,028 people successful in the drawing (93% of successful applicants), and 403 leftover licenses were purchased by people that had applied for a hunt in the drawing. A total of 16,107 licenses were purchased by people that had not entered into the drawing. In addition, 3 people were awarded a Pure Michigan Hunt license, and 11,510 youth obtained a turkey hunting license when they obtained their Mentored Youth Hunt license.

Overall, 29,337 people purchased 30,657 licenses in 2015 (versus 31,823 people purchased 33,313 licenses in 2013, and 30,408 people purchased 31,614 licenses in 2014). The number of licenses sold in 2015 decreased 8% from 2013 and 3% from 2014. Excluding the Mentored Youth Hunt licenses, 17,906 hunters purchased 19,261 licenses in 2015, which was nearly 10% fewer licenses sold than in 2013 but nearly the same number of licenses sold in 2014 (20,078 hunters purchased 21,483 licenses in 2013, and 18,013 hunters purchased 19,124 licenses in 2014).

Excluding people obtaining a Mentored Youth Hunt license, the average age of the 17,906 license buyers was 48 years (Figure 2), and about 6% of the license buyers were younger than 17 years old (1,149). Hunters with a Mentored Youth Hunt license were excluded because only 16 ± 2% of them actually hunted (Table 2).

Including all license types, most license buyers (97%) purchased a single hunting license in 2015 (Figure 3). About 3% of hunters purchased 2 licenses and less than 1% of hunters purchased 3 or more licenses.

Excluding people obtaining a Mentored Youth Hunt license, the number of people buying a license in 2015 (17,906) decreased by about 16% in ten years from 2005 (21,343 people purchased a license in 2005). Although fewer people purchased a license in 2015 than in 2005 (Figure 4), there were increased hunter numbers among the youngest and oldest age classes in 2015. The increased hunter numbers in the oldest age classes likely represented the rising share of older people in the population as the baby-boom generation aged and life expectancies have increased. The increased participation among the youngest hunters likely reflected the lowering of the

minimum age requirements. In 2015, hunters had to be at least 10 years old to participate (excluding Mentored Youth Hunts); while the hunters had to be at least 12 years old to participate in 2005.

In 2015, about 15,275 hunters spent 93,116 days afield pursuing turkeys ($\bar{x} = 6.1 \pm 0.2$ days/hunter) (Tables 3 and 4, Figure 5). The number of people pursuing turkeys and their hunting effort in 2015 decreased significantly from 2013 (14% and 16% decrease, respectively). About 92% of the hunters that went afield were males ($14,050 \pm 275$) and 8% of the hunters were females ($1,223 \pm 144$).

About 29% of active hunters successfully harvested a turkey in 2015, and they harvested an estimated 4,751 turkeys (Tables 5 and 6). The number of turkeys harvested decreased significantly by 13% from 2013 (5,430 turkeys harvested in 2013); however, hunter success was not significantly different between 2015 and 2013 (29% versus 28%, Figure 5). Among the 4,402 hunters that took at least one turkey, 94% ($4,143 \pm 212$) of these hunters took one turkey, 5% (197 ± 47) took 2 turkeys, and about 1% (62 ± 23) took more than 2 turkeys (Figure 6). Hunter success was statistically greater for hunters using private lands than for hunters using public lands in 2015 (29% versus 18%, Table 5).

About 90% ($13,764 \pm 279$) of turkey hunters hunted solely on private land, 7% ($1,021 \pm 71$) hunted on public land only, and 3% (399 ± 54) hunted on both private and public lands. Additionally, about 1% of hunters (92 ± 33) hunted on land of unknown ownership. Of the 4,751 turkeys harvested in 2015, 94% of these birds were taken on private land (4,452), while about 6% of the harvest (279) was taken on public land (Table 6). About 59% of the harvested birds had a beard ($2,781 \pm 192$). Most of these bearded birds (85%) were adults ($2,366 \pm 176$); 15% were juvenile birds (416 ± 77).

Of the 15,275 turkey hunters in 2015, nearly 61% rated their hunting experience as either excellent, very good, or good (Table 7). Satisfaction was statistically greater for hunters using private lands than for hunters using public lands (61% versus 47%). Changes in hunter satisfaction between years generally parallel changes in hunter success (Figure 7). Between 2013 and 2015, neither hunter success (28% in 2013 versus 29% in 2015) nor satisfaction changed significantly (59% in 2013 versus 61% in 2015).

Hunter numbers were greatest in St. Clair, Allegan, and Lapeer counties; these counties had more than 500 hunters (Table 8). Harvest was greatest in Allegan, Ottawa, Lapeer, and Tuscola counties; these counties had more than 150 turkeys taken by hunters.

Most hunters ($62 \pm 1\%$; $9,400 \pm 285$ hunters) used shotguns while hunting turkeys, although $33 \pm 1\%$ ($5,025 \pm 238$) used a crossbow, and $20 \pm 1\%$ ($2,994 \pm 180$) of the hunters used either a compound, recurve, or long bow. About 68% ($3,251 \pm 206$) of the harvested turkeys were taken with a shotgun, while 21% (996 ± 113) of harvested turkeys were taken with a crossbow. About 10% (491 ± 84) were taken with either a compound, recurve, or long bow. About $32 \pm 2\%$ of the hunters using a shotgun took at least one turkey with their shotgun; $20 \pm 2\%$ of the hunters using a crossbow harvested

a turkey; and $16 \pm 2\%$ of hunters using either a compound, recurve, or long bow took a turkey.

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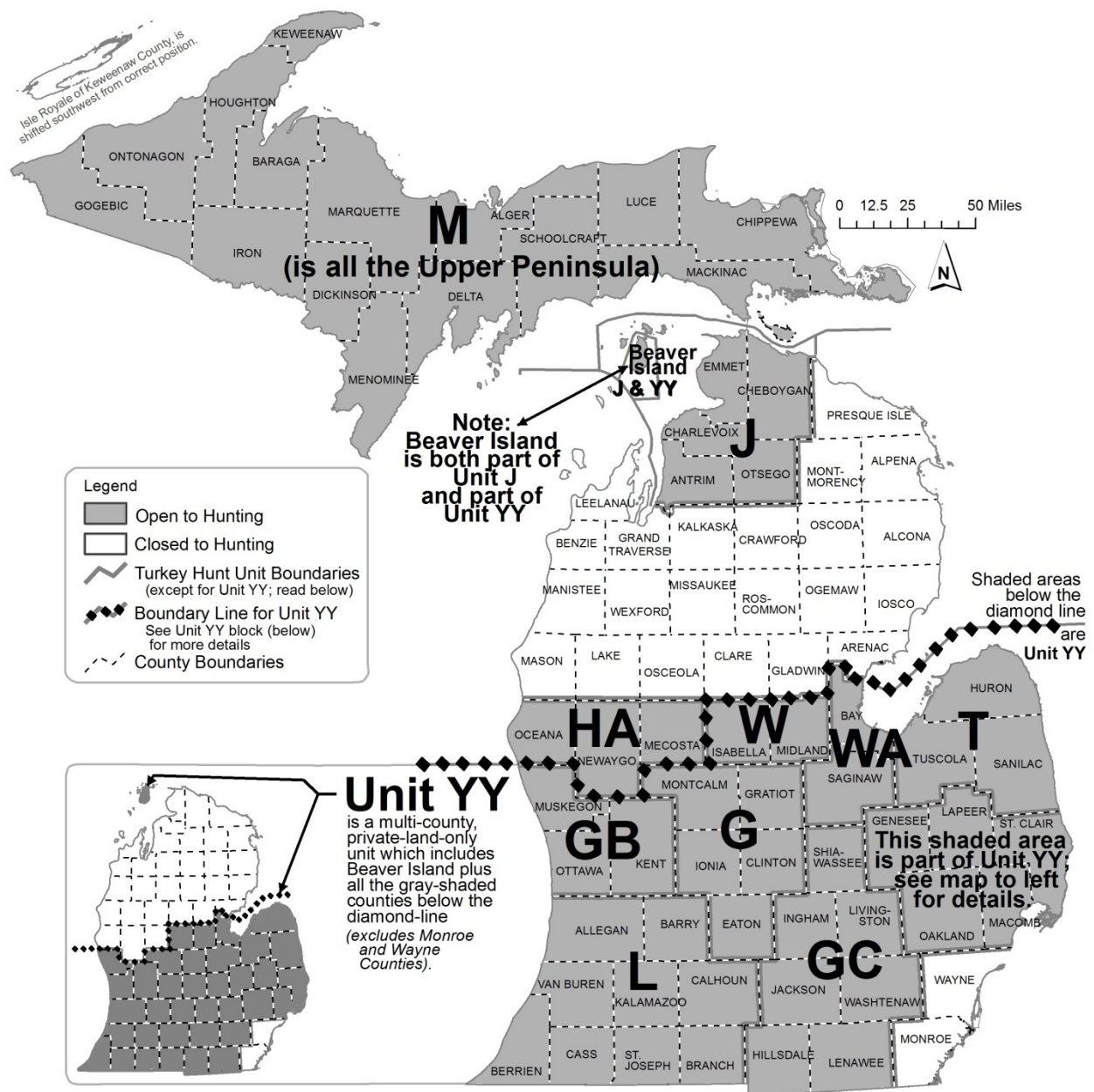


Figure 1. Management units open for fall turkey hunting in Michigan, 2015.

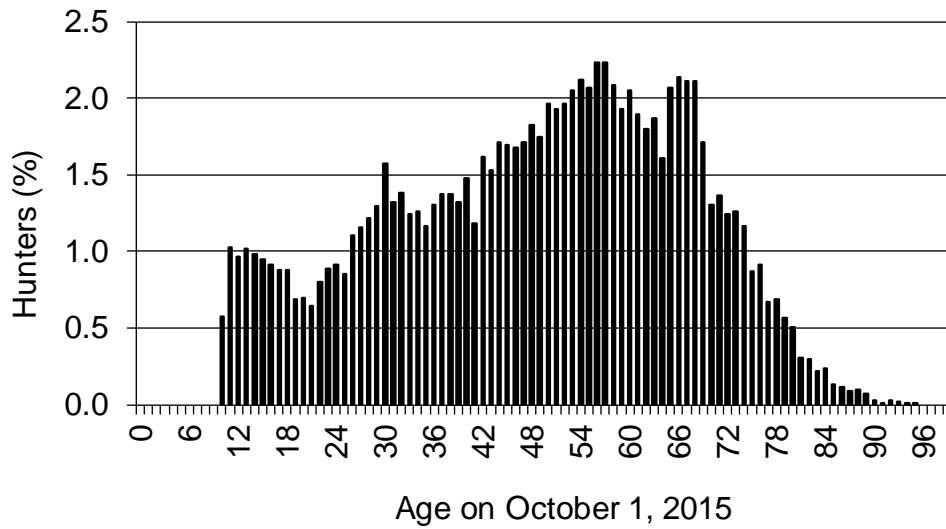


Figure 2. Age of people that purchased a turkey hunting license in Michigan for the 2015 fall hunting season (\bar{x} = 48 years). Licenses were purchased by 17,906 people, excluding Mentored Youth Hunt license buyers.

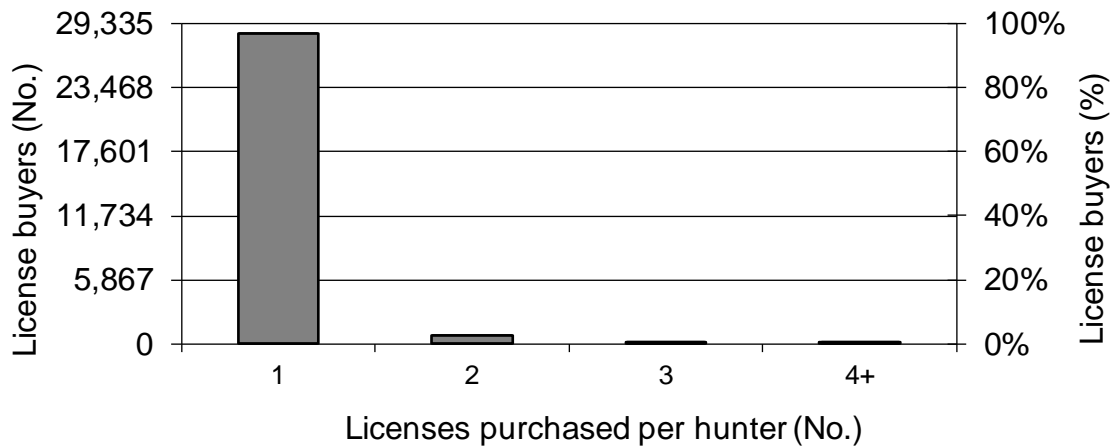


Figure 3. Number of licenses purchased per person for hunting turkey in Michigan during the 2015 fall hunting season (included all hunting license types).

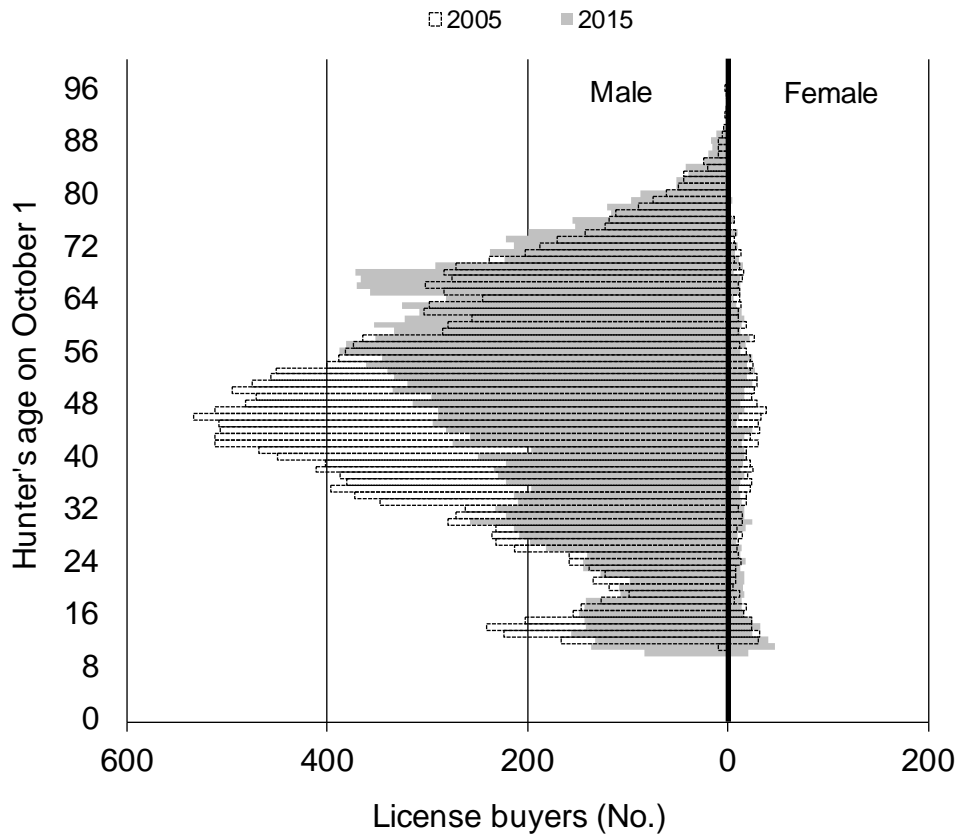


Figure 4. Number of fall turkey hunting license buyers in Michigan by age and sex during 2003 and 2015 hunting seasons, excluding Mentored Youth Hunt licenses. The number of people buying a license was 19,025 in 2003 and 17,906 in 2015.

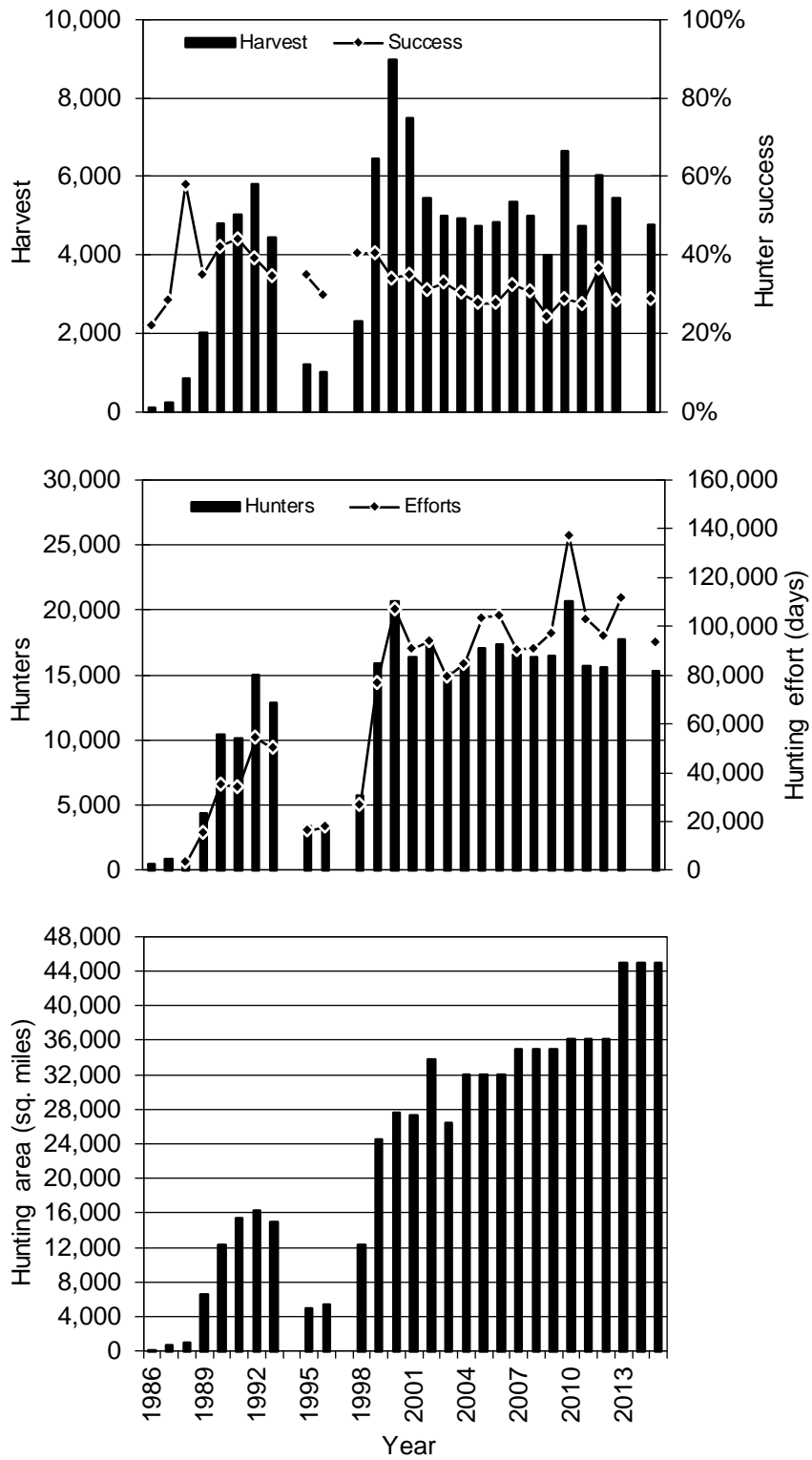


Figure 5. Number of hunters, hunting efforts (days), harvest, hunting success, and hunting area during the fall turkey hunting season, 1986-2015. Turkeys were not hunted during the fall in 1994 and 1997. No survey was done in 2014.

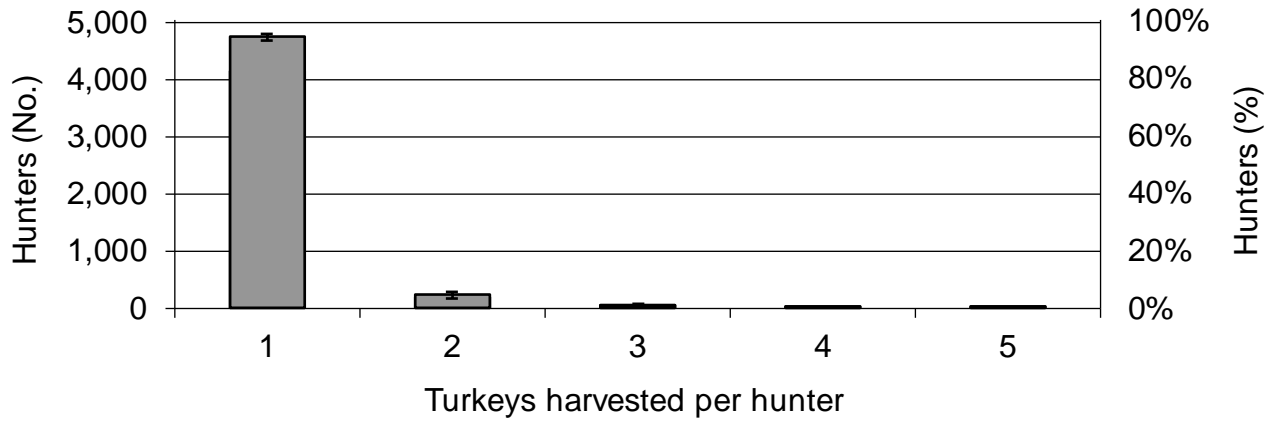


Figure 6. Number of turkeys harvested per successful hunter in Michigan during the 2015 fall hunting season.

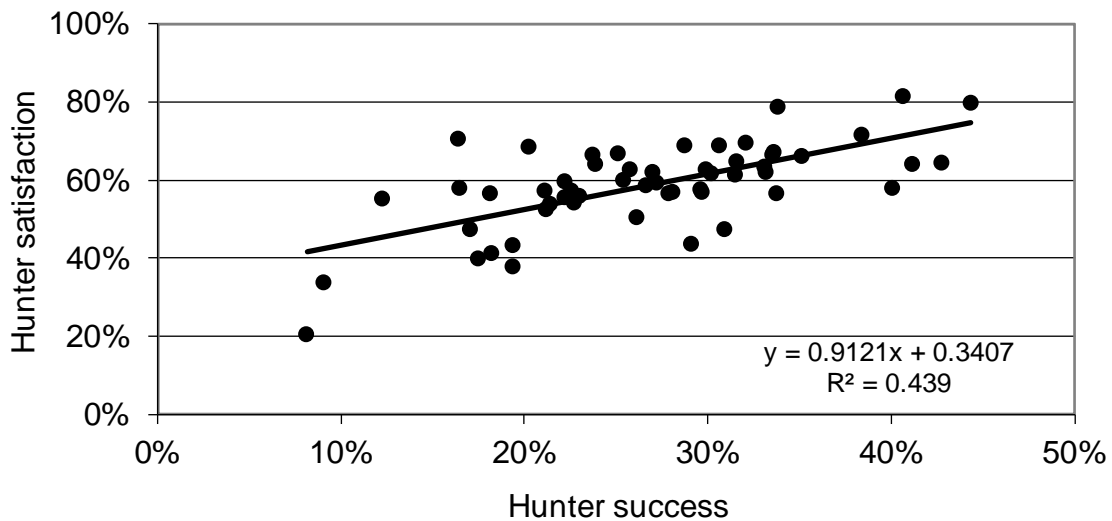


Figure 7. Hunter satisfaction (expressed as the percentage of hunters rating their hunting experience as excellent, very good, or good) associated with hunter success for each of 55 counties in Michigan during the 2015 fall turkey hunting season (only included counties with at least 20 hunters).

Table 1. Number of hunting licenses available and people applying for licenses during the 2015 Michigan fall turkey hunting season.

Management unit	Hunt	Licenses available (quota) ^a	Number of eligible applicants	Number of applicants successful in drawing	Number of licenses remaining after drawing	Number of licenses purchased by successful applicants	Number of leftover licenses purchased by applicants	Number of leftover licenses purchased by people not in the drawing	Licenses sold
G	401	200	162	162	38	121	5	33	159
GB	402	250	154	154	96	105	8	88	201
GC	403	200	487	200	0	155	0	0	155
HA ^b	410	1,700	667	667	1,033	489	34	826	1,349
J	404	1,500	441	441	1,059	318	28	704	1,050
L	405	1,000	294	294	706	226	28	672	926
M	406	1,500	358	358	1,142	255	49	1,087	1,391
T	407	200	172	172	28	125	4	24	153
W	408	200	75	75	125	40	3	121	164
WA	409	100	32	32	68	21	1	67	89
YY ^b	501	45,000	1,186	1,186	43,814	779	243	12,485	13,507
Pure MI ^c	NA ^c	NA	0	0	na	0	0	0	3
MYH ^d	Any	NA	0	0	na	0	0	0	11,510
Statewide	All	51,850	4,028	3,741	48,109	2,634	403	16,107	30,657

^aQuotas were assigned by hunts within each management unit.

^bLicenses were valid on private lands only.

^cPure Michigan Hunt. These hunters could hunt in any management unit.

^dMentored Youth Hunts. These hunters could hunt in any management unit.

Table 2. Number of hunters, hunting effort, harvest, hunter success, and hunter satisfaction during the 2015 Michigan fall turkey hunting season, summarized for hunters that obtained a Mentored Youth Hunt license.

Hunters		Hunting efforts (days)		Harvest		Hunter success		Hunter satisfaction ^a	
Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL
1,832	199	7,612	1,196	363	95	20	5	67	6

^aProportion of hunters that rated their hunting experience as excellent, very good, or good.

Table 3. Number of hunters during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type							
	Private		Public		Unknown		All land types	
	Total	95% CL	Total	95% CL	Total	95% CL	Total ^a	95% CL
G								
401	40	8	85	8	0	0	110	7
501 ^b	891	113	0	0	0	0	891	113
MYH ^c	178	67	23	24	0	0	193	70
Multiple ^d	39	4	13	3	1	1	48	4
Subtotal	1,147	132	121	26	1	1	1,242	133
GB								
402	89	9	68	9	6	3	142	7
501 ^b	745	104	0	0	0	0	745	104
MYH ^c	155	63	8	14	8	14	170	66
Multiple ^d	46	5	9	2	0	0	50	5
Subtotal	1,034	122	84	17	14	14	1,107	123
GC								
403	24	7	78	9	0	0	97	8
501 ^b	2,151	165	0	0	0	0	2,151	165
MYH ^c	224	75	23	24	0	0	232	77
Multiple ^d	87	3	11	1	1	1	99	3
Subtotal	2,487	182	112	26	1	1	2,579	182
HA								
410 ^b	853	38	0	0	0	0	853	38
MYH ^c	116	54	0	0	0	0	116	54
Multiple ^d	61	4	0	0	0	0	61	4
Subtotal	1,030	67	0	0	0	0	1,030	67
J								
404	520	36	177	29	17	10	666	33
501 ^b	15	15	0	0	0	0	15	15
MYH ^c	62	40	15	20	0	0	77	45
Multiple ^d	23	2	17	2	0	0	38	2
Subtotal	619	56	209	35	17	10	797	58
L								
405	388	31	283	29	7	6	611	26
501 ^b	1,746	152	0	0	0	0	1,746	152
MYH	263	81	31	28	8	14	286	85
Multiple ^c	100	5	32	4	1	1	127	6
Subtotal	2,496	175	346	41	16	15	2,770	176

^aNumber of hunters may not add up to total because hunters could hunt on both private and public lands.

^bLicenses were valid on private lands only.

^cMentored Youth Hunts.

^dHunters that purchased multiple hunting licenses for multiple hunting areas.

^eIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^fHunting activity occurred at unknown location within Management Unit YY.

Table 3 (continued). Number of hunters during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type							
	Private		Public		Unknown		All land types	
	Total	95% CL	Total	95% CL	Total	95% CL	Total ^a	95% CL
M								
406	607	42	348	38	18	10	848	38
MYH ^c	77	45	31	28	0	0	93	49
Multiple ^d	35	4	26	3	0	0	51	5
Subtotal	720	61	406	48	18	10	992	62
T								
407	44	7	77	7	0	0	111	5
501 ^b	991	118	0	0	0	0	991	118
MYH ^c	155	63	0	0	0	0	155	63
Multiple ^d	33	3	14	3	0	0	42	4
Subtotal	1,223	134	90	8	0	0	1,298	134
W								
408	77	8	30	6	4	3	108	6
501 ^b	365	74	0	0	0	0	365	74
MYH ^c	46	35	0	0	0	0	46	35
Multiple ^d	32	3	0	0	0	0	32	3
Subtotal	520	82	30	6	4	3	551	82
WA								
409	47	7	10	5	2	2	55	7
501 ^b	365	74	0	0	0	0	365	74
MYH ^c	77	45	0	0	0	0	77	45
Multiple ^d	10	1	1	1	0	0	12	2
Subtotal	499	87	12	5	2	2	509	87
Eastern YY^e								
501 ^b	1,591	146	0	0	0	0	1,591	146
MYH ^c	209	73	0	0	0	0	209	73
Multiple ^d	82	4	0	0	0	0	82	4
Subtotal	1,881	163	0	0	0	0	1,881	163
Unknown YY^f								
501 ^b	610	94	0	0	0	0	610	94
MYH ^c	201	71	15	20	15	20	224	75
Multiple ^d	14	4	2	1	3	2	19	4
Subtotal	825	119	18	20	18	20	853	121
Statewide								
Total	14,160	281	1,423	85	92	33	15,275	283

^aNumber of hunters may not add up to total because hunters could hunt on both private and public lands.

^bLicenses were valid on private lands only.

^cMentored Youth Hunts.

^dHunters that purchased multiple hunting licenses for multiple hunting areas.

^eIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^fHunting activity occurred at unknown location within Management Unit YY.

Table 4. Days of hunting effort during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type							
	Private		Public		Unknown		All land types	
	Total	95% CL	Total	95% CL	Total	95% CL	Total ^a	95% CL
G								
401	252	84	566	96	0	0	818	118
501 ^b	7,204	1,266	0	0	0	0	7,204	1,266
MYH ^c	626	323	70	81	0	0	696	335
Multiple ^d	258	33	43	8	3	3	303	34
Subtotal	8,340	1,309	678	126	3	3	9,020	1,315
GB								
402	584	136	481	125	27	17	1,092	195
501 ^b	3,947	714	0	0	0	0	3,947	714
MYH ^c	742	402	15	28	15	28	773	404
Multiple ^d	236	36	41	8	0	0	277	39
Subtotal	5,510	832	537	129	42	33	6,089	844
GC								
403	70	23	451	85	0	0	521	82
501 ^b	12,762	1,457	0	0	0	0	12,762	1,457
MYH ^c	1,152	527	108	148	0	0	1,260	589
Multiple ^d	490	17	121	3	4	4	645	18
Subtotal	14,474	1,549	680	171	4	4	15,188	1,573
HA								
410 ^b	5,550	510	0	0	0	0	5,550	510
MYH ^c	379	207	0	0	0	0	379	207
Multiple ^d	346	30	0	0	0	0	346	30
Subtotal	6,274	551	0	0	0	0	6,274	551
J								
404	2,696	309	719	148	127	102	3,541	339
501 ^b	50	53	0	0	0	0	50	53
MYH ^c	255	196	93	144	0	0	348	243
Multiple ^d	145	5	68	8	0	0	212	13
Subtotal	3,145	369	879	206	127	102	4,151	421
L								
405	2,277	292	1,812	282	7	7	4,096	367
501 ^b	11,532	1,385	0	0	0	0	11,532	1,385
MYH	842	334	139	140	15	28	997	424
Multiple ^c	666	42	195	44	5	5	866	59
Subtotal	15,317	1,455	2,146	318	28	30	17,491	1,496

^aColumn and row totals for hunting effort may not equal statewide totals because of rounding errors.

^bLicenses were valid on private lands only.

^cMentored Youth Hunts.

^dHunters that purchased multiple hunting licenses for multiple hunting areas.

^eIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^fHunting activity occurred at unknown location within Management Unit YY.

Table 4 (continued). Days of hunting effort during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type							
	Private		Public		Unknown		All land types	
	Total	95% CL	Total	95% CL	Total	95% CL	Total ^a	95% CL
M								
406	3,339	383	2,502	436	72	59	5,912	583
MYH ^c	363	267	124	137	0	0	487	367
Multiple ^d	199	28	150	25	0	0	349	49
Subtotal	3,901	467	2,775	458	72	59	6,748	690
T								
407	133	27	478	97	0	0	612	95
501 ^b	6,048	1,043	0	0	0	0	6,048	1,043
MYH ^c	510	258	0	0	0	0	510	258
Multiple ^d	256	47	59	10	0	0	315	52
Subtotal	6,948	1,075	537	97	0	0	7,485	1,080
W								
408	400	68	206	72	1	2	608	91
501 ^b	1,981	547	0	0	0	0	1,981	547
MYH ^c	116	105	0	0	0	0	116	105
Multiple ^d	145	12	0	0	0	0	145	12
Subtotal	2,642	562	206	72	1	2	2,849	565
WA								
409	253	65	43	23	17	22	314	65
501 ^b	2,166	618	0	0	0	0	2,166	618
MYH ^c	278	195	0	0	0	0	278	195
Multiple ^d	49	1	4	4	0	0	53	4
Subtotal	2,747	651	47	23	17	22	2,811	651
Eastern YY^e								
501 ^b	9,751	1,298	0	0	0	0	9,751	1,298
MYH ^c	974	446	0	0	0	0	974	446
Multiple ^d	505	17	0	0	0	0	505	17
Subtotal	11,229	1,373	0	0	0	0	11,229	1,373
Unknown YY^f								
501 ^b	2,912	680	0	0	0	0	2,912	680
MYH ^c	773	336	23	32	0	0	796	339
Multiple ^d	66	18	5	1	0	0	71	18
Subtotal	3,750	759	29	32	0	0	3,779	760
Statewide								
Total ^a	84,279	2,938	8,514	656	293	128	93,116	3,026

^aColumn and row totals for hunting effort may not equal statewide totals because of rounding errors.

^bLicenses were valid on private lands only.

^cMentored Youth Hunts.

^dHunters that purchased multiple hunting licenses for multiple hunting areas.

^eIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^fHunting activity occurred at unknown location within Management Unit YY.

Table 5. Hunting success (proportion of hunters taking at least one turkey) during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type						All land types	
	Private		Public		Unknown			
	%	95% CL	%	95% CL	%	95% CL	% ^a	95% CL
G								
401	12	7	16	6	0	0	17	5
501 ^a	29	6	0	0	0	0	29	6
MYH ^b	30	18	33	50	0	0	32	17
Multiple ^c	38	4	24	5	100	0	40	4
Subtotal	29	5	20	11	100	0	29	5
GB								
402	22	6	13	6	0	0	20	5
501 ^a	38	7	0	0	0	0	38	7
MYH ^b	20	16	0	0	0	0	18	15
Multiple ^c	51	6	62	11	0	0	53	5
Subtotal	34	6	17	5	0	0	33	5
GC								
403	40	15	17	7	0	0	23	7
501 ^a	30	4	0	0	0	0	30	4
MYH ^b	14	12	0	0	0	0	13	11
Multiple ^c	50	2	12	10	0	0	46	2
Subtotal	29	4	13	5	0	0	29	3
HA								
410 ^b	27	4	0	0	0	0	27	4
MYH ^b	27	21	0	0	0	0	27	21
Multiple ^c	47	4	0	0	0	0	47	4
Subtotal	28	4	0	0	0	0	28	4
J								
404	30	5	18	7	29	26	29	4
501 ^a	33	48	0	0	0	0	33	48
MYH ^b	13	21	0	0	0	0	10	17
Multiple ^c	18	1	14	7	0	0	17	3
Subtotal	28	5	17	6	29	26	26	4
L								
405	25	5	15	5	67	40	23	4
501 ^a	27	4	0	0	0	0	27	4
MYH ^b	15	11	50	46	0	0	19	12
Multiple ^c	40	3	17	4	0	0	36	3
Subtotal	26	3	18	6	28	33	25	3

^aLicenses were valid on private lands only.

^bMentored Youth Hunts.

^cHunters that purchased multiple hunting licenses for multiple hunting areas.

^dIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^eHunting activity occurred at unknown location within Management Unit YY.

Table 5 (continued). Hunting success (proportion of hunters taking at least one turkey) during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type						All land types	
	Private		Public		Unknown			
	%	95% CL	%	95% CL	%	95% CL	% ^a	95% CL
M								
406	31	5	18	5	14	20	30	4
MYH ^b	20	23	0	0	0	0	17	20
Multiple ^c	42	6	25	6	0	0	40	5
Subtotal	30	5	17	5	14	20	29	4
T								
407	29	9	20	6	0	0	26	5
501 ^a	30	6	0	0	0	0	30	6
MYH ^b	5	9	0	0	0	0	5	9
Multiple ^c	43	5	44	11	0	0	42	5
Subtotal	27	5	24	5	0	0	27	5
W								
408	37	7	19	9	33	29	33	6
501 ^a	36	10	0	0	0	0	36	10
MYH ^b	33	35	0	0	0	0	33	35
Multiple ^c	59	4	0	0	0	0	59	4
Subtotal	37	8	19	9	33	29	36	7
WA								
409	33	12	33	25	0	0	31	11
501 ^a	26	9	0	0	0	0	26	9
MYH ^b	20	23	0	0	0	0	20	23
Multiple ^c	58	7	0	0	0	0	51	8
Subtotal	26	8	29	22	0	0	26	7
Eastern YY^d								
501 ^a	30	5	0	0	0	0	30	5
MYH ^c	19	14	0	0	0	0	19	14
Multiple ^c	38	2	0	0	0	0	38	2
Subtotal	29	4	0	0	0	0	29	4
Unknown YY^e								
501 ^a	25	7	0	0	0	0	25	7
MYH ^b	27	16	0	0	0	0	24	15
Multiple ^c	49	14	0	0	100	0	50	12
Subtotal	26	6	0	0	15	19	26	6
Statewide								
Total	29	1	18	2	19	10	29	1

^aLicenses were valid on private lands only.

^bMentored Youth Hunts.

^cHunters that purchased multiple hunting licenses for multiple hunting areas.

^dIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^eHunting activity occurred at unknown location within Management Unit YY.

Table 6. Number of turkeys harvested during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type							
	Private		Public		Unknown		All land types	
	Total	95% CL	Total	95% CL	Total	95% CL	Total ^a	95% CL
G								
401	5	3	14	5	0	0	19	6
501 ^b	295	76	0	0	0	0	295	76
MYH ^c	54	37	8	14	0	0	62	40
Multiple ^d	15	2	3	0	1	1	19	2
Subtotal	369	85	25	15	1	1	395	86
GB								
402	19	6	9	4	0	0	28	7
501 ^b	305	75	0	0	0	0	305	75
MYH ^c	31	28	0	0	0	0	31	28
Multiple ^d	29	5	6	1	0	0	35	5
Subtotal	384	81	15	4	0	0	399	81
GC								
403	10	5	13	5	0	0	23	7
501 ^b	690	108	0	0	0	0	690	108
MYH ^c	31	28	0	0	0	0	31	28
Multiple ^d	53	3	1	1	0	0	55	3
Subtotal	784	112	14	5	0	0	799	112
HA								
410 ^b	244	39	0	0	0	0	244	39
MYH ^c	31	28	0	0	0	0	31	28
Multiple ^d	33	3	0	0	0	0	33	3
Subtotal	308	48	0	0	0	0	308	48
J								
404	167	31	35	15	5	5	206	33
501 ^b	5	9	0	0	0	0	5	9
MYH ^c	8	14	0	0	0	0	8	14
Multiple ^d	4	0	2	1	0	0	6	1
Subtotal	183	35	37	15	5	5	225	37
L								
405	96	20	51	18	4	5	152	27
501 ^b	480	87	0	0	0	0	480	87
MYH	39	32	15	20	0	0	54	37
Multiple ^c	48	6	6	1	0	0	54	6
Subtotal	663	95	73	27	4	5	740	99

^aColumn and row totals for hunting effort may not equal statewide totals because of rounding errors.

^bLicenses were valid on private lands only.

^cMentored Youth Hunts.

^dHunters that purchased multiple hunting licenses for multiple hunting areas.

^eIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^fHunting activity occurred at unknown location within Management Unit YY.

Table 6 (continued). Number of turkeys harvested during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type							
	Private		Public		Unknown		All land types	
	Total	95% CL	Total	95% CL	Total	95% CL	Total ^a	95% CL
M								
406	215	50	77	26	5	8	297	56
MYH ^c	15	20	0	0	0	0	15	20
Multiple ^d	20	6	7	2	0	0	27	6
Subtotal	251	54	84	26	5	8	340	60
T								
407	13	4	16	5	0	0	28	6
501 ^b	315	72	0	0	0	0	315	72
MYH ^c	8	14	0	0	0	0	8	14
Multiple ^d	21	7	6	2	0	0	27	8
Subtotal	357	74	22	5	0	0	378	74
W								
408	28	6	6	3	1	2	36	7
501 ^b	135	47	0	0	0	0	135	47
MYH ^c	15	20	0	0	0	0	15	20
Multiple ^d	21	5	0	0	0	0	21	5
Subtotal	200	52	6	3	1	2	207	52
WA								
409	16	6	3	3	0	0	19	7
501 ^b	110	46	0	0	0	0	110	46
MYH ^c	15	20	0	0	0	0	15	20
Multiple ^d	6	0	0	0	0	0	6	0
Subtotal	147	51	3	3	0	0	150	51
Eastern YY^e								
501 ^b	505	91	0	0	0	0	505	91
MYH ^c	39	32	0	0	0	0	39	32
Multiple ^d	39	5	0	0	0	0	39	5
Subtotal	583	96	0	0	0	0	583	96
Unknown YY^f								
501 ^b	160	51	0	0	0	0	160	51
MYH ^c	54	37	0	0	0	0	54	37
Multiple ^d	8	4	0	0	3	2	11	4
Subtotal	222	63	0	0	3	2	225	63
Statewide								
Total ^a	4,452	236	279	44	20	11	4,751	240

^aColumn and row totals for hunting effort may not equal statewide totals because of rounding errors.

^bLicenses were valid on private lands only.

^cMentored Youth Hunts.

^dHunters that purchased multiple hunting licenses for multiple hunting areas.

^eIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^fHunting activity occurred at unknown location within Management Unit YY.

Table 7. Proportion of hunters that rated their hunting experience as excellent, very good, or good during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type						All land types	
	Private		Public		Unknown			
	%	95% CL	%	95% CL	%	95% CL	% ^a	95% CL
G								
401	46	11	40	8	0	0	38	7
501 ^a	60	6	0	0	0	0	60	6
MYH ^b	65	18	67	50	0	0	68	17
Multiple ^c	86	3	71	12	100	0	81	4
Subtotal	61	6	48	12	100	0	60	5
GB								
402	50	7	52	8	25	24	52	6
501 ^a	65	7	0	0	0	0	65	7
MYH ^b	90	12	100	0	100	0	91	11
Multiple ^c	73	5	62	11	0	0	71	5
Subtotal	68	5	58	10	68	37	68	5
GC								
403	60	15	58	9	0	0	58	8
501 ^a	66	4	0	0	0	0	66	4
MYH ^b	48	17	0	0	0	0	47	17
Multiple ^c	71	1	47	6	0	0	69	2
Subtotal	64	4	45	12	0	0	64	4
HA								
410 ^b	53	4	0	0	0	0	53	4
MYH ^b	80	19	0	0	0	0	80	19
Multiple ^c	68	4	0	0	0	0	68	4
Subtotal	57	4	0	0	0	0	57	4
J								
404	63	5	56	9	43	28	60	5
501 ^a	100	0	0	0	0	0	100	0
MYH ^b	63	31	100	0	0	0	70	27
Multiple ^c	56	4	62	6	0	0	57	3
Subtotal	63	5	60	8	43	28	62	5
L								
405	53	6	43	6	100	0	51	4
501 ^a	57	5	0	0	0	0	57	5
MYH ^b	68	15	50	46	0	0	68	14
Multiple ^c	72	2	58	6	100	0	69	2
Subtotal	58	4	45	7	51	49	57	3

^aLicenses were valid on private lands only.

^bMentored Youth Hunts.

^cHunters that purchased multiple hunting licenses for multiple hunting areas.

^dIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^eHunting activity occurred at unknown location within Management Unit YY.

Table 7 (continued). Proportion of hunters that rated their hunting experience as excellent, very good, or good during the 2015 Michigan fall turkey hunting season.

Area and hunting license	Land type						All land types	
	Private		Public		Unknown			
	%	95% CL	%	95% CL	%	95% CL	% ^a	95% CL
M								
406	51	5	38	6	57	29	48	4
MYH ^b	60	28	25	40	0	0	58	26
Multiple ^c	64	6	37	6	0	0	57	5
Subtotal	52	5	37	6	57	29	49	4
T								
407	58	9	57	7	0	0	58	6
501 ^a	64	6	0	0	0	0	64	6
MYH ^b	55	20	0	0	0	0	55	20
Multiple ^c	64	5	66	11	0	0	63	5
Subtotal	63	6	59	6	0	0	62	5
W								
408	63	7	57	12	33	29	59	6
501 ^a	67	10	0	0	0	0	67	10
MYH ^b	83	28	0	0	0	0	83	28
Multiple ^c	87	1	0	0	0	0	87	1
Subtotal	69	7	57	12	33	29	68	7
WA								
409	48	12	50	26	100	0	50	11
501 ^a	51	10	0	0	0	0	51	10
MYH ^b	70	27	0	0	0	0	70	27
Multiple ^c	90	1	0	0	0	0	80	9
Subtotal	55	9	44	24	100	0	55	9
Eastern YY^d								
501 ^a	64	5	0	0	0	0	64	5
MYH ^c	63	17	0	0	0	0	63	17
Multiple ^c	74	2	0	0	0	0	74	2
Subtotal	64	4	0	0	0	0	64	4
Unknown YY^e								
501 ^a	52	8	0	0	0	0	52	8
MYH ^b	58	18	50	65	100	0	62	16
Multiple ^c	56	13	57	24	0	0	48	12
Subtotal	53	7	51	56	85	19	54	7
Statewide								
Total	61	2	47	3	60	17	61	1

^aLicenses were valid on private lands only.

^bMentored Youth Hunts.

^cHunters that purchased multiple hunting licenses for multiple hunting areas.

^dIncluded Genesee, Lapeer, Macomb, Oakland, and St. Clair counties within Management Unit YY.

^eHunting activity occurred at unknown location within Management Unit YY.

Table 8. Number of hunters, hunting effort, harvest, hunter success, and hunter satisfaction during the 2015 Michigan fall turkey hunting season, summarized by county.

County	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b	
	Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL
Alger	41	15	280	150	5	3	9	5	34	17
Allegan	549	80	3,260	648	200	52	34	7	67	7
Antrim	208	35	1,172	263	78	27	32	9	65	8
Baraga	15	10	59	41	5	6	33	29	33	29
Barry	387	66	2,544	576	90	37	21	8	54	9
Bay	101	39	430	183	40	23	40	19	58	18
Berrien	246	55	1,646	452	76	32	29	10	69	11
Branch	206	58	847	283	44	25	20	11	68	13
Calhoun	390	77	2,040	533	64	29	17	7	58	10
Cass	221	53	1,331	394	49	25	21	10	52	12
Charlevoix	108	29	546	160	36	16	33	12	63	14
Cheboygan	116	30	578	191	26	12	22	10	55	13
Chippewa	29	12	270	169	5	4	17	14	47	21
Clinton	227	60	1,556	608	54	28	24	11	66	12
Delta	157	36	943	263	35	14	19	8	43	11
Dickinson	112	27	750	213	45	23	29	10	44	12
Eaton	238	62	1,916	658	76	37	30	12	57	13
Emmet	84	27	447	143	16	11	16	10	70	13
Genesee	318	70	1,955	688	146	50	44	11	80	9
Gogebic	78	24	480	172	24	17	31	17	47	16
Gratiot	231	58	1,355	493	68	34	27	11	62	12

^aNumber of hunters does not add up to statewide total because hunters can hunt in more than one county. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

Table 8 (continued). Number of hunters, hunting effort, harvest, hunter success, and hunter satisfaction during the 2015 Michigan fall turkey hunting season, summarized by county.

County	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b	
	Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL
Hillsdale	410	78	1,944	505	136	48	32	9	69	9
Houghton	56	22	309	160	13	10	18	13	41	18
Huron	421	78	2,284	578	138	44	31	8	69	9
Ingham	280	64	1,444	467	95	38	34	11	78	9
Ionia	229	56	1,715	585	78	41	30	12	57	12
Iron	137	32	1,073	360	48	17	33	11	62	11
Isabella	243	58	1,280	383	93	35	38	12	71	11
Jackson	499	87	3,023	752	140	46	28	8	57	9
Kalamazoo	316	62	2,012	590	89	34	28	9	56	10
Kent	428	77	2,452	539	112	38	25	8	60	9
Keweenaw	5	6	18	21	0	0	0	0	50	54
Lapeer	501	87	3,291	764	160	53	30	8	63	9
Lenawee	351	72	2,197	596	88	40	22	9	59	10
Livingston	476	82	2,720	646	132	43	26	7	62	9
Luce	3	4	15	24	0	0	0	0	0	0
Mackinac	10	8	33	34	0	0	0	0	25	33
Macomb	161	51	901	381	44	27	27	14	59	15
Marquette	63	23	444	186	5	6	8	9	20	13
Mecosta	272	49	1,346	282	64	25	23	8	56	9
Menominee	207	41	1,186	319	117	47	43	10	64	10
Midland	295	60	1,493	415	111	38	35	10	66	10

^aNumber of hunters does not add up to statewide total because hunters can hunt in more than one county. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

Table 8 (continued). Number of hunters, hunting effort, harvest, hunter success, and hunter satisfaction during the 2015 Michigan fall turkey hunting season, summarized by county.

County	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b	
	Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL
Montcalm	335	71	2,332	615	116	50	30	10	62	10
Muskegon	232	54	1,374	383	100	47	34	11	56	12
Newaygo	422	52	2,657	409	126	31	27	6	58	7
Oakland	357	74	2,063	574	93	34	25	9	67	10
Oceana	194	36	1,283	294	88	27	41	10	64	9
Ontonagon	42	15	268	142	5	6	12	12	55	18
Otsego	175	36	810	250	42	15	24	8	64	10
Ottawa	435	83	2,174	545	184	54	41	9	81	7
Saginaw	403	78	2,366	627	108	45	23	8	54	10
St. Clair	565	93	3,021	665	141	48	23	7	57	8
St. Joseph	185	50	1,256	448	48	25	26	12	50	14
Sanilac	422	80	2,504	677	83	35	18	7	56	10
Schoolcraft	55	21	325	159	10	7	18	12	40	18
Shiawassee	240	65	1,634	618	58	30	21	10	57	13
Tuscola	471	82	2,636	616	156	49	32	8	61	9
Van Buren	353	72	2,183	601	70	32	19	8	38	10
Washtenaw	381	72	2,190	592	145	51	34	9	66	9
Unknown	1,371	130	6,457	844	332	67	24	4	51	5

^aNumber of hunters does not add up to statewide total because hunters can hunt in more than one county. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.



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2016 MICHIGAN SPRING TURKEY HUNTER SURVEY

Brian J. Frawley

ABSTRACT

A survey of turkey hunters was conducted following the 2016 spring hunting season to determine turkey harvest and hunter participation. In 2016, about 74,295 hunters harvested about 30,386 turkeys. Statewide, 41% of hunters harvested a turkey. Nearly 70% of the hunters rated their hunting experience as excellent, very good, or good in 2016. About 92% of the hunters reported they experienced no or only minor interference from other hunters. The number of hunters (+3%) and hunting effort (+5%) increased significantly between 2015 and 2016; however, harvest, hunter success, and hunter satisfaction was not significantly different.

INTRODUCTION

Michigan's spring turkey (*Meleagris gallopavo*) hunting season was based originally on an area and quota system. This system was set up primarily to distribute hunters across geographic areas (management units) and time (hunt periods). As the turkey population has expanded statewide, license types were created that allowed hunters to hunt in multiple management units. The goal of the current system has been to provide hunting opportunities while maintaining acceptable levels of hunter satisfaction (Luukkonen 1998).

In 2016, nearly the entire state was open for wild turkey hunting from April 18 through May 31 (Figure 1). The area open for turkey hunting (58,114 square miles) was the same as last year. The statewide hunting area was divided into 13 management units (Figure 1). Hunting licenses were available on these management units for three types of hunts: (1) quota [limited licenses available] hunts on both public and private lands in a



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specific management unit, (2) quota hunt on private lands in southern Michigan [Hunt 301 in Unit ZZ], and (3) a guaranteed hunt (no quota) that included all units [Hunt 234], but excluded public lands in the Southern Lower Peninsula (SLP).

People interested in obtaining a turkey hunting license could enter into a random drawing (lottery) conducted by the Department of Natural Resources (DNR) or purchase a license not allocated through the lottery (i.e., left-over licenses and licenses for Hunt 234). Each applicant in the lottery could select up to two hunt choices (any combination of quota and unlimited quota hunts). The lottery consisted of two drawings. The first drawing was used to select applicants based on their preferred hunt choice. The second drawing was among applicants who were not successful in the first drawing, and was based on the hunter's second choice for a hunt. Any licenses available after the drawing was completed were made available on a first-come, first-served basis to applicants that were unsuccessful in the drawing. Unsuccessful applicants could purchase one leftover license or a license for Hunt 234. Beginning one week after licenses were available to unsuccessful applicants, all remaining licenses were made available to nonapplicants. Hunters were allowed to purchase one license and take one bearded turkey with the harvest tag issued with their license. Hunters could use a bow and arrow, crossbow, or shotgun with number 4 or smaller shot (including a muzzleloading shotgun) to hunt turkeys.

A limited number of licenses were available for quota hunts, and they were valid only in a certain management unit and only during a limited time period (7-42 days). Most quota hunts began before May 5 and lasted for seven days. A private land management unit (Unit ZZ) was created in 2002 that included all private lands in southern Michigan (Figure 1). Hunters who selected Hunt 301 could hunt the first two weeks of the season (April 18-May 1) anywhere on private lands in Unit ZZ. This unit and hunt period was created to provide additional hunting opportunity and increased flexibility for hunters who had difficulty finding time to hunt during shorter quota hunts.

Licenses for Hunt 234 could be used in any management unit. They were valid on public and private lands, except in Unit ZZ, where they were only valid on private lands or on Fort Custer military lands. Hunt 234 started later than most quota hunts but lasted for 30 days (May 2-31). Licenses for Hunt 234 were sold as a leftover license with no quota and could be purchased throughout the entire spring turkey hunting season.

The Pure Michigan Hunt (PMH) was a unique multi-species hunting opportunity offered for the first time in 2012. Individuals could purchase an unlimited number of applications for the PMH. Three individuals were randomly chosen from all applications, and winners received elk, bear, spring turkey, fall turkey, and antlerless deer hunting licenses and could participate in a reserved waterfowl hunt on a managed waterfowl area. The turkey hunting licenses were valid for all areas open for hunting turkey and during all turkey hunting periods. Furthermore, the PMH license holder could hunt any season until their turkey harvest tag was filled.

A mentored youth hunting program started in 2012. Under this program, a mentored youth hunting license was created and could be purchased by youth hunters aged 9 and younger. The youth hunter had to participate with a mentor who was at least 21 years

old. The mentored youth hunting license allowed the youth hunter to hunt small game, turkey, deer, trap furbearers, and fish for all species. A turkey kill tag issued under the mentored youth hunting license was valid for one turkey during any hunt period, in any open hunt unit, on private or public land. No application was required to purchase the mentored youth license.

The DNR and the Natural Resources Commission have the authority and responsibility to protect and manage the wildlife resources of the state of Michigan. Harvest surveys are a management tool used by the Wildlife Division to accomplish its statutory responsibility. Estimating harvest, hunting effort, and hunter satisfaction are the primary objectives of this survey.

METHODS

The Wildlife Division provided all hunters the option to report voluntarily information about their turkey hunting activity via the internet. This option was advertised in the hunting regulation booklet and through a statewide news release. Hunters could report information anytime during the hunting season. Hunters reported whether they hunted, the days spent afield, whether they harvested a turkey, type of device used while hunting (i.e., firearm, crossbow, or bow and arrow), and whether other hunters caused interference during their hunt (none, minor, some irritation, or major problem). Successful hunters were also asked to report where their turkeys were taken (public or private land), date of harvest, and beard length of the harvested bird. Birds with a beard less than six inches were classified as juveniles (one year old), while birds with longer beards were adults (two years old or greater; Kelly, 1975). Finally, hunters were asked to rate their overall hunting experience (excellent, very good, good, fair, or poor), and indicate the status of the turkey population in their hunting area (increasing, decreasing, stable, or unknown).

Following the 2016 spring turkey hunting season, a questionnaire was sent to 13,633 randomly selected people that had purchased a turkey hunting license (resident turkey, senior resident turkey, nonresident turkey, mentored youth, and Pure Michigan hunting licenses) and had not already voluntarily reported harvest information via the internet. Hunters receiving the questionnaire were asked to report the same information that was collected from hunters that reported voluntarily on the internet.

Estimates were calculated using a stratified random sampling design that included 18 strata (Cochran 1977). Hunters were stratified based on the management unit where their license was valid (13 management units). Hunters who purchased a license that could be used in multiple management units (mentored youth hunters, PMH license holders, and licenses for hunts 234 and 301) were treated as separate strata (strata 14-17). Moreover, people that had voluntarily reported information about their hunting activity via the internet were treated as a separate stratum (eighteenth stratum).

A 95% confidence limit (CL) was calculated for each estimate. This CL could be added to and subtracted from the estimate to calculate the 95% confidence interval. The confidence interval was a measure of the precision associated with the estimate and

implies the true value would be within this interval 95 times out of 100. Estimates were based on information collected from random samples of hunting license buyers. Thus, these estimates were subject to sampling errors (Cochran 1977). Estimates were not adjusted for possible response or nonresponse biases.

Statistical tests are used routinely to determine the likelihood that differences among estimates are larger than expected by chance alone. The overlap of 95% confidence intervals was used to determine whether estimates differed. Non-overlapping 95% confidence intervals was equivalent to stating the difference between the means was larger than would be expected 995 out of 1,000 times ($P < 0.005$), if the study had been repeated (Payton et al. 2003).

Questionnaires were mailed initially during early July 2016, and nonrespondents were mailed up to two follow-up questionnaires. Although 13,633 people were sent the questionnaire, 242 surveys were undeliverable resulting in an adjusted sample size of 13,391. Questionnaires were returned by 7,197 people, yielding a 54% adjusted response rate. In addition, 3,000 people voluntarily reported information about their hunting activity via the internet before the random sample was selected.

RESULTS AND DISCUSSION

In 2016, licenses were purchased by 90,774 people, an increase of about 4% from 2015 (Table 1). Most of the people buying a license were males (92%), and the average age of the license buyers was 45 years (Figure 2). Nearly 11% (9,675) of the license buyers were younger than 17 years old. Mentored youth hunting licenses were purchased by 2,264 youths.

The number of people buying a turkey hunting license in 2016 decreased nearly 28% in ten years from 2006 (125,934 people purchased a license in 2006). There were fewer license buyers for age classes between 25 and 57 years of age in 2016, compared to 2006 (Figure 3). However, there were increased hunter numbers among the youngest and oldest age classes in 2016. The increased hunter numbers in the oldest age classes likely represented the rising share of older people in the population as the baby-boom generation aged and life expectancies have increased. The increased participation among the youngest hunters reflected the lowering of the minimum age requirements. In 2016, there was no minimum age limit to hunt turkeys; while hunters had to be at least 12 years old to participate in 2006.

About 82% ($\pm 1\%$) of license buyers hunted turkeys (74,295 hunters). Most of these hunters were males (68,315 \pm 903), although nearly 8% ($\pm 1\%$) of the hunters were females (5,979 \pm 520). The estimated number of hunters increased significantly by 3% between 2015 and 2016 (71,902 versus 74,295 hunters). Counties listed in descending order with more than 2,000 hunters afield included Allegan, Kent, Montcalm, Jackson, Lapeer, Newaygo, and Tuscola (Table 3).

Hunters spent an estimated 298,486 days afield pursuing turkeys (4.0 \pm 0.1 days/hunter), and harvested approximately 30,386 birds (Figure 4). Counties

listed in descending order with hunters taking more than 900 turkeys included Montcalm, Allegan, Jackson, Tuscola, Kent, and Newaygo (Table 3). Hunter effort was significantly higher by 5% in 2016 than 2015, but harvest was not significantly different from 2015. Hunter success was 41% in 2016, which was not significantly different from the 42% hunter success experienced in 2015.

About 20% ($\pm 2\%$) of the harvested birds were juvenile males ($6,088 \pm 524$); 79% ($\pm 2\%$) were adult males ($23,901 \pm 909$), and about 1% were bearded females (198 ± 89). Additionally, the age of a small number of harvested birds ($< 1\%$) was unknown (199 ± 95) because hunters failed to report a beard length.

Hunting effort and the number of turkeys harvested were generally highest during the earliest hunting periods (Figures 5-8). For turkeys that the harvest date was known, 45% of these birds were taken during the first seven days (April 18-24). Daily hunter success generally was more than 8% during April 18 through May 10. Daily hunter success was generally below 8% during May 11-31. Hunting effort and harvest generally was greater on the weekends than weekdays.

About 81% of turkey hunters hunted solely on private land; 14% hunted on public land only; and 5% hunted on both private and public lands (Table 4). Of the 30,386 turkeys harvested in 2016, $90\% \pm 1\%$ were taken on private land ($27,251 \pm 933$ birds). About $10\% \pm 1\%$ of the harvest ($3,069 \pm 383$ birds) was taken on public land.

Sixteen percent of turkey hunters believed turkey numbers were increasing in their hunting area (Table 5); while, 43% thought turkey numbers were stable, 22% thought turkey were decreasing; 18% of turkey hunters were uncertain about the status of turkeys; and 1% did not comment on the status of turkey.

Hunter satisfaction is one measure used to assess the turkey management program in Michigan. Of the estimated 74,295 people hunting turkeys in 2016, $70\% \pm 1\%$ of the hunters rated their hunting experience as either excellent ($15,322 \pm 768$ hunters), very good ($15,738 \pm 786$), or good ($20,711 \pm 879$) (Table 6). Nearly $18\% \pm 1\%$ of the hunters rated their experience as fair ($13,269 \pm 757$ hunters). Only $12\% \pm 1\%$ of the hunters rated their experience as poor ($8,572 \pm 625$ hunters). About 1% of the hunters (683 ± 185 hunters) failed to rate their hunting experience.

Hunter satisfaction is affected by many factors such as hunting success and whether hunting activities were completed without interference (Luukkonen 1998). In 2016, $75\% \pm 1\%$ of the hunters reported no hunter interference; $18\% \pm 1\%$ reported minor interference; $6\% \pm 1\%$ reported some irritation caused by hunter interference; and 1% reported hunter interference was a major problem (Table 7).

Although interference can affect hunter satisfaction, hunter satisfaction was more closely associated with hunter success (Figures 9 and 10). Hunter success was greatest for hunts beginning April 18; however, satisfaction varied little among the hunt periods (Table 8).

Compared to 2015, hunter numbers and hunting effort increased significantly statewide in 2016 (Table 9); however, harvest changed little. In addition, hunter success, hunter satisfaction, and the proportion of hunters that indicated they experienced no or only minor interference with another hunter were similar in both 2015 and 2016 (Table 10).

Most hunters ($89 \pm 1\%$) used firearms while hunting turkeys, although $6\% \pm 1\%$ of the hunters used archery equipment (compound, recurve, or long bows), and $5\% \pm 1\%$ used a crossbow. Most hunters ($94\% \pm 1\%$) used a firearm to harvest their turkeys, while $3\% \pm 1\%$ used archery equipment, and $3\% \pm 1\%$ used a crossbow. About 42% of hunters using a firearm harvested a turkey, while 21% of hunters using a crossbow took a turkey, and 21% of hunters using another type of bow (longbows, recurve, or compound bows) took a turkey (Table 11).

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Table 1. Number of hunting licenses available and people applying for licenses during the 2016 Michigan spring turkey hunting season.

Management unit or hunt period	Licenses available (quota)	Number of eligible applicants ^a	Number of applicants successful in drawing	Number of licenses remaining after drawing	Number of licenses purchased by successful applicants ^b	Number of licenses purchased by unsuccessful applicants ^b	Number of licenses purchased by people not in the drawing ^b	Number of licensees ^b
A	5,500	1,312	1,314	4,186	966	0	1,060	2,026
B	1,000	27	27	973	17	0	14	31
E	1,700	1,734	1,673	27	1,232	2	19	1,253
F	5,000	2,870	2,890	2,107	2,145	1	1,008	3,154
J	4,000	1,253	1,258	2,741	911	0	1,067	1,978
K	8,500	7,925	7,689	808	5,695	24	759	6,478
M	6,000	724	728	5,272	574	0	3,600	4,174
ZA	4,800	1,428	1,447	3,353	1,048	3	1,649	2,700
ZB	2,600	699	706	1,894	521	0	692	1,213
ZC	2,400	1,139	1,133	1,265	810	2	865	1,677
ZD	40	68	40	0	18	0	0	18
ZE	2,000	1,614	1,542	458	1,121	18	434	1,573
ZF	5,600	1,581	1,601	3,999	1,185	0	2,675	3,860
Hunt 234	NA	NA	NA	NA	524	78	32,676	33,278
Hunt 301	65,000	4,543	4,591	60,409	3,702	23	21,372	25,097
Pure MI Hunts	3	NA	NA	NA	NA	NA	NA	3
Mentored Hunts	NA	NA	NA	NA	NA	NA	NA	2,261
Statewide	114,143	26,917	26,639	87,492	20,469	151	67,890	90,774

^aNumber of eligible applicants selecting the management unit as their first choice to hunt.

^bIf a licensee purchased more than one license, only the latest purchase is included in the summary of licenses purchased.

Table 2. Number of hunters, hunting efforts, harvest, hunter success, hunter satisfaction, and hunter interference during the spring 2016 Michigan turkey hunting season.

Management unit	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b		Noninterfered hunters ^c	
	Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL	%	95% CL
Hunt periods with quotas (General limited quota hunt periods)												
A	1,683	95	5,901	601	487	104	29	6	60	7	94	3
B	22	4	59	18	6	4	28	16	76	16	100	0
E	1,140	43	3,340	278	444	70	39	6	70	6	90	4
F	2,741	130	9,799	829	803	165	29	6	59	6	92	4
J	1,575	106	5,810	676	562	117	36	7	59	7	89	5
K	5,694	257	19,407	1,565	2,412	369	42	6	65	6	90	4
M	2,926	240	15,123	2,294	1,062	223	36	7	55	7	96	3
ZA	2,263	142	8,208	1,075	799	174	35	7	64	7	87	5
ZB	1,020	62	3,409	327	309	72	30	7	79	6	90	5
ZC	1,247	106	4,503	646	340	95	27	7	63	8	79	7
ZD	16	3	62	31	5	4	33	24	87	19	87	19
ZE	1,290	81	5,102	613	355	85	27	6	67	7	84	5
ZF	3,317	181	14,712	1,784	1,069	228	32	7	68	7	89	5
Pure MI Hunt	3	0	15	3	2	2	50	57	100	0	100	0
Subtotal	24,937	487	95,450	3,812	8,655	588	35	2	64	2	90	1
Hunt period 301 with quota (Private lands in Management Unit ZZ; April 18-May 1, 2016)												
ZA	5,316	412	18,733	1,922	2,875	320	54	4	79	4	95	2
ZB	2,355	295	8,673	1,428	1,170	212	50	7	76	6	91	4
ZC	3,143	334	10,622	1,433	1,530	239	49	6	77	5	95	3
ZD	331	116	1,167	470	65	50	20	14	71	16	93	9
ZE	6,118	434	21,390	2,082	3,190	335	52	4	78	3	92	2
ZF	4,573	390	17,715	1,991	2,415	296	51	5	76	4	92	3
Unknown	430	133	1,302	523	0	0	0	0	67	15	97	5
Subtotal	21,777	346	79,603	2,985	11,244	502	52	2	78	2	93	1

^aNumber of hunters does not add up to statewide total because mentored youth and hunters with licenses for hunts 234 and 301 can hunt in more than one unit. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

^cProportion of hunters that indicated they experienced no or only minor interference from other hunters.

Table 2 (continued). Number of hunters, hunting efforts, harvest, hunter success, hunter satisfaction, and hunter interference during the spring 2016 Michigan turkey hunting season.

Management unit	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b		Noninterfered hunters ^c	
	Total	95%	Total	95%	Total	95%	%	95%	%	95%	%	95%
		CL		CL		CL		CL		CL		CL
Unlimited quota hunt period (Guaranteed Hunt 234; May 2-31, 2016)												
A	648	180	2,425	918	153	87	24	12	45	14	95	6
B	0	0	0	0	0	0	0	0	0	0	0	0
E	1,344	256	5,718	1,403	443	148	33	9	61	9	94	4
F	1,222	243	5,052	1,246	238	107	19	8	51	10	95	4
J	865	204	2,954	837	284	117	33	11	65	11	96	4
K	5,421	478	24,668	2,840	1,921	299	35	5	65	5	92	3
M	182	96	770	488	62	55	34	25	59	26	100	0
ZA	5,465	482	23,699	3,002	2,212	322	40	5	68	5	94	2
ZB	1,483	269	6,645	1,572	610	173	41	9	64	9	94	4
ZC	2,089	315	8,315	1,778	889	208	43	8	74	7	95	3
ZD	192	99	955	593	45	48	23	22	70	24	100	0
ZE	4,381	437	20,213	2,728	1,749	285	40	5	76	5	92	3
ZF	3,515	399	15,584	2,325	1,398	258	39	6	77	5	91	4
Unknown	380	140	1,403	767	0	0	0	0	50	19	92	10
Subtotal	25,989	542	118,403	5,104	10,004	592	38	2	68	2	93	1

^aNumber of hunters does not add up to statewide total because mentored youth and hunters with licenses for hunts 234 and 301 can hunt in more than one unit. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

^cProportion of hunters that indicated they experienced no or only minor interference from other hunters.

Table 2 (continued). Number of hunters, hunting efforts, harvest, hunter success, hunter satisfaction, and hunter interference during the spring 2016 Michigan turkey hunting season.

Management unit	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b		Noninterfered hunters ^c	
	Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL	%	95% CL
Mentored hunts (youth hunters nine years old and younger could hunt during any open season)												
A	23	13	66	43	3	5	13	19	63	27	100	0
B	0	0	0	0	0	0	0	0	0	0	0	0
E	49	19	141	63	14	10	29	17	88	12	100	0
F	40	17	135	64	11	9	29	19	79	17	93	11
J	52	19	227	98	6	6	11	12	89	12	94	9
K	204	37	534	112	60	21	30	9	83	7	90	6
M	43	17	106	59	14	10	33	19	73	18	87	14
ZA	402	49	1,261	217	118	28	29	6	83	5	94	3
ZB	118	28	391	134	43	17	37	12	80	10	95	5
ZC	132	30	359	97	40	17	30	11	72	11	89	7
ZD	3	5	20	32	0	0	0	0	100	0	100	0
ZE	282	42	856	159	92	25	33	8	87	5	95	4
ZF	282	42	893	192	80	24	28	7	80	6	92	4
Unknown	20	12	40	43	0	0	0	0	71	27	86	21
Subtotal	1,592	58	5,031	334	483	52	30	3	81	3	93	2
Statewide	74,295	808	298,486	7,043	30,386	976	41	1	70	1	92	1

^aNumber of hunters does not add up to statewide total because mentored youth and hunters with licenses for hunts 234 and 301 can hunt in more than one unit. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

^cProportion of hunters that indicated they experienced no or only minor interference from other hunters.

Table 3. Estimated number of hunters, hunting effort, harvest, hunter success, hunter satisfaction, and hunter interference during the 2016 Michigan spring turkey hunting season. Estimates combined quota and unlimited quota hunts in each county.

County	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b		Noninterfered hunters ^c	
	Total	95%	Total	95%	Total	95%	%	95%	%	95%	%	95%
		CL		CL		CL		CL		CL		CL
Alcona	948	191	3,268	734	204	89	21	8	53	10	95	4
Alger	87	72	210	196	52	56	60	40	57	41	100	0
Allegan	2,516	335	10,040	1,839	1,034	220	41	7	73	7	91	4
Alpena	443	119	1,122	370	185	77	42	14	50	14	92	8
Antrim	727	157	2,383	628	273	96	38	11	74	10	97	4
Arenac	454	118	1,749	630	169	68	37	13	72	13	86	9
Baraga	61	60	228	233	2	0	3	3	40	47	98	2
Barry	1,743	290	6,878	1,418	560	166	32	8	68	8	91	5
Bay	503	149	1,738	774	239	101	47	15	87	10	91	9
Benzie	333	157	1,422	700	66	64	20	18	43	23	84	19
Berrien	911	207	3,562	1,046	396	135	43	11	75	10	93	5
Branch	862	192	3,652	1,088	429	134	50	11	74	10	95	5
Calhoun	1,404	245	5,550	1,359	615	162	44	9	67	8	91	5
Cass	757	192	3,330	1,078	255	109	34	12	71	12	84	9
Charlevoix	373	111	1,406	469	136	65	37	15	75	14	91	8
Cheboygan	489	131	1,570	530	94	60	19	11	37	14	85	10
Chippewa	136	87	683	627	28	35	21	24	47	32	100	0
Clare	991	181	3,473	810	384	115	39	9	65	9	93	5
Clinton	1,269	239	5,868	1,695	434	137	34	9	71	9	94	5
Crawford	653	166	2,202	658	163	85	25	11	65	13	97	4
Delta	566	177	2,590	1,214	190	106	34	16	44	17	100	0

^aNumber of hunters does not add up to statewide total because hunters can hunt in more than one county. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

^cProportion of hunters that indicated they experienced no or only minor interference from other hunters.

Table 3 (continued). Estimated number of hunters, hunting effort, harvest, hunter success, hunter satisfaction, and hunter interference during the 2016 Michigan spring turkey hunting season. Estimates combined quota and unlimited quota hunts in each county.

County	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b		Noninterfered hunters ^c	
	Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL	%	95% CL
Dickinson	567	178	2,506	998	154	97	27	15	44	17	93	8
Eaton	1,030	211	3,609	909	491	149	48	10	75	9	91	6
Emmet	314	109	983	370	103	64	33	17	63	17	87	11
Genesee	1,400	242	4,953	1,132	642	164	46	9	76	8	94	4
Gladwin	1,006	178	3,680	1,042	328	100	33	9	66	9	96	3
Gogebic	138	91	582	455	41	49	29	30	30	30	100	0
Gd. Traverse	523	189	1,729	693	184	110	35	17	70	18	91	10
Gratiot	1,298	242	4,200	1,087	485	148	37	9	62	9	88	6
Hillsdale	1,332	237	4,939	1,088	508	147	38	9	77	7	90	5
Houghton	81	69	677	671	22	35	27	37	75	37	100	0
Huron	1,315	222	5,309	1,193	503	141	38	8	72	8	88	5
Ingham	1,076	211	3,913	1,026	487	141	45	10	84	7	90	6
Ionia	1,324	241	4,629	1,016	574	159	43	9	71	8	94	4
Iosco	692	174	2,782	797	153	82	22	11	50	13	94	6
Iron	353	143	1,451	719	173	101	49	21	65	20	100	0
Isabella	1,257	234	3,771	900	650	167	52	9	73	9	94	4
Jackson	2,120	288	7,917	1,534	1,012	202	48	7	73	6	90	4
Kalamazoo	938	210	3,610	1,032	350	126	37	11	76	10	96	5
Kalkaska	784	225	3,216	1,108	265	132	34	14	72	13	94	6
Kent	2,283	318	8,617	1,569	941	204	41	7	76	6	94	3
Keweenaw	39	49	66	80	18	35	46	63	54	63	100	0

^aNumber of hunters does not add up to statewide total because hunters can hunt in more than one county. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

^cProportion of hunters that indicated they experienced no or only minor interference from other hunters.

Table 3 (continued). Estimated number of hunters, hunting effort, harvest, hunter success, hunter satisfaction, and hunter interference during the 2016 Michigan spring turkey hunting season. Estimates combined quota and unlimited quota hunts in each county.

County	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b		Noninterfered hunters ^c	
	Total	95%	Total	95%	Total	95%	%	95%	%	95%	%	95%
		CL		CL		CL		CL		CL		CL
Lake	1,143	277	4,283	1,227	330	162	29	12	61	12	84	9
Lapeer	2,078	293	7,149	1,367	896	195	43	7	73	6	93	4
Leelanau	359	149	1,295	606	243	127	68	19	91	11	92	13
Lenawee	1,100	215	4,473	1,206	533	150	48	10	79	8	91	6
Livingston	1,727	253	6,198	1,164	665	159	39	7	75	7	91	4
Luce	0	0	0	0	0	0	0	0	0	0	0	0
Mackinac	1	0	6	0	0	0	0	0	100	0	100	0
Macomb	576	155	2,048	645	232	98	40	13	76	11	95	6
Manistee	755	222	3,010	1,079	189	114	25	13	49	15	87	11
Marquette	322	138	1,158	589	23	35	7	11	59	22	100	0
Mason	853	244	2,965	974	330	147	39	14	61	15	95	7
Mecosta	1,107	258	4,123	1,186	458	167	41	12	73	10	97	4
Menominee	981	220	4,324	1,401	396	148	40	12	56	13	92	7
Midland	1,025	212	4,040	1,140	581	162	57	10	72	10	94	5
Missaukee	708	222	2,235	810	309	158	44	16	62	16	98	4
Monroe	424	136	1,820	710	78	58	18	12	72	15	97	5
Montcalm	2,220	312	8,391	1,652	1,048	217	47	7	71	7	91	4
Montmorency	687	146	2,656	862	180	78	26	10	60	11	92	6
Muskegon	1,125	237	4,448	1,182	433	146	39	10	78	9	92	6
Newaygo	2,075	358	7,620	1,560	932	247	45	9	72	8	91	5
Oakland	1,234	200	4,151	833	366	115	30	8	66	8	82	7

^aNumber of hunters does not add up to statewide total because hunters can hunt in more than one county. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

^cProportion of hunters that indicated they experienced no or only minor interference from other hunters.

Table 3 (continued). Estimated number of hunters, hunting effort, harvest, hunter success, hunter satisfaction, and hunter interference during the 2016 Michigan spring turkey hunting season. Estimates combined quota and unlimited quota hunts in each county.

County	Hunters ^a		Hunting efforts (days) ^a		Harvest ^a		Hunter success		Hunter satisfaction ^b		Noninterfered hunters ^c	
	Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL	%	95% CL
Oceana	969	247	4,100	1,191	377	154	39	13	66	12	88	8
Ogemaw	780	176	2,793	792	226	97	29	11	47	12	92	7
Ontonagon	61	60	835	912	19	35	32	47	64	47	95	9
Osceola	1,164	275	3,892	1,099	404	172	35	12	61	12	88	8
Oscoda	722	175	2,467	774	189	92	26	11	63	12	94	6
Otsego	645	151	2,349	669	242	99	37	12	59	12	94	5
Ottawa	1,631	272	5,713	1,131	788	190	48	8	79	7	90	5
Presque Isle	642	138	2,503	639	152	70	24	10	53	12	96	5
Roscommon	739	171	2,845	778	220	97	30	11	64	12	87	9
Saginaw	1,489	257	5,497	1,207	582	162	39	9	72	8	91	5
St. Clair	1,389	237	5,069	1,279	661	164	48	9	79	7	94	4
St. Joseph	939	213	3,841	1,188	477	151	51	11	72	10	93	6
Sanilac	1,598	251	5,423	1,101	662	164	41	8	77	7	95	4
Schoolcraft	110	82	446	395	20	35	18	29	69	34	100	0
Shiawassee	1,050	215	4,099	1,030	418	134	40	10	75	9	92	6
Tuscola	2,011	264	7,521	1,320	964	190	48	7	74	6	92	4
Van Buren	1,243	242	5,521	1,481	535	158	43	10	75	9	88	7
Washtenaw	1,630	245	6,204	1,217	622	155	38	7	81	6	90	5
Wayne	115	71	381	266	37	39	32	28	66	30	90	19
Wexford	998	259	3,611	1,104	278	145	28	12	61	13	91	8
Unknown	2,669	363	10,923	2,030	300	120	11	4	55	7	91	4

^aNumber of hunters does not add up to statewide total because hunters can hunt in more than one county. Column totals for hunting effort and harvest may not equal statewide totals because of rounding errors.

^bProportion of hunters that rated their hunting experience as excellent, very good, or good.

^cProportion of hunters that indicated they experienced no or only minor interference from other hunters.

Table 4. Estimated number and proportion of hunters hunting on private and public lands during the spring 2016 Michigan turkey hunting season.^a

Management unit	Private land only				Public land only				Both private and public lands				Unknown land			
	Total	95% CL	95% %	95% CL	Total	95% CL	95% %	95% CL	Total	95% CL	95% %	95% CL	Total	95% CL	95% %	95% CL
Hunt periods with quotas (General limited quota hunt periods)																
A	1,211	122	72	6	304	88	18	5	140	62	8	4	28	30	2	2
B	17	5	76	16	4	3	16	14	2	2	8	10	0	0	0	0
E	834	70	73	5	218	56	19	5	82	37	7	3	6	10	1	1
F	1,217	186	44	6	1,241	186	45	6	257	104	9	4	27	36	1	1
J	983	130	62	7	384	102	24	6	197	79	13	5	10	19	1	1
K	3,591	383	63	6	1,450	319	25	5	600	224	11	4	52	71	1	1
M	1,977	259	68	7	481	164	16	5	468	164	16	5	0	0	0	0
ZA	1,178	190	52	8	862	177	38	7	208	102	9	4	15	29	1	1
ZB	391	78	38	7	582	83	57	7	40	29	4	3	7	13	1	1
ZC	537	113	43	8	633	116	51	8	57	42	5	3	21	27	2	2
ZD	13	4	80	19	3	3	20	19	0	0	0	0	0	0	0	0
ZE	352	87	27	6	835	103	65	7	104	50	8	4	0	0	0	0
ZF	1,590	253	48	7	1,287	242	39	7	440	163	13	5	0	0	0	0
PMH	2	2	50	57	0	0	0	0	2	2	50	57	0	0	0	0
Subtotal	13,891	641	56	2	8,284	553	33	2	2,596	376	10	1	166	97	1	0
Hunt 301 with quota (Private lands in Management Unit ZZ; April 18-May 1, 2016)																
ZA	5,204	403	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZB	2,305	288	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZC	3,077	326	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZD	323	113	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZE	5,988	424	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZF	4,476	381	100	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	421	130	100	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	21,314	338	100	0	0	0	0	0	0	0	0	0	0	0	0	0

^aRow totals may not equal 100% because of rounding errors.

Table 4 (continued). Estimated number and proportion of hunters hunting on private and public lands during the spring 2016 Michigan turkey hunting season.^a

Management unit	Private land only				Public land only				Both private and public lands				Unknown land			
	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL
Unlimited quota hunt period (Guaranteed Hunt 234; May 2-31, 2016)																
A	527	162	81	11	77	62	12	9	44	48	7	7	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	1,030	225	77	8	255	114	19	8	58	55	4	4	0	0	0	0
F	693	186	57	10	424	143	35	10	105	73	9	6	0	0	0	0
J	587	169	68	11	202	99	23	10	75	62	9	7	0	0	0	0
K	3,794	412	70	4	1,072	228	20	4	554	165	10	3	0	0	0	0
M	79	62	43	26	59	55	33	25	44	48	24	23	0	0	0	0
ZA ^b	5,465	482	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZB ^b	1,483	269	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZC ^b	2,089	315	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZD ^b	192	99	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZE ^b	4,381	437	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZF ^b	3,515	399	100	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	351	135	92	10	29	39	8	10	0	0	0	0	0	0	0	0
Subtotal	23,006	602	89	1	1,803	292	7	1	1,181	238	5	1	0	0	0	0

^aRow totals may not equal 100% because of rounding errors.

^bLicenses for the unlimited quota hunt were valid only on private lands in Management Unit ZZ in southern Michigan (Figure 1).

^cNumber of hunters does not add up to statewide total because hunters can hunt in more than one unit for the unlimited quota hunts.

Table 4 (continued). Estimated number and proportion of hunters hunting on private and public lands during the spring 2016 Michigan turkey hunting season.^a

Management unit	Private land only				Public land only				Both private and public lands				Unknown land			
	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL
Mentored hunts (youth hunters nine years old and younger could hunt during any open season)																
A	20	12	88	19	3	5	13	19	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	43	17	88	12	6	6	12	12	0	0	0	0	0	0	0	0
F	26	14	64	20	6	6	14	15	9	8	21	17	0	0	0	0
J	40	17	78	16	6	6	11	12	6	6	11	12	0	0	0	0
K	161	33	79	8	37	16	18	7	6	6	3	3	0	0	0	0
M	29	14	67	19	11	9	27	18	3	5	7	10	0	0	0	0
ZA	388	48	96	2	6	6	1	2	3	5	1	1	6	6	1	2
ZB	109	27	93	6	6	6	5	5	0	0	0	0	3	5	2	4
ZC	118	28	89	7	11	9	9	7	3	5	2	3	0	0	0	0
ZD	3	5	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZE	259	41	92	4	17	11	6	4	6	6	2	2	0	0	0	0
ZF	256	40	91	5	14	10	5	4	9	8	3	3	3	5	1	2
Unknown	20	12	100	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	1,413	62	89	2	112	28	7	2	55	20	3	1	11	9	1	1
Statewide ^c	60,087	948	81	1	10,196	626	14	1	3,832	446	5	1	210	105	0	0

^aRow totals may not equal 100% because of rounding errors.

^bLicenses for the unlimited quota hunt were valid only on private lands in Management Unit ZZ in southern Michigan (Figure 1).

^cNumber of hunters does not add up to statewide total because hunters can hunt in more than one unit for the unlimited quota hunts.

Table 5. Status of turkey population reported by turkey hunters during the spring 2016 Michigan turkey hunting season.

Management unit	Turkey population status (% of hunters) ^a				
	Increasing	Decreasing	Stable	Unknown	No answer
Hunt periods with quotas (General limited quota hunt periods)					
A	16	37	31	15	1
B	24	16	36	24	0
E	20	18	41	20	1
F	14	26	34	24	2
J	14	27	30	28	1
K	12	28	41	17	0
M	14	33	26	26	1
ZA	12	18	44	26	1
ZB	19	15	48	18	0
ZC	18	14	38	29	0
ZD	6	0	67	27	0
ZE	17	15	36	31	1
ZF	19	21	38	20	2
Pure MI Hunt	0	0	0	100	0
Mean	15	25	37	22	1
Hunt 301 with quota (Private lands in Management Unit ZZ; April 18-May 1, 2016)					
ZA	13	19	56	11	0
ZB	19	20	47	13	1
ZC	17	19	48	16	0
ZD	8	26	44	19	4
ZE	19	15	49	16	0
ZF	20	16	51	11	2
Unknown	11	25	47	17	0
Mean	17	17	51	14	1

^aRow totals may not equal 100% because of rounding errors.

Table 5 (continued). Status of turkey population reported by turkey hunters during the spring 2016 Michigan turkey hunting season.

Management unit	Turkey population status (% of hunters) ^a				
	Increasing	Decreasing	Stable	Unknown	No answer
Unlimited quota hunt period (Guaranteed Hunt 234; May 2-31, 2016)					
A	7	42	32	18	0
B	0	0	0	0	0
E	22	25	35	16	2
F	12	36	35	17	0
J	16	20	48	16	0
K	14	29	38	19	1
M	24	34	25	9	8
ZA	10	27	47	15	1
ZB	18	15	51	16	0
ZC	19	19	45	16	1
ZD	8	8	76	8	0
ZE	20	17	45	17	2
ZF	19	19	44	18	0
Unknown	0	27	46	19	8
Mean	15	23	43	17	1
Mentored hunts (youth hunters nine years old and younger could hunt during any open season)					
A	13	38	50	0	0
B	0	0	0	0	0
E	24	0	41	35	0
F	29	21	21	29	0
J	6	22	39	33	0
K	10	14	45	31	0
M	7	13	47	33	0
ZA	11	16	46	26	0
ZB	24	5	44	24	2
ZC	13	20	30	30	7
ZD	0	0	100	0	0
ZE	21	8	52	18	0
ZF	16	11	47	24	1
Unknown	14	0	71	14	0
Mean	15	13	45	25	1
Statewide ^b	16	22	43	18	1

^aRow totals may not equal 100% because of rounding errors.

^bStatewide mean interference levels (all hunts and periods).

Table 6. How hunters rated their hunting experience during the spring 2016 Michigan turkey hunting season.

Management unit	Satisfaction level (% of hunters) ^a					
	Excellent	Very good	Good	Fair	Poor	No answer
Hunt periods with quotas (General limited quota hunt periods)						
A	15	16	28	18	20	2
B	24	28	24	16	0	8
E	17	29	24	17	12	1
F	13	17	28	22	18	1
J	16	19	24	21	16	3
K	20	21	23	20	14	1
M	15	16	24	26	19	0
ZA	18	12	34	20	15	1
ZB	19	21	39	14	7	0
ZC	16	22	26	19	16	2
ZD	27	6	54	0	13	0
ZE	14	21	32	21	11	1
ZF	18	23	26	21	9	2
Pure MI Hunt	100	0	0	0	0	0
Mean	17	20	27	21	15	1
Hunt 301 with quota (Private lands in Management Unit ZZ; April 18-May 1, 2016)						
ZA	26	25	28	12	8	1
ZB	24	23	30	15	7	1
ZC	29	21	28	14	7	1
ZD	27	22	22	8	14	7
ZE	29	24	25	13	9	0
ZF	27	23	27	17	6	1
Unknown	17	8	42	14	17	3
Mean	27	23	27	14	8	1

^aRow totals may not equal 100% because of rounding errors.

Table 6 (continued). How hunters rated their hunting experience during the spring 2016 Michigan turkey hunting season.

Management unit	Satisfaction level (% of hunters) ^a					
	Excellent	Very good	Good	Fair	Poor	No answer
Unlimited quota hunt period (Guaranteed Hunt 234; May 2-31, 2016)						
A	10	11	24	18	37	0
B	0	0	0	0	0	0
E	15	17	29	22	16	1
F	7	12	32	26	23	0
J	16	20	28	22	14	0
K	17	20	29	19	15	1
M	10	9	41	25	16	0
ZA	19	19	30	21	10	0
ZB	24	24	16	24	12	0
ZC	24	26	25	16	9	1
ZD	15	9	46	30	0	0
ZE	20	25	30	15	8	1
ZF	19	22	36	15	7	0
Unknown	0	27	23	27	15	8
Mean	18	21	29	19	12	1
Mentored hunts (youth hunters nine years old and younger could hunt during any open season)						
A	13	0	50	13	25	0
B	0	0	0	0	0	0
E	24	29	35	12	0	0
F	14	21	43	14	7	0
J	11	28	50	6	6	0
K	28	27	28	13	3	1
M	33	20	20	20	7	0
ZA	28	21	34	9	8	1
ZB	37	17	27	15	2	2
ZC	26	20	26	20	4	4
ZD	100	0	0	0	0	0
ZE	31	24	32	12	1	0
ZF	26	28	27	13	6	1
Unknown	29	14	29	29	0	0
Mean	28	23	31	12	5	1
Statewide ^b	21	21	28	18	12	1

^aRow totals may not equal 100% because of rounding errors.

^bStatewide mean satisfaction levels (all hunts and periods).

Table 7. Estimated amount of hunter interference experienced by turkey hunters during the spring 2016 Michigan turkey hunting season.

Management unit	Interference level (% of hunters) ^a				
	None	Minor	Some irritation	Major problem	No answer
Hunt periods with quotas (General limited quota hunt periods)					
A	77	16	5	1	1
B	92	8	0	0	0
E	78	12	7	2	1
F	67	24	6	1	1
J	70	19	7	4	1
K	73	18	7	1	1
M	82	14	3	1	0
ZA	65	23	11	2	0
ZB	62	28	9	1	1
ZC	59	20	17	4	0
ZD	73	13	13	0	0
ZE	59	26	12	4	0
ZF	57	31	10	0	1
Pure MI Hunt	100	0	0	0	0
Mean	69	21	8	2	1
Hunt 301 with quota (Private lands in Management Unit ZZ; April 18-May 1, 2016)					
ZA	78	16	4	1	0
ZB	73	19	8	0	1
ZC	80	15	4	0	1
ZD	82	11	7	0	0
ZE	79	13	6	1	0
ZF	70	22	5	1	2
Unknown	89	8	3	0	0
Mean	77	16	5	1	1

^aRow totals may not equal 100% because of rounding errors.

Table 7 (continued). Estimated amount of hunter interference experienced by turkey hunters during the spring 2016 Michigan turkey hunting season.

Management unit	Interference level (% of hunters) ^a				
	None	Minor	Some irritation	Major problem	No answer
Unlimited quota hunt period (Guaranteed Hunt 234; May 2-31, 2016)					
A	86	9	5	0	0
B	0	0	0	0	0
E	79	16	4	1	0
F	80	15	4	1	0
J	74	23	4	0	0
K	73	19	6	2	0
M	84	16	0	0	0
ZA	80	14	4	2	1
ZB	81	13	5	1	0
ZC	82	13	3	2	0
ZD	85	15	0	0	0
ZE	76	16	6	1	1
ZF	73	17	7	1	1
Unknown	62	31	4	0	4
Mean	77	16	5	1	0
Mentored hunts (youth hunters nine years old and younger could hunt during any open season)					
A	75	25	0	0	0
B	0	0	0	0	0
E	82	18	0	0	0
F	79	14	7	0	0
J	78	17	6	0	0
K	80	10	7	3	0
M	80	7	13	0	0
ZA	81	13	5	1	0
ZB	83	12	5	0	0
ZC	72	17	7	0	4
ZD	100	0	0	0	0
ZE	89	6	5	0	0
ZF	81	11	8	0	0
Unknown	86	0	14	0	0
Mean	81	11	6	1	0
Statewide ^b	75	18	6	1	1

^aRow totals may not equal 100% because of rounding errors.

^bStatewide mean interference levels (all hunts and periods).

Table 8. Estimated number of hunting efforts, hunters, hunting success, noninterfered hunters, and hunter rating of the 2016 spring turkey hunting season, by hunt periods.

Variable	Hunt periods beginning									
	April 18		April 25		May 2		May 9		All periods ^a	
	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL
Hunting efforts (days)	138,622	4,471	21,070	2,111	130,326	5,466	8,467	1,396	298,486	7,043
Number of hunters	37,969	703	5,989	485	28,479	615	1,858	232	74,295	808
Successful hunters (n)	17,207	703	2,001	345	10,676	621	503	136	30,386	976
Successful hunters (%)	45	2	33	5	37	2	27	7	41	1
Noninterfered hunters (n) ^b	34,992	725	5,381	476	26,466	649	1,599	221	68,437	906
Noninterfered hunters (%) ^b	92	1	90	3	93	1	86	5	92	1
Favorable rating (n) ^c	27,808	759	3,581	422	19,351	700	1,031	183	51,771	1,033
Favorable rating (%) ^c	73	2	60	5	68	2	55	7	70	1

^aRow totals may not equal totals for all periods because of rounding errors.

^bProportion of hunters that indicated they experienced no or only minor interference from other hunters.

^cHunters rating their hunting experience as excellent, very good, or good.

Table 9. Comparison of the estimated number of hunters, hunting effort, and harvest between 2015 and 2016 Michigan spring turkey hunting seasons, summarized by regions.

Region ^a	Hunters (No.) ^b					Hunting efforts (days)					Harvest (No.)				
	2015		2016		Change (%)	2015		2016		Change (%)	2015		2016		Change (%)
	Total	95% CL	Total	95% CL		Total	95% CL	Total	95% CL		Total	95% CL	Total	95% CL	
UP	3,040	253	3,097	261	2	15,426	2,320	15,762	2,354	2	1,292	237	1,139	230	-12
NLP	20,795	645	21,884	681	5	80,484	4,150	83,732	3,981	4	6,878	531	7,765	573	13
SLP	45,697	764	47,405	813	4*	175,642	5,649	188,069	5,950	7*	21,458	751	21,183	793	-1
Unknown	3,233	378	2,669	363		12,212	1,910	10,923	2,030		412	139	300	120	
Total	71,902	757	74,295	808	3*	283,764	6,897	298,486	7,043	5*	30,039	922	30,386	976	1

^aRegions included the Upper Peninsula (UP), the Northern Lower Peninsula north of Management Unit ZZ (NLP), and Management Unit ZZ in the Southern Lower Peninsula (SLP).

^bNumber of hunters did not add up to statewide total because mentored youth and hunters with a license for the unlimited quota hunt can hunt in more than one unit.

*P<0.005.

Table 10. Comparison of estimated hunter success, hunter satisfaction, and hunt interference between 2015 and 2016 Michigan spring turkey hunting season, summarized by regions.

Region ^a	Hunter success					Hunter satisfaction ^b					Noninterfered hunters ^c				
	2015		2016		Differ-ence (%)	2015		2016		Differ-ence (%)	2015		2016		Differ-ence (%)
	%	95% CL	%	95% CL		%	95% CL	%	95% CL		%	95% CL	%	95% CL	
UP	43	7	37	7	-6	63	7	55	7	-7	96	3	96	3	0
NLP	33	2	35	2	2	63	2	63	2	-1	92	1	92	1	0
SLP	47	1	45	2	-2	75	1	74	1	0	92	1	92	1	0
Total	42	1	41	1	-1	70	1	70	1	0	92	1	92	1	0

^aRegions included the Upper Peninsula (UP), the Northern Lower Peninsula north of Management Unit ZZ (NLP), and Management Unit ZZ in the Southern Lower Peninsula (SLP).

^bHunters rating their hunting experience as excellent, very good, or good.

^cProportion of hunters that indicated they experienced no or only minor interference from other hunters.

*P<0.005.

Table 11. Number of turkeys harvested and hunter success, summarized by hunting device, during the spring turkey hunting season in Michigan, 2010-2016.

Year	Number of turkey harvested by device								Hunter success by device ^a					
	Firearm		Crossbows		Other bows ^b		Unknown		Firearm		Crossbows		Other bows ^b	
	Total	95% CL	Total	95% CL	Total	95% CL	Total	95% CL	%	95% CL	%	95% CL	%	95% CL
2010	34,984	1,093	525	161	1,519	279	22	32	41	1	20	6	20	3
2011	28,831	1,017	590	170	1,143	228	23	34	37	1	17	5	17	3
2012	29,611	984	650	172	1,055	214	62	57	39	1	17	4	18	3
2013	30,152	1,038	921	210	1,090	231	80	76	39	1	22	5	18	4
2014	27,746	919	516	143	838	195	9	13	41	1	17	4	21	4
2015	28,272	908	751	188	935	196	81	63	43	1	20	5	21	4
2016	28,422	959	860	200	963	221	142	87	42	1	21	4	21	4

^aHunters harvesting a turkey.

^bIncluded longbows, recurve, and compound bows.

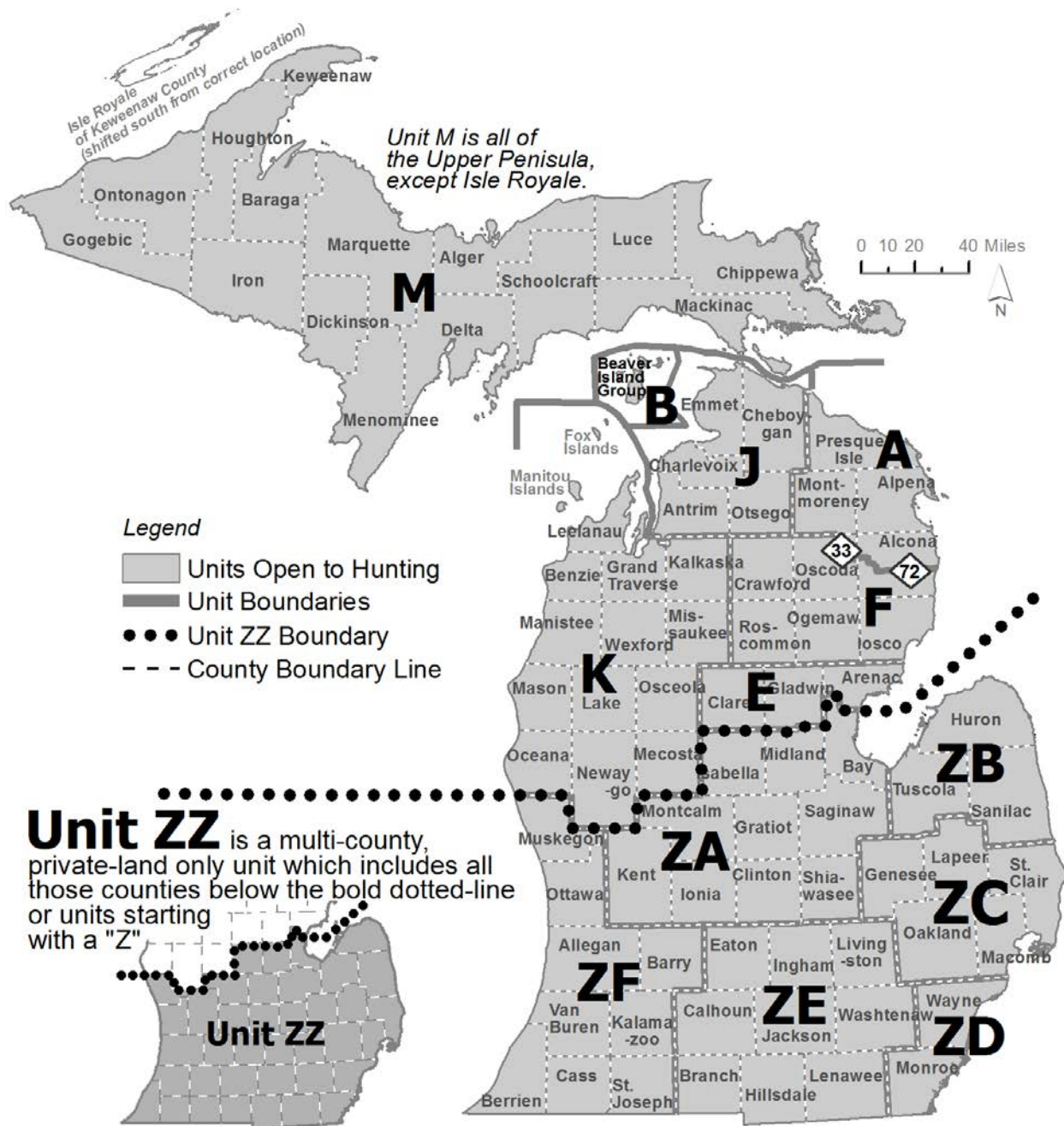


Figure 1. Management units in Michigan open to spring turkey hunting in 2016.

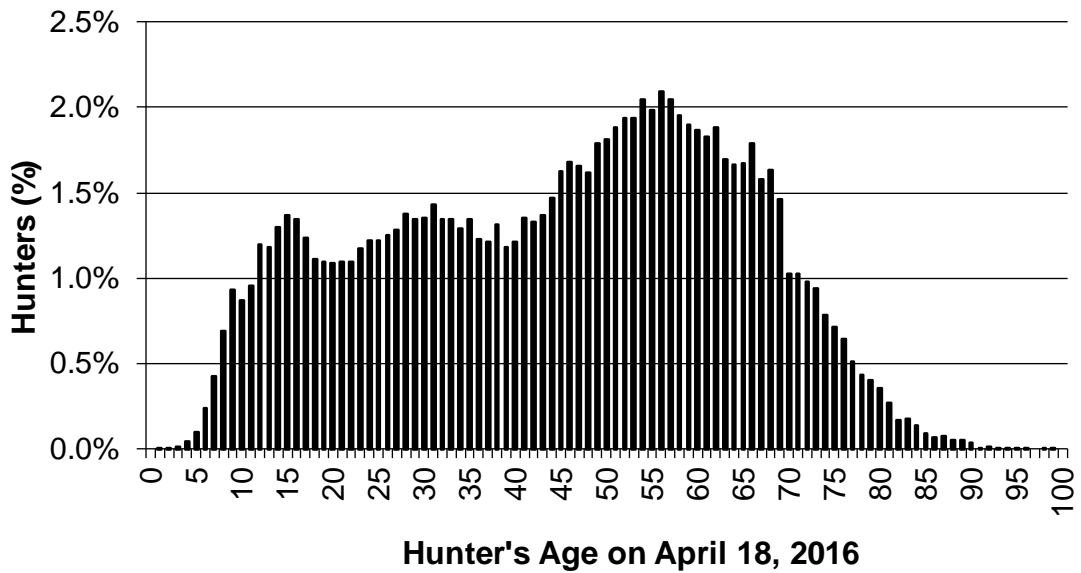


Figure 2. Age of people that purchased a turkey hunting license in Michigan for the 2016 spring hunting season (mean = 45 years). Licenses were purchased by 90,774 people.

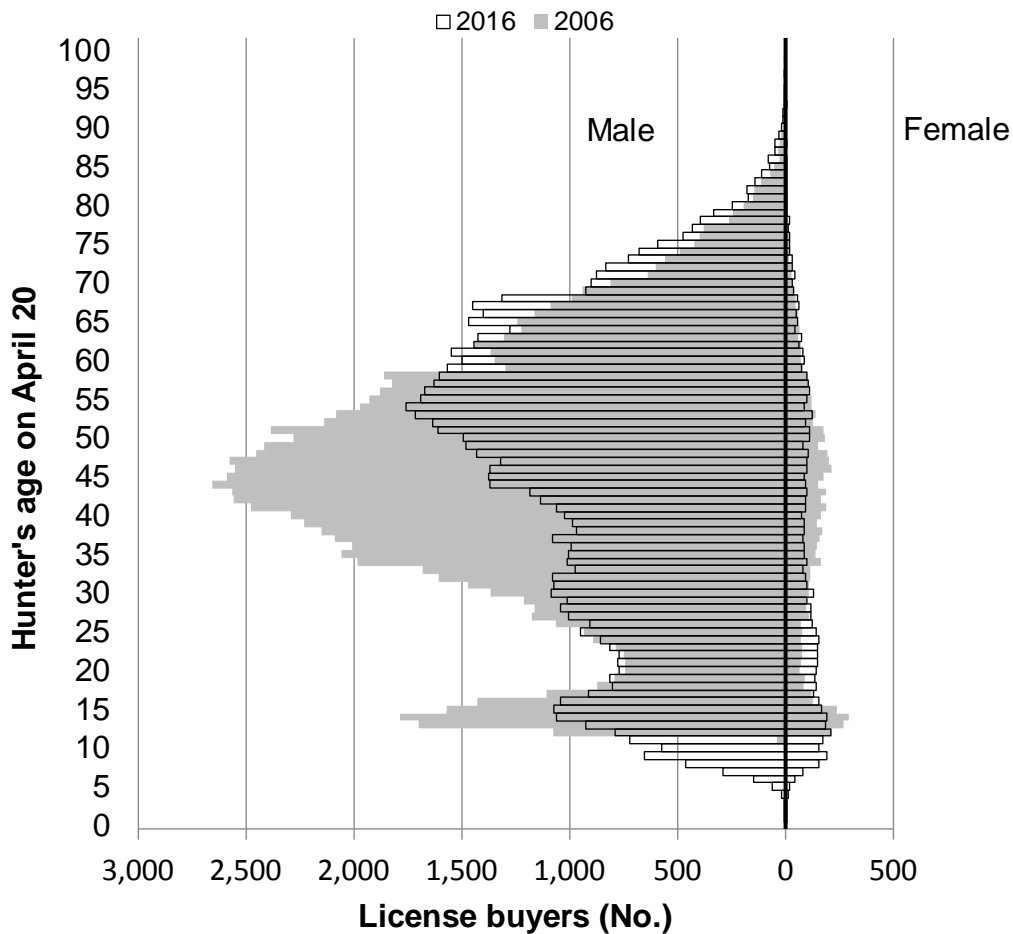


Figure 3. Number of spring turkey hunting license buyers in Michigan by age and sex during 2006 and 2016 hunting seasons. The number of people buying a license was 125,934 in 2006 and 90,774 in 2016.

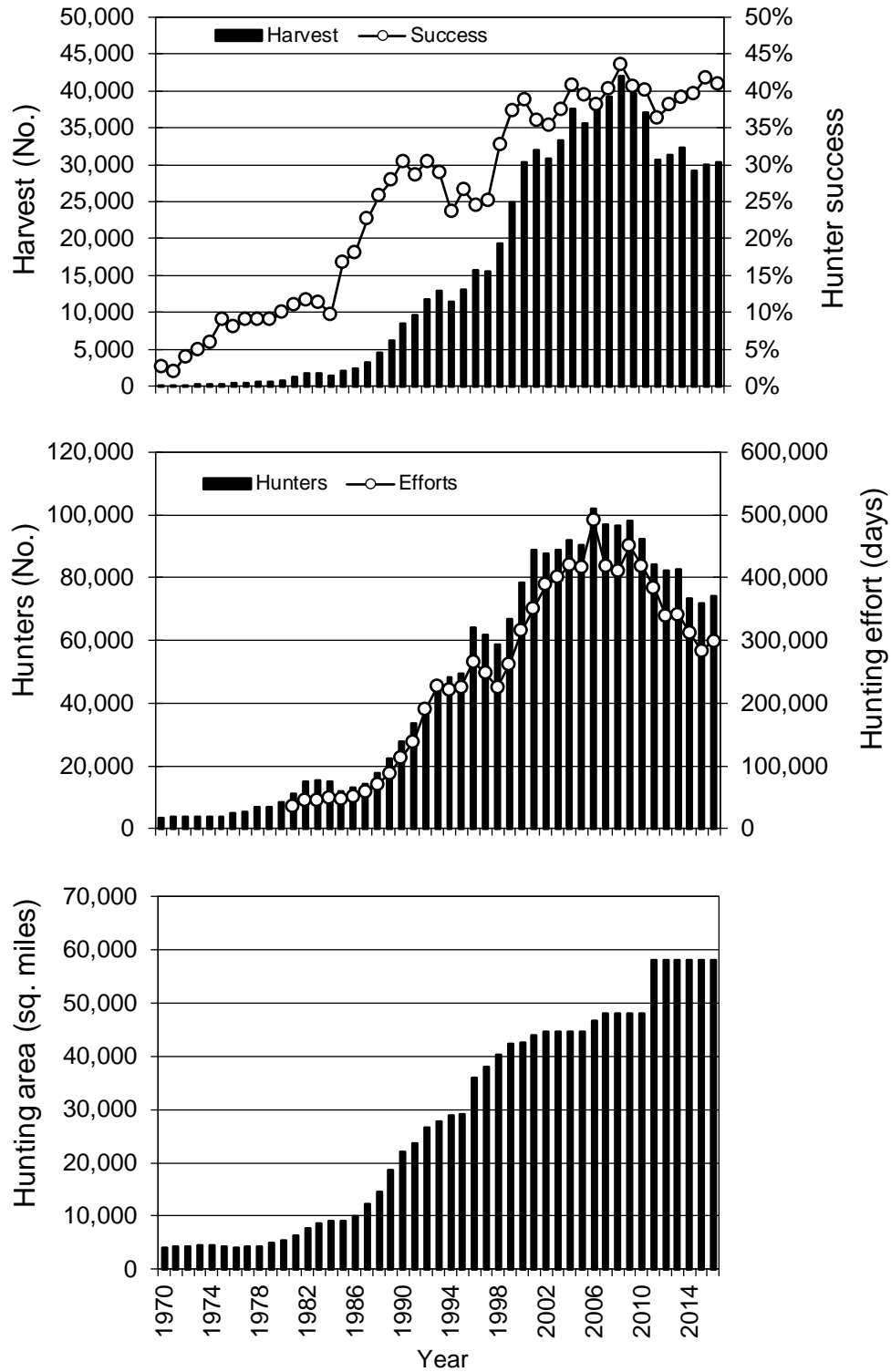


Figure 4. Estimated number of hunters, harvest, hunting efforts, hunter success, and area open to hunting during the Michigan spring turkey hunting season, 1970-2016. Estimates of hunting effort generally were not available before 1981.

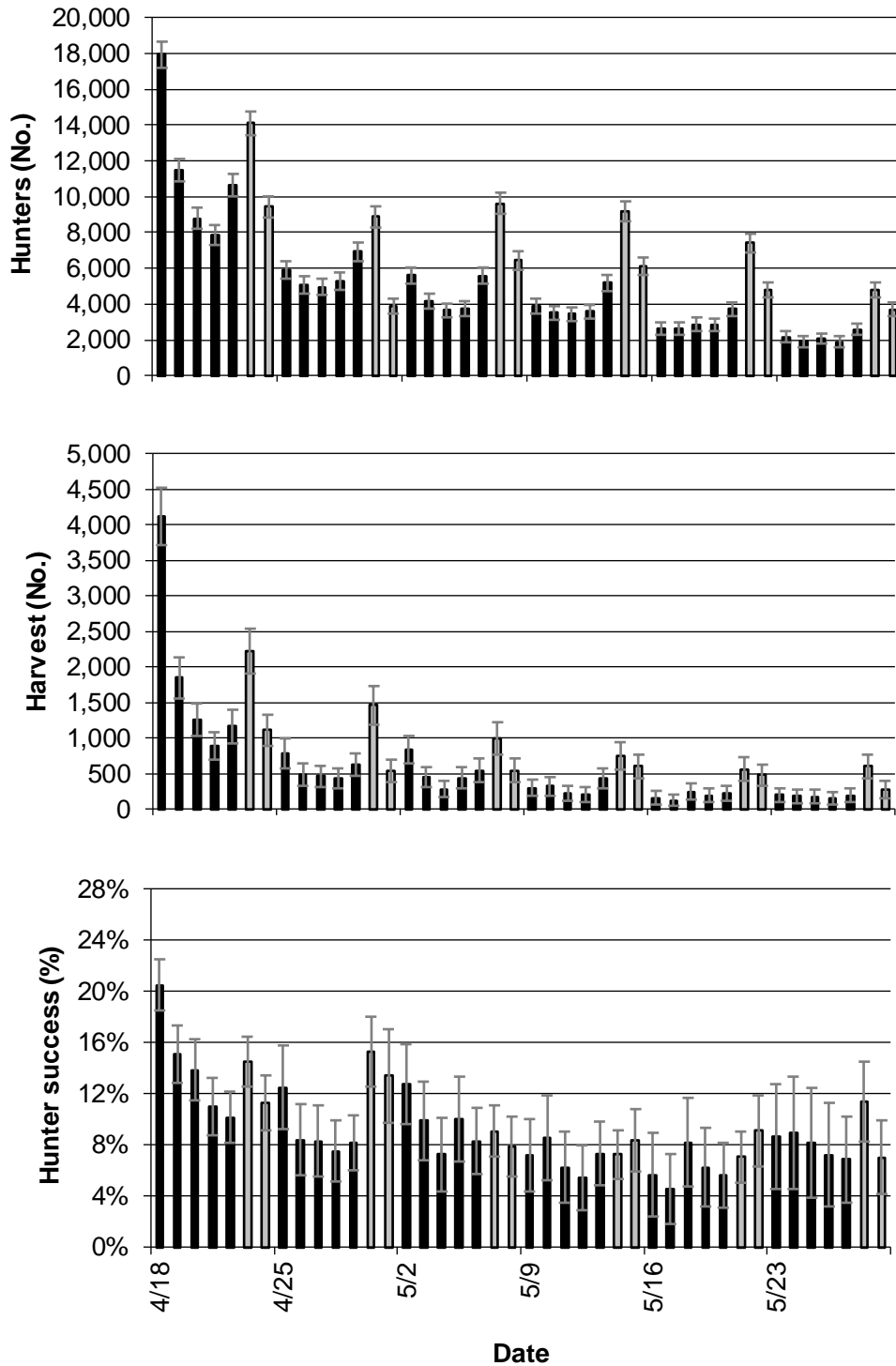


Figure 5. Estimated number of hunters, harvest, and hunter success by date during the 2016 Michigan spring turkey hunting season (includes all hunts). An additional $1,545 \pm 271$ birds were taken on unknown dates. Gray-shaded bars indicate weekends. Vertical bars represent the 95% confidence interval.

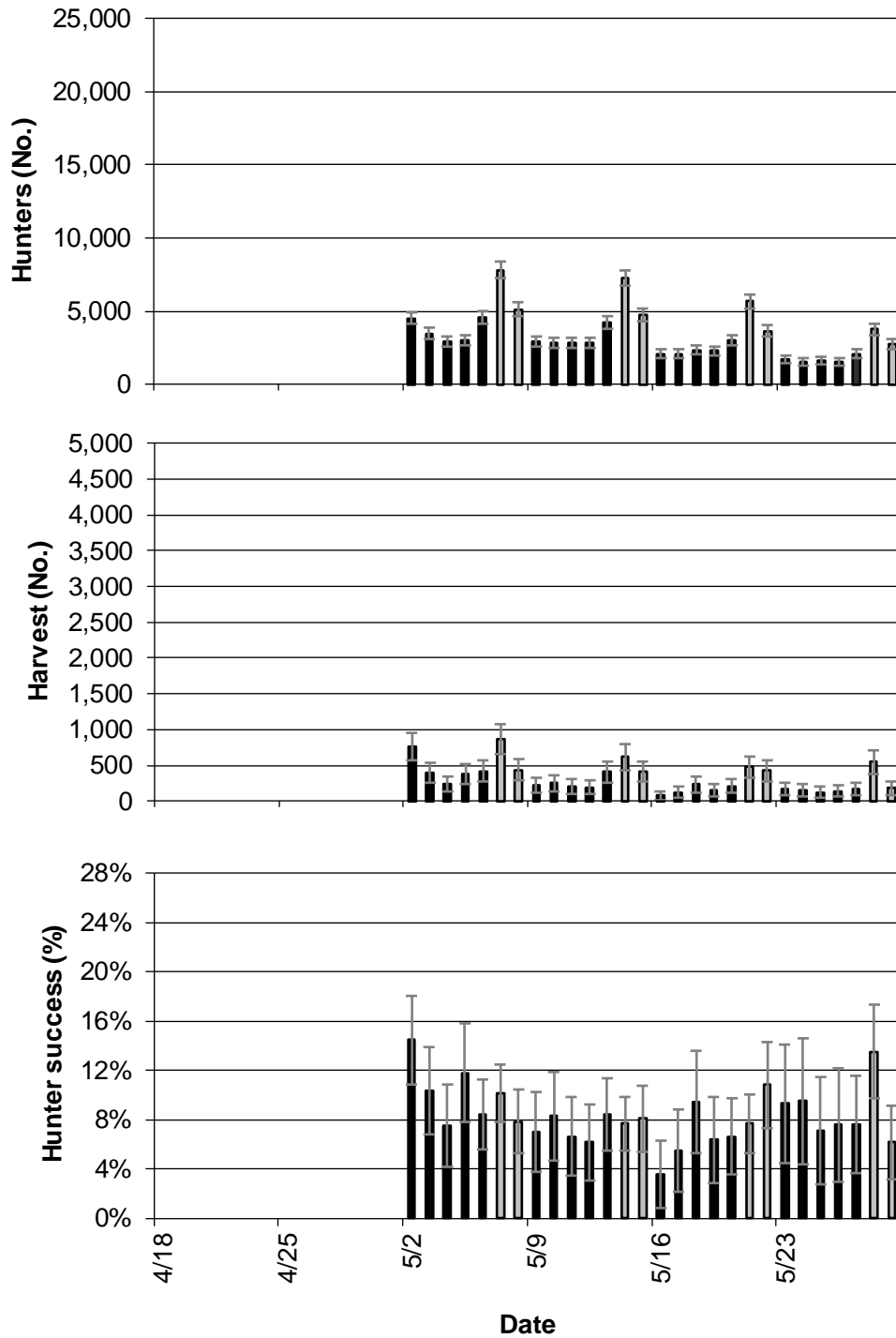


Figure 6. Estimated number of hunters, harvest, and hunter success by date during Hunt 234 of the 2016 Michigan spring turkey hunting season (May 2-31). An additional 512 ± 162 birds were taken on unknown dates. Gray-shaded bars indicate weekends. Vertical bars represent the 95% confidence interval.

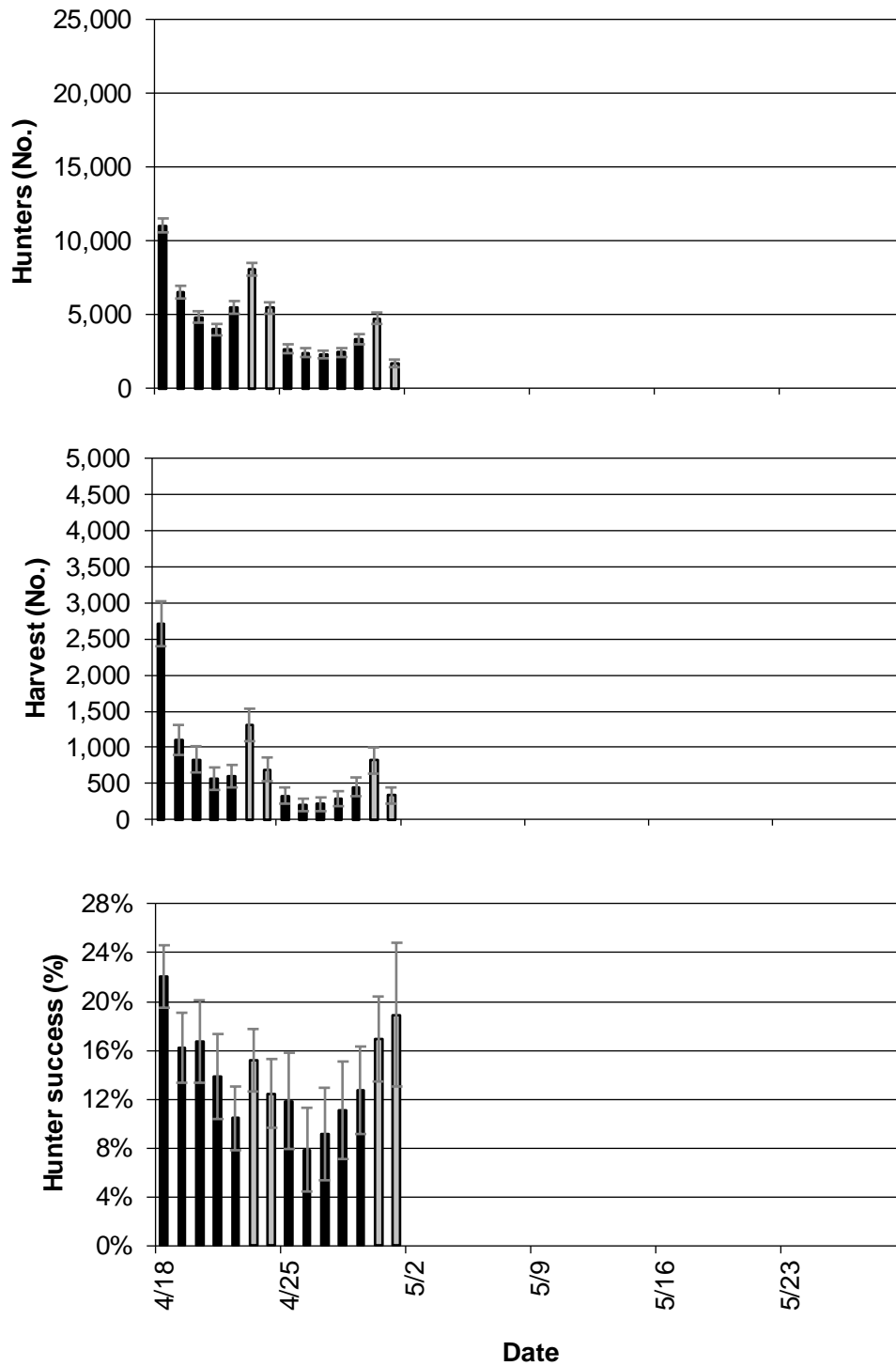


Figure 7. Estimated number of hunters, harvest, and hunter success by date during Hunt 301 of the 2016 Michigan spring turkey hunting season (April 18-May 1). An additional 777 ± 178 birds were taken on unknown dates. Gray-shaded bars indicate weekends. Vertical bars represent the 95% confidence interval.

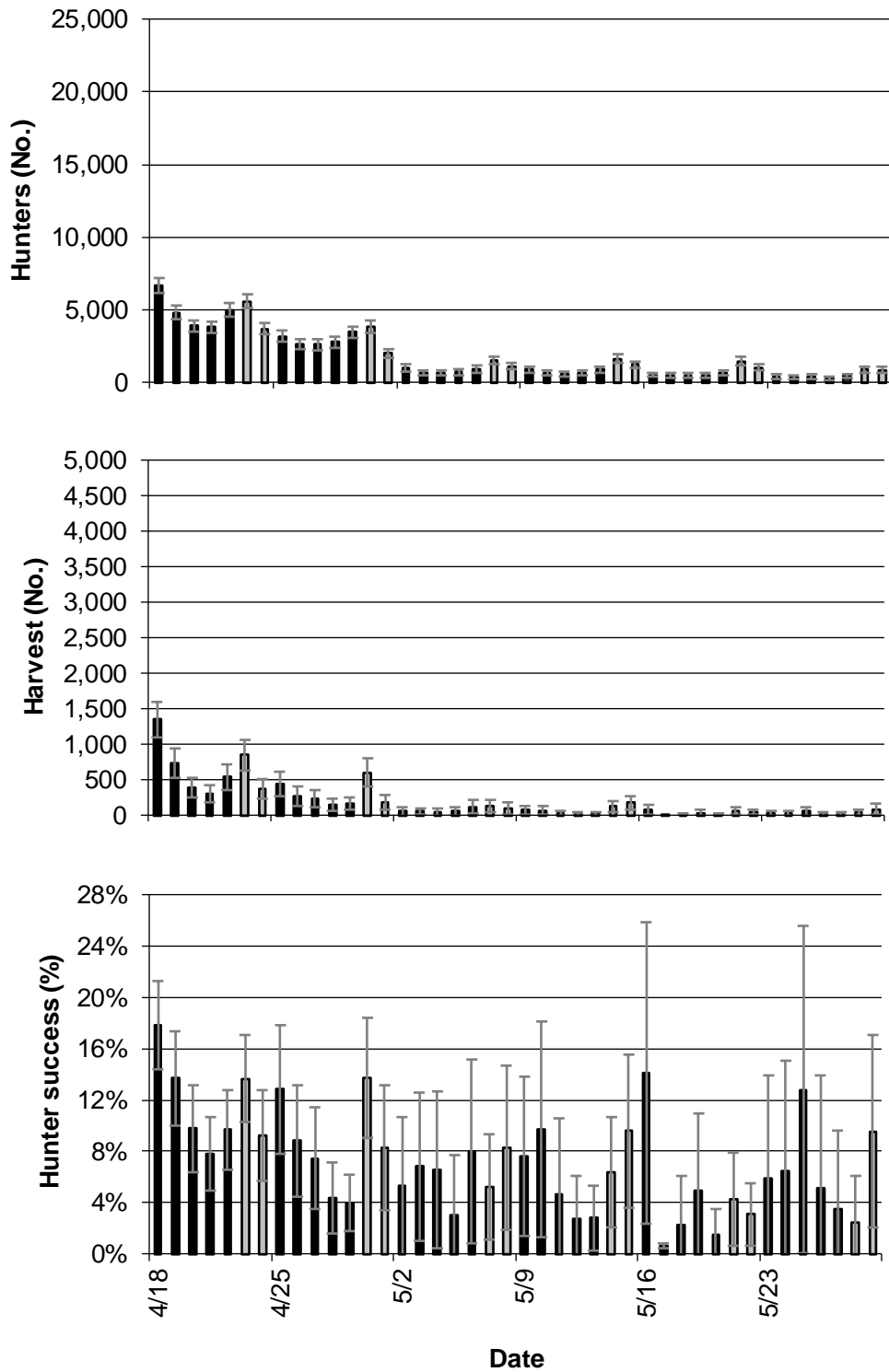


Figure 8. Estimated number of hunters, harvest, and hunter success by date during all hunts, except for mentored youth hunts and hunts 234 and 301 of the 2016 Michigan spring turkey hunting season. An additional 231 ± 124 birds were taken on unknown dates. Gray-shaded bars indicate weekends. Vertical bars represent the 95% confidence interval.

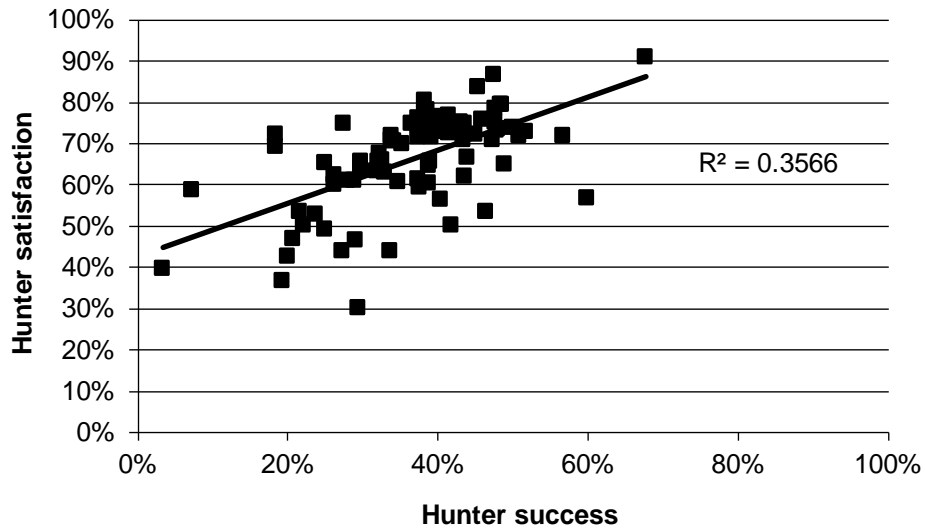


Figure 9. Relationship between hunter satisfaction (expressed as the percentage of hunters rating their hunting experience as excellent, very good, or good) and hunter success for each of 81 counties in Michigan during the 2016 spring turkey hunting season (included only counties with at least 30 hunters).

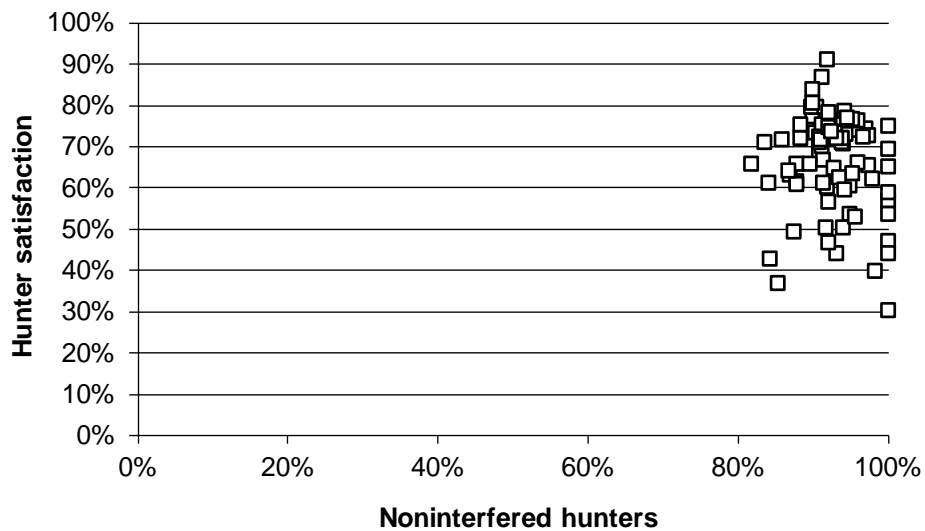


Figure 10. Relationship between hunter satisfaction (expressed as the percentage of hunters rating their hunting experience as excellent, very good, or good) and hunter interference for each of 81 counties in Michigan during the 2016 spring turkey hunting season (included only counties with at least 30 hunters). Noninterfered hunters were the proportion of hunters that indicated that they experienced no or only minor interference from other hunters.

APPENDIX T

MINNESOTA

MINNESOTA WILD TURKEY POPULATION STATUS REPORT – 2017

41st Midwest Deer & Wild Turkey Study Group Meeting – August 29–30, 2017 Honey Creek Resort at Lake Rathbun – Moravia, Iowa

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POPULATION STATUS

Minnesota conducts no formal population assessments for wild turkey. Hunters are required to register ALL harvests and as such, hunter harvest and success rates are currently used informally to monitor wild turkey populations across the state and within individual permit areas. Of note, wild turkey have previously been included on a deer hunter observation survey, but this survey has not been conducted since 2010. A similar survey is being prepared, beginning in 2017, and asks experienced (purchased a license for the past 3 years) archery deer hunters to record observations of several species of interest (including wild turkey) seen from blinds/tree stands as well as location, date, time of day, etc. The observation period for this survey is September 16- November 3.

Like many other mid-western states, the current turkey population in Minnesota is the result of years of restoration work. No restocking efforts have taken place in the Minnesota since winter 2008/09. Wild turkeys remain common in the core areas of the state (central and southeastern Minnesota). Wild turkeys continue to expand their range in Minnesota, particularly in the Northeast region, with reports of observations and harvest state-wide.

REPRODUCTION

Minnesota conducts no formal assessment of wild turkey reproduction.

HARVEST

2017 Spring Turkey Season

Season Structure

Although significant changes were made to the spring turkey season structure in 2016, there were no major changes for the 2017 season. The spring turkey season was 49 days in length (12 April – 30 May) and allowed hunters to take one bearded wild turkey (tom, jake, or bearded hen). The spring turkey season was divided into six time periods with permits valid during a specified time period (A-F) and permit area (501-512; Figure 1). A restricted number of permits

were available through a lottery system in each permit area during time periods A and B (A: April 12-18, and B: April 19-25). Permits not sold during the lottery process were available for over-the-counter surplus sales. Permits for the remaining time periods (C: April 26 – May 2, D: May 3-9, E: May 10-16, F: May 17-30) were available over-the-counter in unlimited quantities in each permit area. Hunters possessing a permit unfilled during time periods A-E were permitted to hunt during the final time period (F) in their respective permit area. Permits for archery and youth hunters were valid the entire season and statewide (i.e., no time period or permit area restrictions).

Permits Issued

There were 49,919 permits issued during the spring 2017 season, including 10,324 general lottery and landowner permits, 11,355 youth permits, 11,249 archery permits, and 16,991 surplus over-the-counter permits (Table 3). The total number of permits purchased remained relatively steady (<1% decrease) in 2017 (Table 4). Youth permit sales composed 22.7% of total permit sales in 2017, a slight decrease (<1%) from 2016 (Table 4). Archery permits accounted for 22.5% of total permit sales (Table 3). Archery permits issued increased 8.8% in 2017 (Table 4); this follows a 105% increase in spring 2016 after regulation changes expanded opportunity, allowing archery hunters to hunt statewide during any time period. Purchase of lottery permits declined by 8.9% from 2016, continuing a declining trend whereas purchase of surplus gun permits remained steady in 2017.

Harvest

Hunters registered 11,854 turkeys (Tables 3, 4, 5, & 7), which was above the 5-year average (11,548 turkeys, Figure 3) and the best consecutive 5-year harvest average (11,610 turkeys during the 2008-2012 seasons). Although harvest remained the highest in the core turkey range in permit areas 507 (3,098 turkeys) and 501 (2,622 turkeys), harvest in permit area 508 (1,632 turkeys) surpassed 503 (1,373 turkeys) for the first time. Youth harvest (2,168 turkeys) declined 3.5% from 2016 whereas archery harvest (1,665 turkeys) increased 12% from 2016 (Table 3). The winter of 2016-2017 was again mild, and likely was not a significant factor beyond normal winter mortality for turkeys. Spring weather was variable, but generally warm and spring “green-up” was earlier than normal. Periods of rain during the A and B time periods may have impacted hunter participation and effort and could account for lower harvest rates during those periods in 2017.

2017 Fall Turkey Season

Season Structure

The fall turkey season was 30 days in length (October 3- November 1) and allowed for an unlimited number of hunters to take one wild turkey of either sex in one of 12 pre-selected

permit areas (501-512, Figure 1). Permits for archery and youth hunters were valid statewide (i.e., no restrictions on permit area).

Permits Issued

Permits issued to hunters increased slightly from 8,210 permits in 2015 to 8,562 in 2016 (Table 1, Figure 2). Youth permit sales accounted for 23.4% of total license sales during the fall 2016 season which increased from 14.5% in fall 2015. This may reflect recent regulation changes which permit youth to hunt statewide (i.e., no permit area restrictions).

Harvest

There were 1,111 harvested turkeys registered during the fall 2016 season which was a 1% decrease from 2015 (Table 1). Hunter success rates declined slightly (-0.7%) to 13.0% in 2016 from 2015 and remained below the 5-year average (13.9%). The greatest number of permits were issued in permit areas 507 and 508 and this effort was reflected in harvest with these two permit areas also registering the highest harvest numbers (Table 2). Statewide, females represented 54.4% of the total harvest while juvenile males (jakes) and mature males (toms) represented 15.7% and 30.0% of the total harvest respectively (Table 2).

RESEARCH

Currently, there is no on-going research involving wild turkeys. However, a recent collaboration with the Minnesota Department of Natural Resources and the Minnesota Cooperative Fish and Wildlife Research Unit surveyed spring turkey hunters in 2014 and evaluated hunter participation, satisfaction, motivations, perceptions related to hunt quality, and attitudes regarding turkey management and season structure. Based on the results of this study and public input sessions, significant changes to spring turkey hunting season structure were put into place in 2016.

EMERGING OR EVOLVING ISSUES

Minnesota recently enacted several season structure changes, one of which was intended to expand opportunity for archery hunters. Archery permits now allow hunters to harvest turkeys statewide and season long (no permit area or time period restrictions). Managers and some members of the public have expressed concern over the potential for increased crippling of wild turkeys via archery hunting. Is there justification for examining crippling rates and evaluating at what threshold take via archery hunting may be unethical?

Wild turkeys in urban settings continue to get attention from the public, mainly in the form of nuisance complaints. City municipalities continue to work with wildlife managers to reduce human-wildlife conflict issues and to secure depredation permits when deemed necessary. Public tolerance of turkeys in urban areas will likely continue to be an issue for wildlife managers.

RELEVANT LINKS

General information about wild turkey hunting in Minnesota:

<http://www.dnr.state.mn.us/hunting/turkey/index.html>

Wild Turkey hunting regulations:

http://files.dnr.state.mn.us/rlp/regulations/hunting/2016/full_regs.pdf#page=6

Wild Turkey management in Minnesota (and links to recent harvest reports):

<http://www.dnr.state.mn.us/turkey/index.html?tab=2#detailTabs>

Wild Turkey document archive (older harvest reports, etc.):

<http://www.dnr.state.mn.us/hunting/turkey/archive.html#Maps>

2015 Wild Turkey hunter survey report (referred to in research section):

<http://files.dnr.state.mn.us/recreation/hunting/turkey/2015-survey.pdf>

Table 1. Permits available, number of applicants, permits issued, registered harvest, and hunter success rates for fall wild turkey seasons in Minnesota, 1990-2016.

Year	Permits available	Applicants	Permits issued	Registered harvest	Hunter success (%) ^a
1990	1,000	4,522	951	326	34.3
1991	2,200	2,990	2,020	552	27.3
1992	2,200	2,782	2,028	588	29.0
1993	2,400	3,186	2,094	605	28.9
1994	2,500	3,124	2,106	601	28.5
1995	2,500	3,685	2,125	648	30.5
1996	2,500	4,453	2,289	685	29.9
1997	2,580	4,574	2,378	698	29.4
1998	2,710	4,526	2,483	828	33.3
1999	2,890	5,354	2,644	865	32.7
2000	3,090	5,263	2,484	735	29.6
2001	2,870	4,501	2,262	629	27.8
2002	3,790	5,180	2,945	594	20.2
2003	3,870	5,264	2,977	889	29.9
2004	4,380	5,878	3,277	758	23.1
2005	4,410	4,542	2,978	681	22.9
2006	4,290	4,167	2,802	618	22.1
2007	4,490	4,464	2,837	695	24.5
2008	7,560	5,834	4,981	1,187	23.8
2009	9,330	7,738	5,019	1,163	23.2
2010	10,430	6,869	6,607	1,353	20.5
2011	10,430	3,538	5,382	953	17.7
2012	Unlimited	N/A	10,779	1,753	16.3
2013	Unlimited	N/A	8,193	1,078	13.2
2014	Unlimited	N/A	8,339	1,137	13.6
2015	Unlimited	N/A	8,210	1,124	13.7
2016	Unlimited	N/A	8,562	1,111	13.0

^a Success rates not adjusted for non-participation.

Table 2. Permits issued, registered harvest by sex, total registered harvest, regular gun harvest, and hunter success rates during the 2016 fall wild turkey season in Minnesota.

Permit Area	Regular permits issued ^a	Toms ^b	Jakes ^b	Hens ^b	Total registered harvest ^b	Regular gun harvest ^c	Regular gun success rates (%)
501	1,068	52	20	95	167	143	13.4
502	100	3	2	9	14	10	10.0
503	675	33	9	64	106	83	12.3
504	226	8	6	11	25	22	9.7
505	417	23	9	25	57	47	11.3
506	226	8	6	21	35	30	13.3
507	1,635	89	52	154	295	245	15.0
508	1,242	72	50	131	253	214	17.2
509	130	13	5	17	35	30	23.1
510	696	27	13	72	112	72	10.3
511	62	1	1	0	2	2	3.2
512	82	4	1	5	10	7	8.5
TOTAL	6,559	333	174	604	1,111	905	13.8

^a Archery and youth permits were not included (valid in all permit areas).

^b Total harvest for all license types.

^c All firearm harvest, excluding harvest from youth and archery license holders.

Table 3. Total permits sold, harvest, and success rate by type of permit during the spring 2017 wild turkey season in Minnesota.

	Total permits sold	Harvest	Success (%) ^a
Lottery	10,324	3,836 ^b	37.1
Surplus	16,991	4,185	24.6
Youth	11,355	2,168	19.1
Archery	11,249	1,665	14.8
Total	49,919	11,854	23.7

^a Success rates not adjusted for non-participation.

^b Includes military and military disabled veteran permit types.

Table 4. Permits available, permits issued, registered harvest, and relative success rates from 1978-2017 for all spring wild turkey hunting seasons in Minnesota.

Year	Permits			Harvest	
	Available	Issued	Issued (%)	Registered harvest	Success (%) ^a
1978	420	411	97.9	94	22.9
1979	840	827	98.5	116	14.0
1980	1,200	1,191	99.3	98	8.2
1981	1,500	1,437	95.8	113	7.9
1982	2,000	1,992	99.6	106	5.3
1983	2,100	2,079	99.0	116	5.6
1984	3,000	2,837	94.6	178	6.3
1985	2,750	2,449	89.1	323	13.2
1986	2,500	2,251	90.0	333	14.8
1987	2,700	2,520	93.3	520	20.6
1988	3,000	2,994	99.8	674	22.5
1989	4,000	3,821	95.5	930	24.3
1990	6,600	6,126	92.8	1,709	27.9
1991	9,170	8,607	93.9	1,724	20.0
1992	9,310	9,051	97.2	1,691	18.7
1993	9,625	9,265	96.3	2,082	22.5
1994	9,940	9,479	95.4	1,975	20.8
1995	9,975	9,550	95.7	2,339	24.5
1996	12,131	10,983	90.5	2,841	25.9
1997	12,530	11,610	92.7	3,302	28.4
1998	14,035	13,229	94.3	4,361	33.0
1999	18,360	16,387	89.3	5,132	31.3
2000	20,160	18,661	92.6	6,154	33.0
2001	22,936	21,404	93.3	6,383	29.8
2002	24,136	22,607	93.7	6,516	28.8
2003	25,016	22,770	91.0	7,666	33.7
2004	27,600	25,261	91.5	8,434	33.4
2005	31,748	27,638	87.1	7,800	28.2
2006	32,624	27,876	85.4	8,241	30.0
2007 ^b	33,976	28,320	83.4	9,412	33.2
2008 ^b	37,992	31,942	84.1	10,994	34.4
2009 ^b	42,328	36,193	85.5	12,210	33.7
2010 ^b	55,982	46,548 ^c	83.0	13,467	28.9
2011 ^b	Unlimited	43,521 ^c	N/A	10,055	23.1
2012 ^b	Unlimited	38,906 ^c	N/A	11,325	29.1
2013 ^b	Unlimited	34,281 ^c	N/A	10,390	30.3
2014 ^b	Unlimited	43,305 ^c	N/A	11,447	26.4
2015 ^b	Unlimited	41,623 ^c	N/A	11,734	28.2
2016 ^b	Unlimited	39,648 ^c	N/A	12,313	31.1
2017 ^b	Unlimited	38,670 ^c	N/A	11,854	30.7

^aSuccess rates not adjusted for non-participation.

^bYouth hunt data included.

^cPermits issued to archery hunters were not included. There were 2,462, 3,911, 4,550, 4,899, 5,052, 10,343, and 11,249 permits issued to archers in 2011, 2012, 2013, 2014, 2015, 2016, and 2017, respectively.

Table 5. Permits issued, registered harvest, and hunter success during the 2017 spring wild turkey season in Minnesota.

Permit area	Regular permits issued ^a	Total registered harvest ^b	Regular gun harvest ^c	Regular gun success rates (%)
501	6,667	2,622	2,037	30.6
502	620	177	131	21.1
503	3,235	1,373	964	29.8
504	725	311	181	25.0
505	2,217	904	671	30.3
506	1,033	426	267	25.8
507	6,586	3,098	2,002	30.4
508	3,770	1,632	1,044	27.7
509	332	204	106	31.9
510	1,922	1,014	577	30.0
511	103	53	20	19.4
512	105	40	21	20.0
TOTAL	27,315	11,854	8,021	29.4

^a Permits issued for the Camp Ripley disabled veterans hunt, archery, and youth permits were not included.

^b Total harvest for all license types.

^c All lottery, military, and surplus permit harvest, excluding youth and archery licenses.

Table 6. Permits available and issued by license type (resident and non-resident) and time period for the spring 2017 wild turkey season in Minnesota.

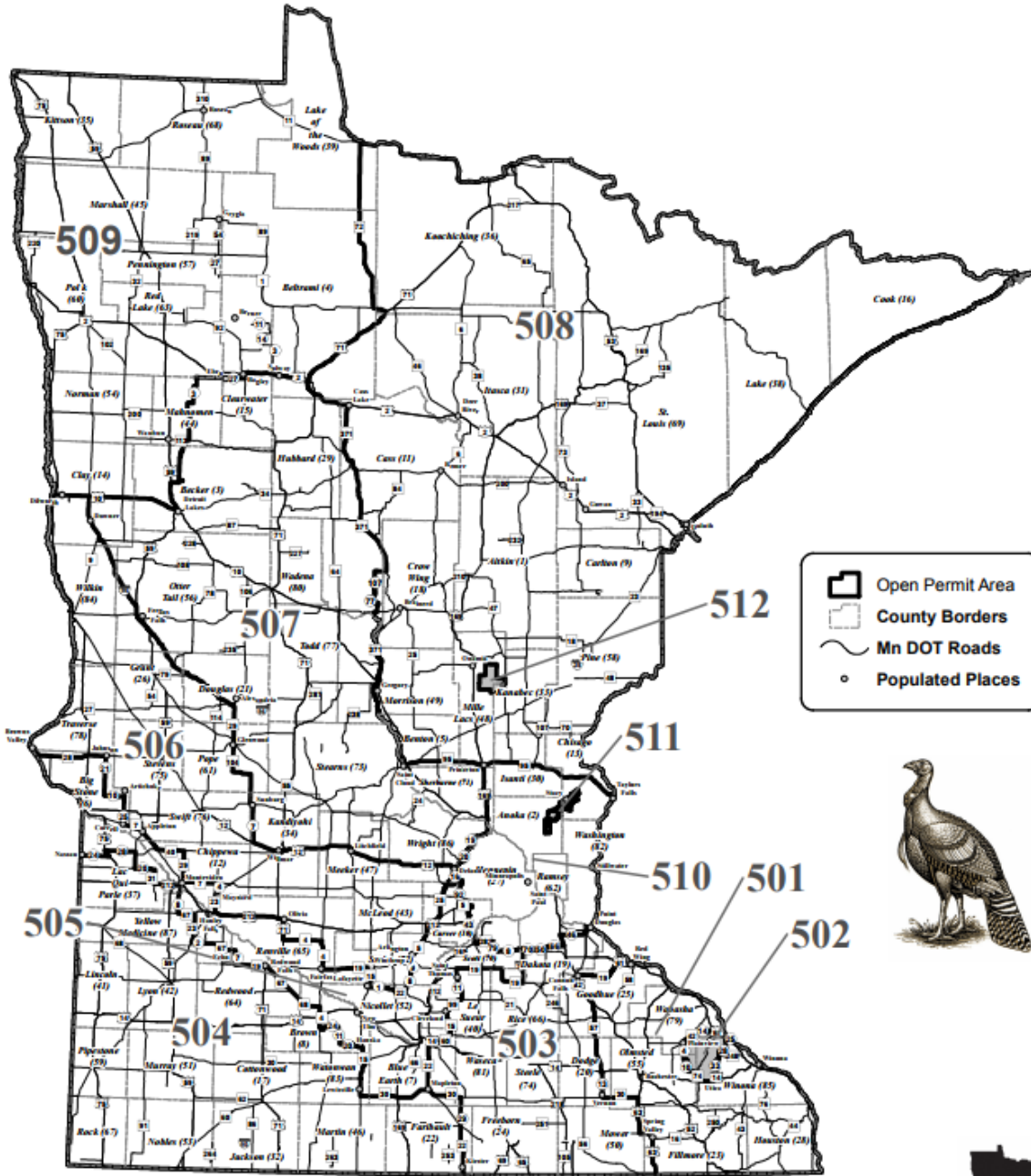
Time period	Permits available	General lottery ^a	Surplus	Youth	Archery
A: Apr. 12-18	7,010	5,802	358	Not applicable – Youth and archery permits were valid during all time periods.	
B: Apr. 19-25	7,010	4,504	1,873		
C: Apr. 26-May 2	Unlimited	5	7,215		
D: May 3-9	Unlimited	4	4,359		
E: May 10-16	Unlimited	5	2,012		
F: May 17-30	Unlimited	4	1,174 ^b		
Total^a	Unlimited	10,324	16,991	11,355	11,249

^a Includes landowner licenses.

^b Number of surplus licenses sold for this time period. Actual number of hunters in unknown because all unsuccessful hunters from previous time periods were permitted to hunt in the final (F) season.

Table 7. Total harvest by time period during the spring 2017 wild turkey season in Minnesota.

Time period	Total harvest	Harvest (%)
A	3,793	32.0
B	2,815	23.7
C	2,041	17.2
D	1,383	11.7
E	665	5.6
F	1,157	9.8
Total	11,854	100



Date: 2016-12-02

Figure 1. Permit areas open for hunting, fall 2016 and spring 2017 wild turkey seasons in Minnesota.

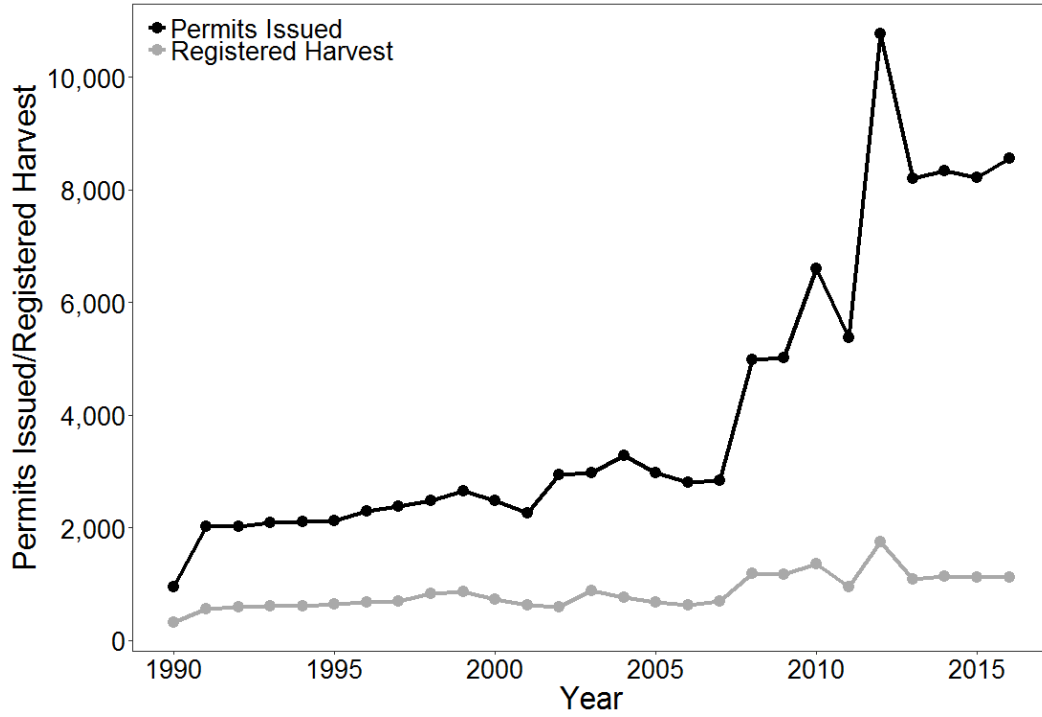


Figure 2. Permits issued and registered harvest for fall wild turkey seasons in Minnesota, 1990-2017.

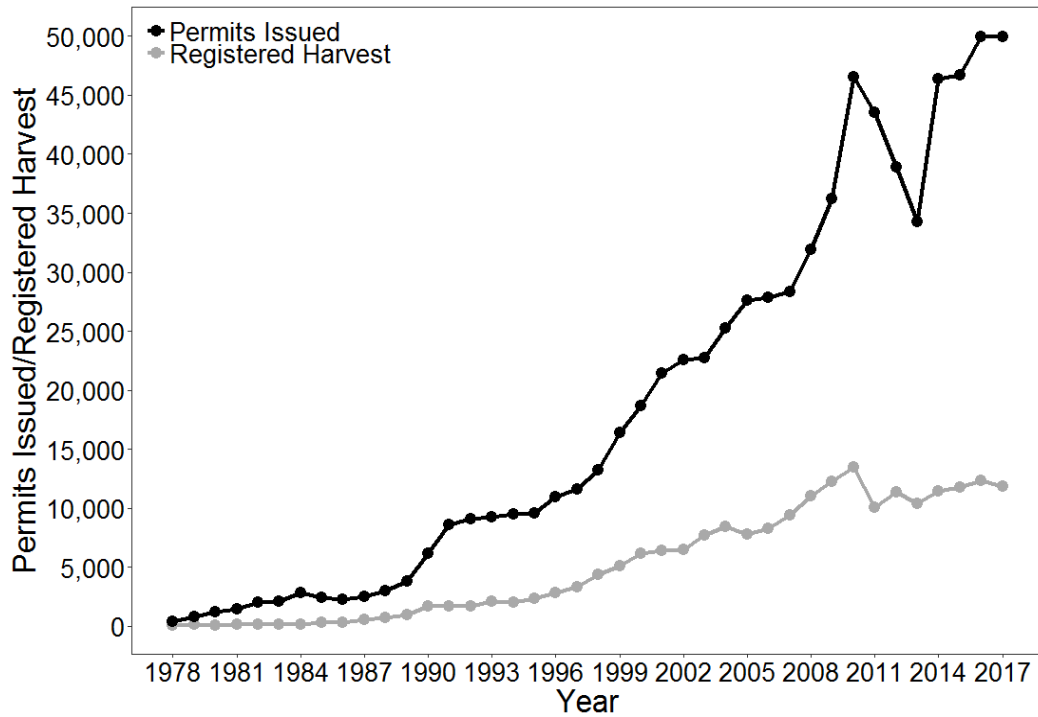


Figure 3. Permits issued and registered harvest for spring wild turkey seasons in Minnesota, 1978-2017.

APPENDIX U

MISSOURI

MISSOURI WILD TURKEY POPULATION STATUS REPORT – 2017

41st Midwest Deer and Wild Turkey Study Group Meeting – August 28-30, 2017 Honey Creek Resort State Park – Moravia, Iowa

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POPULATION STATUS

After reaching peak abundance in the early 2000s, Missouri's wild turkey population declined by about 25% at the statewide scale during the mid-to-late 2000s. From 2000-2010, the poult-to-hen ratio (PHR) from the Missouri Department of Conservation's (MDC) brood survey exhibited a 7% annual declining trend (Figure 1). Although production has generally improved since 2010, the statewide PHR was 0.8 in 2016 and was tied for the lowest on record since the survey was initiated in 1959.

Spring harvest data suggest turkey numbers have been stable at the statewide scale during the last five years, but remain 25-30% below the population peak. In northern Missouri (Northwest and Northeast turkey productivity regions (Figure 2)), turkey numbers reached a peak in the early-to-mid 2000s before declining by 40-50% following several years of poor production. Although turkey numbers in the Northeast region increased following good production in 2011 and 2014, the region has experienced poor production during the last two years. Regional turkey numbers are currently stable and remain about 45% less than the population peak. Turkey numbers are also currently stable in the Northwest region and remain 45-50% below peak numbers.

Turkey numbers in the West Prairie region are stable as they are in the Lindley Breaks and Union Breaks regions along the Missouri and Mississippi Rivers. Turkey abundance in these regions currently ranges 20-35% below the population peak that occurred in the early-to-mid 2000s. The five-year turkey abundance trend is also stable in the Mississippi Lowlands region of southeastern Missouri. Unlike other regions, turkey numbers in the Mississippi Lowlands increased during the 2000s, influenced by regional translocations that occurred during the winter of 2006-2007.

During the early 2000s, turkey numbers in the Ozarks of southern Missouri experienced the same peak in abundance as northern populations; however, the population decline that followed was not of the same magnitude as regional numbers declining by approximately 25-30%. Although production since 2010 has generally improved, very poor production in 2016 has reduced regional turkey numbers. As a result, turkey abundance in the Ozarks East, Ozarks West, and Ozark Border regions currently ranges 15-30% below peak numbers.

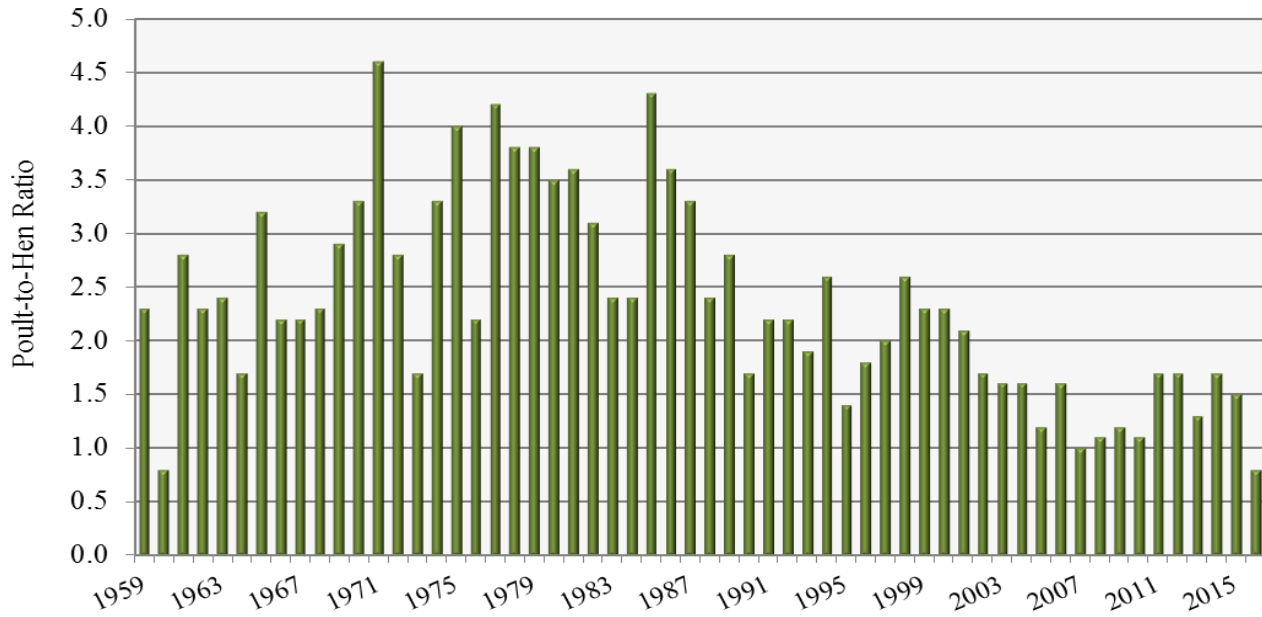


Figure 1. Statewide poult-to-hen ratios derived from the Missouri Department of Conservation’s wild turkey brood survey conducted in June, July, and August, 1959-2016.

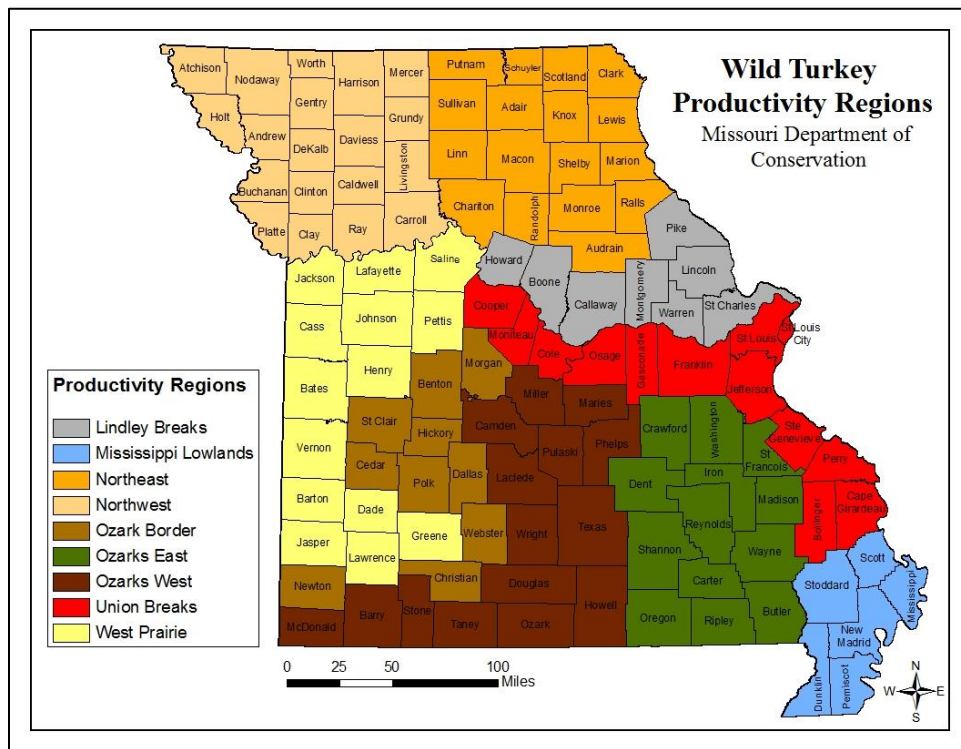


Figure 2. Turkey productivity regions in Missouri. Regions consist of counties grouped by similar land cover composition.

REPRODUCTION

The MDC has been conducting a turkey brood survey annually since 1959. Turkey observations are recorded at the county-level and analyzed by turkey productivity region (Figure 2), which are counties grouped by similar land cover composition. Observations of more than two hens per brood are not included in PHR calculations.

At the statewide scale in 2016, 29% of hens were observed with a brood (Table 1). The percentage of hens observed with a brood ranged from 25% in the Northeast and Northwest regions to 35% in the Mississippi Lowlands region. Statewide, the average brood size was 3.5 poults. Average regional brood size ranged from 3.3 poults in the Union Breaks to 4.2 poults in the Mississippi Lowlands. The 2016 statewide PHR of 0.8 was 47% less than the 2015 ratio, 50% less than the five-year average, 43% less than the 10-year average, and 53% less than the 20-year average (Table 2). Among turkey productivity regions, PHRs ranged from 0.8 in the Northeast, Union Breaks, and West Prairie regions to 1.3 in the Mississippi Lowlands region.

Table 1. Wild turkey brood survey data by turkey productivity region (Figure 2). Data were obtained from Missouri's wild turkey brood survey conducted in June, July, and August, 2016.

Productivity Region	% Hens w/ Poults	Average Brood Size	Poult-to-Hen Ratio	Gobbler-to-Hen Ratio
Lindley Breaks	33%	3.5	0.9	0.64
Mississippi Lowlands	35%	4.2	1.3	0.79
Northeast	25%	4.0	0.8	0.70
Northwest	25%	4.1	0.9	0.87
Ozark Border	27%	4.0	0.9	0.99
Ozarks East	28%	3.7	0.9	0.54
Ozarks West	26%	4.0	0.9	0.86
Union Breaks	29%	3.3	0.8	0.59
West Prairie	28%	3.5	0.8	1.02
Statewide^a	29%	3.5	0.8	0.75

^aStatewide totals include observations where region was not recorded on the survey card.

Table 2. Index (poult-to-hen ratio) of Missouri wild turkey production listed by turkey productivity region (Figure 2). Data were obtained during the 2016 turkey brood survey and are compared to previous years. For each interval value, the percent change indicates how the 2016 index compares to the previous year or the average for periodic intervals.

Productivity Region	2016 Index	1-year (2015) Change	5-year (2011–2015) Change	10-year (2006–2015) Change	20-year (1996–2015) Change
Lindley Breaks	0.9	-40%	-47%	-40%	-50%
Mississippi Lowlands	1.3	-19%	-13%	-24%	-38%
Northeast	0.8	-33%	-50%	-43%	-50%
Northwest	0.9	-50%	-44%	-36%	-50%
Ozark Border	0.9	-25%	-40%	-25%	-44%
Ozarks East	0.9	-53%	-55%	-50%	-53%
Ozarks West	0.9	-44%	-40%	-36%	-44%
Union Breaks	0.8	-47%	-47%	-43%	-50%
West Prairie	0.8	-27%	-38%	-27%	-47%
Statewide^a	0.8	-47%	-50%	-43%	-53%

^aStatewide totals include observations where region was not recorded on the survey card.

HARVEST

2016 Spring Turkey Season

During the 2016 youth spring season, hunters harvested 4,167 turkeys. This harvest total represented a 6% decrease from the 2015 youth season and was 1% less than the previous five-year average. Hunters harvested 44,187 turkeys during the 21-day regular spring turkey season. The regular season harvest was similar to the harvest total in 2015 (43,993). The total 2016 spring harvest, including both the youth and regular seasons, was 48,354 (Figure 3). This harvest total was slightly less than the 2015 harvest (48,442) and was 5% greater than the previous five-year average. Counties with the highest total spring harvest were Franklin, St. Clair, and Texas, where 1,066, 963, and 934 turkeys were harvested, respectively (Figure 4).

Permit sales for the 2016 spring turkey season (107,482; excluding no-cost landowner permits) were 3% less than in 2015 (Figure 3). Spring turkey permit sales in 2016 included 99,160 (92%) resident permits and 8,322 (8%) non-resident permits. An additional 42,624 no-cost permits were distributed to resident landowners. The total number of spring turkey hunters in Missouri in 2016 was 144,840, which was 3% less than in 2015. The total number of hunters does not equal the permit sales total because some hunters purchase a permit in addition to receiving a no-cost landowner permit.

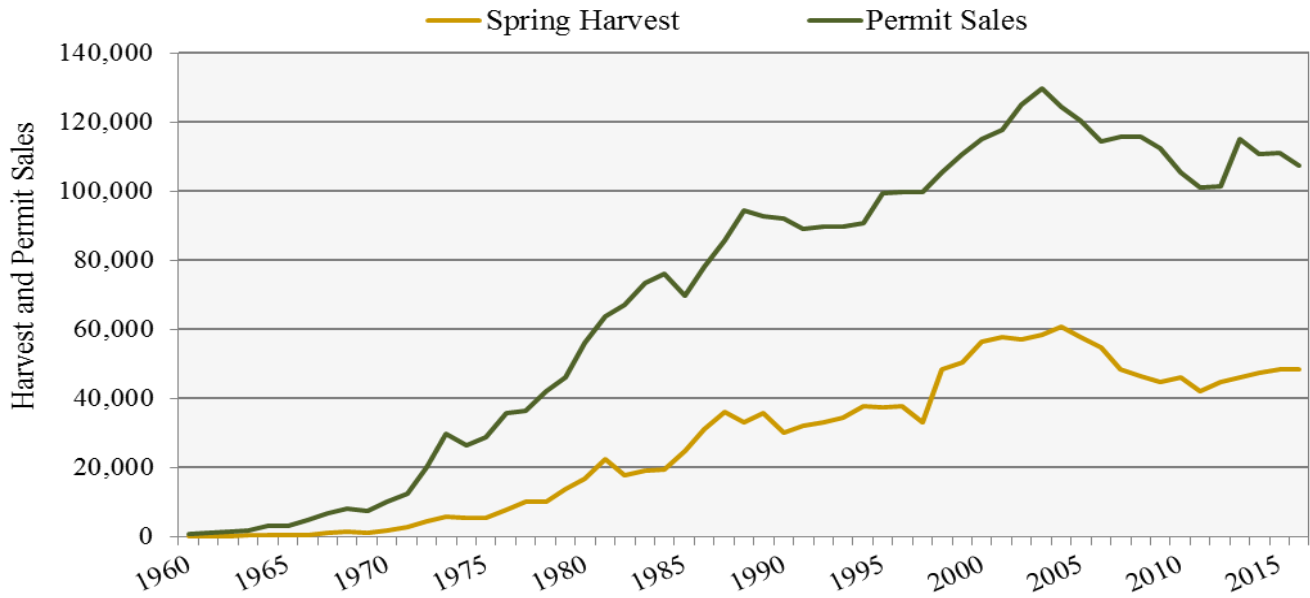


Figure 3. Number of wild turkeys harvested during the spring season (youth and regular season) in Missouri, and the number of turkey hunting permits sold for the spring season, 1960-2016. Permit sales do not include no-cost landowner permits.

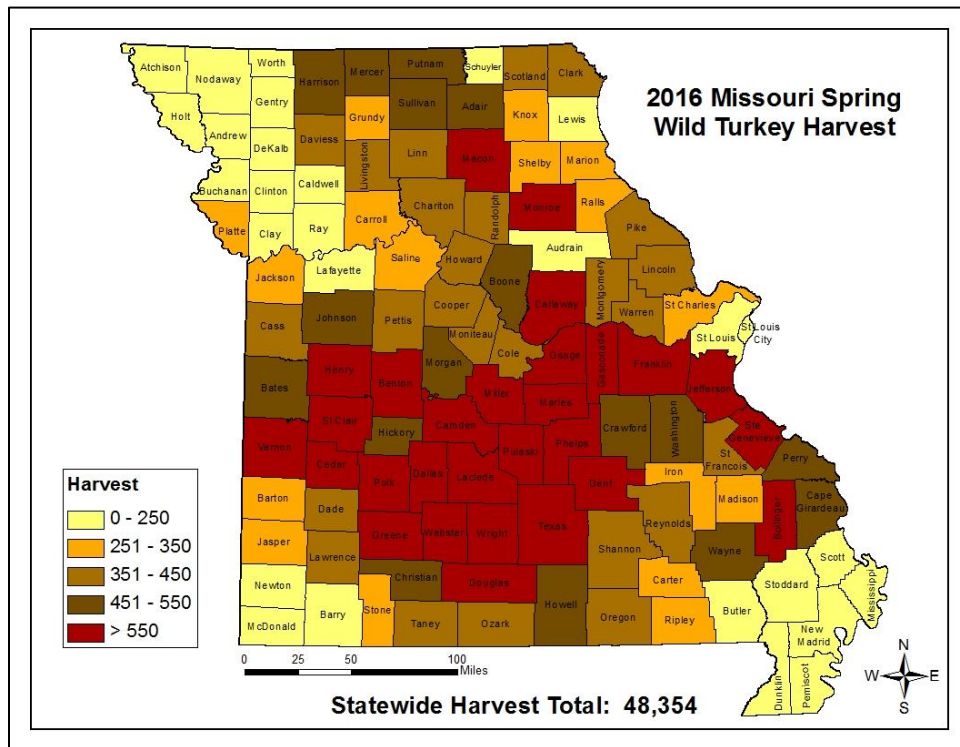


Figure 4. Total (youth and regular season) spring wild turkey harvest in Missouri, 2016.

2016 Fall Turkey Season

The 2016 fall firearms turkey harvest total of 3,698 was 40% less than the 2015 harvest total and was 45% below the previous five-year average (Figure 5). The majority of the fall firearms harvest occurred in southern Missouri (Figure 6). The top three harvest counties were Greene, Franklin, and Wayne where 128, 96, and 92 turkeys were harvested, respectively.

Fall firearms turkey permit sales declined by 12% in 2016 (Figure 5). Of the 11,696 permits sold, 11,469 (98%) were purchased by Missouri residents and 227 (2%) by nonresidents; an additional 60,761 no-cost permits were distributed to resident landowners. Fall firearms turkey hunting in Missouri has generally been declining in popularity since the late 1980s when over 50,000 permits were sold and more than 28,000 turkeys were harvested during the 14-day season.

Although the novelty of the fall firearms turkey season may have worn off for some of Missouri's hunters, the increasing popularity of the archery deer and turkey season is likely to be partially responsible for the declining interest. Additionally, declining turkey numbers during the mid-to-late 2000s are likely to have reduced hunter participation in the fall season.

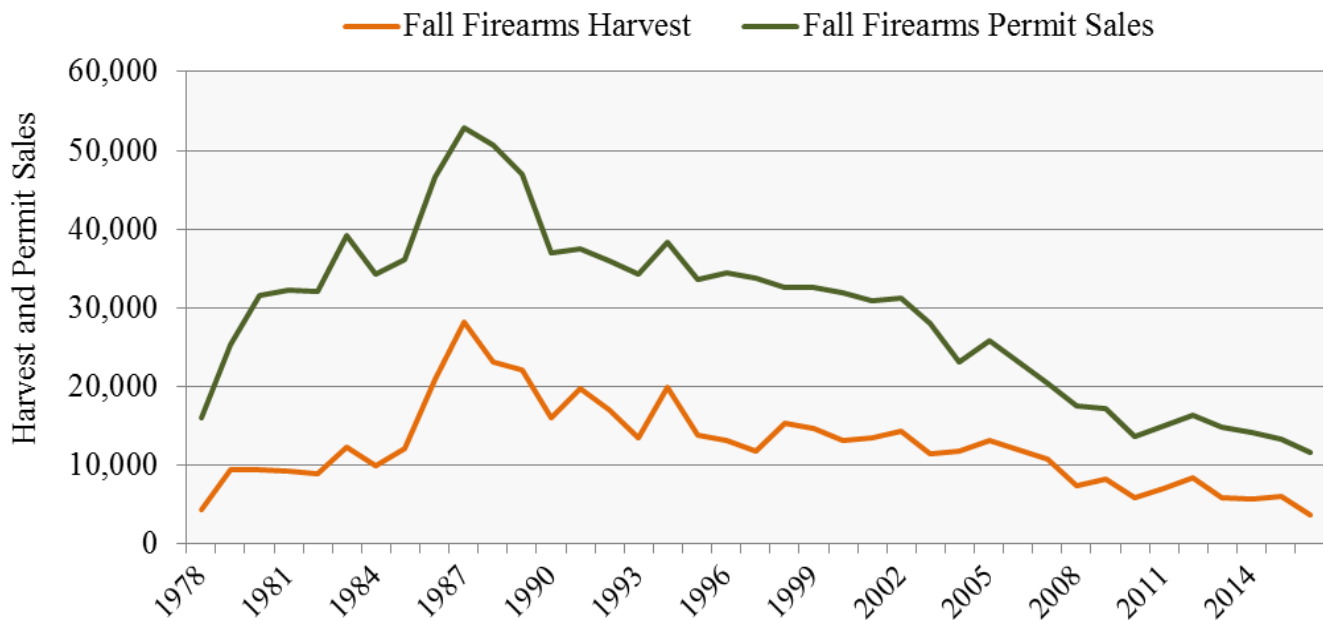


Figure 5. Number of wild turkeys harvested during the fall firearms turkey season in Missouri, and the number of fall firearms permits sold, 1978-2016. Permit sales do not include no-cost landowner permits.

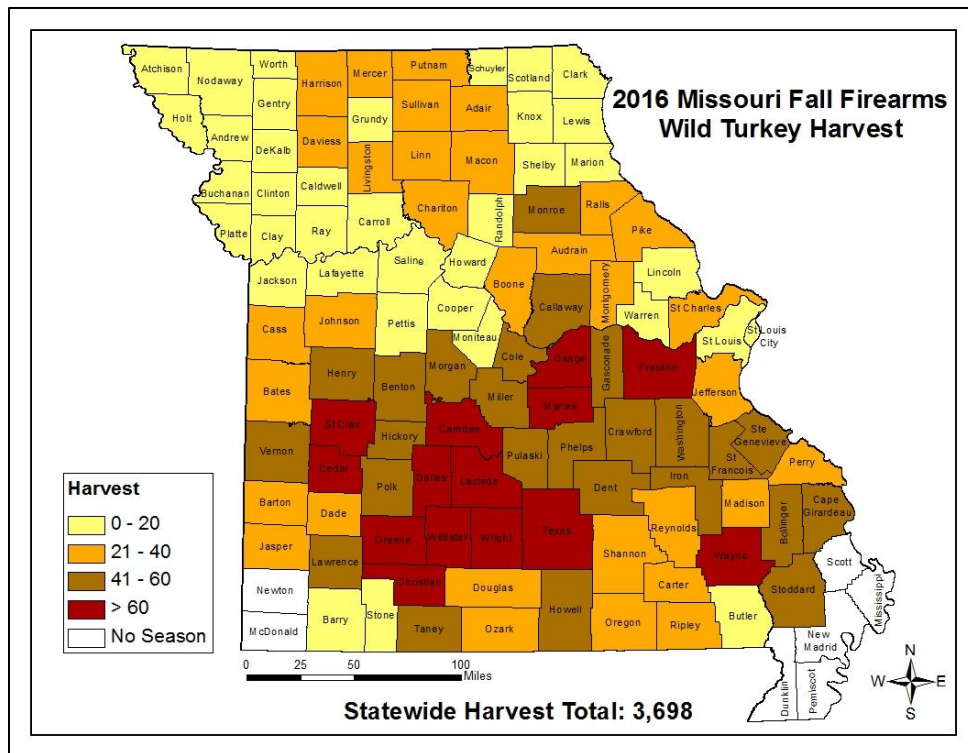


Figure 6. Missouri fall firearms wild turkey harvest, 2016.

Hunters harvested 2,304 turkeys during the 2016 fall archery deer and turkey season (Figures 7, 8). The 2016 archery turkey harvest total was 24% less than the 2015 harvest total and was 20% less than the previous five-year average. Unlike the fall firearms turkey harvest, which has shown a declining trend since the late 1980s, the fall archery harvest increased until the mid-2000s. Since 2005, archery turkey harvests have fluctuated substantially on an annual basis, while showing a general trend towards stabilization.

Although archery permit sales were relatively stable from the mid-1990s through the mid-2000s, sales have since shown an increasing trend (Figure 9). In 2016, 121,489 permits were sold; the highest number since the season's inception. Of the archery permits sold in 2016, 111,039 (91%) were purchased by Missouri residents and 10,450 (9%) by non-residents. An additional 93,495 no-cost permits were distributed to resident landowners. In 2016, crossbows became a legal method for all hunters to use during the fall archery deer and turkey season, which is likely to have positively impacted permit sales.

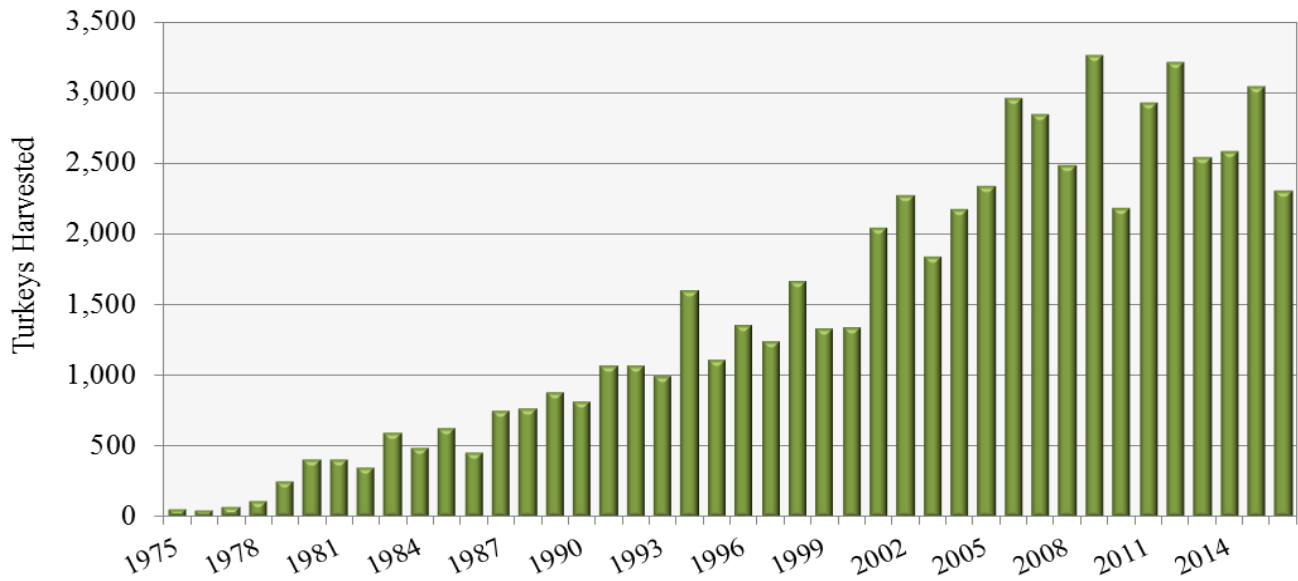


Figure 7. Missouri fall archery wild turkey harvest, 1975-2016.

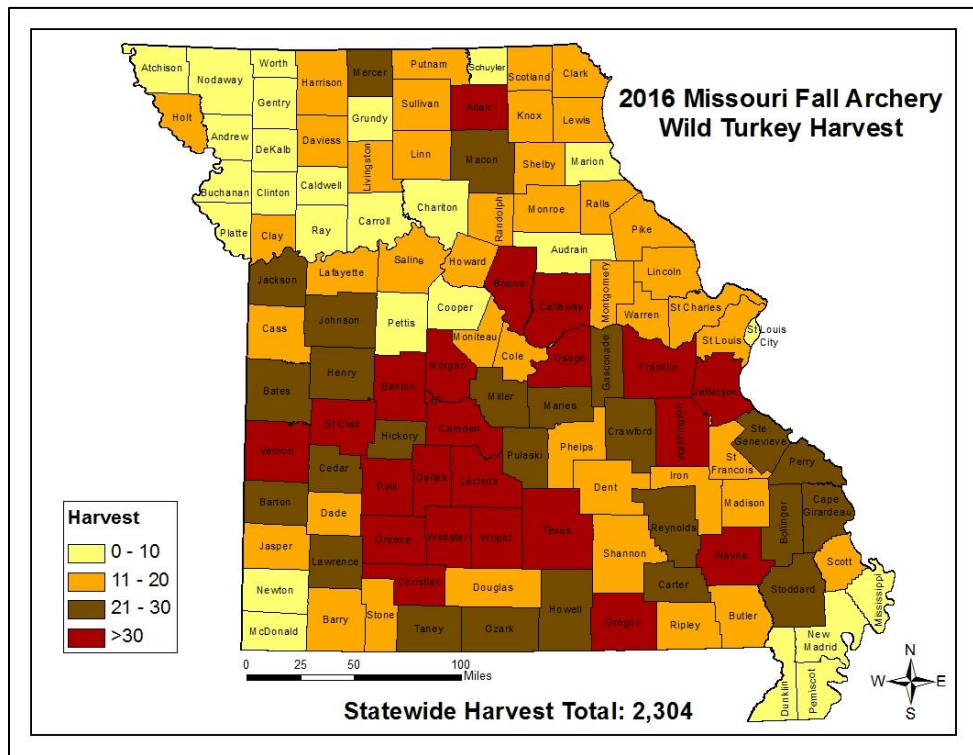


Figure 8. Missouri fall archery wild turkey harvest during the 2016 season.

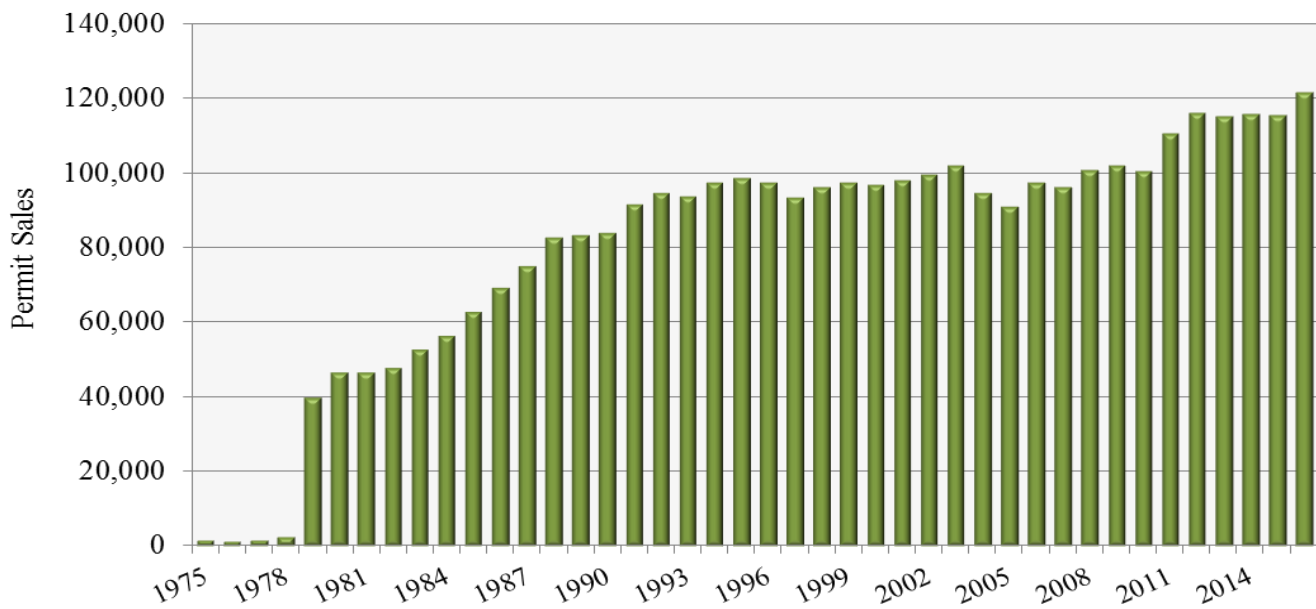


Figure 9. Missouri archery deer and turkey permit sales, 1975-2016. Permit sales do not include no-cost landowner permits. Prior to 1979, hunters purchased archery deer and turkey permits separately.

HUNTING INCIDENTS

There was one non-fatal hunting incident during the 2016 spring turkey season. The number of spring turkey hunting incidents in Missouri has declined considerably over the course of the last three decades. During the late 1980s, more than 30 incidents occurred annually for every 100,000 permits sold. During the last five hunting seasons, the average number of incidents per 100,000 permits sold is 3.3 (Figure 10).

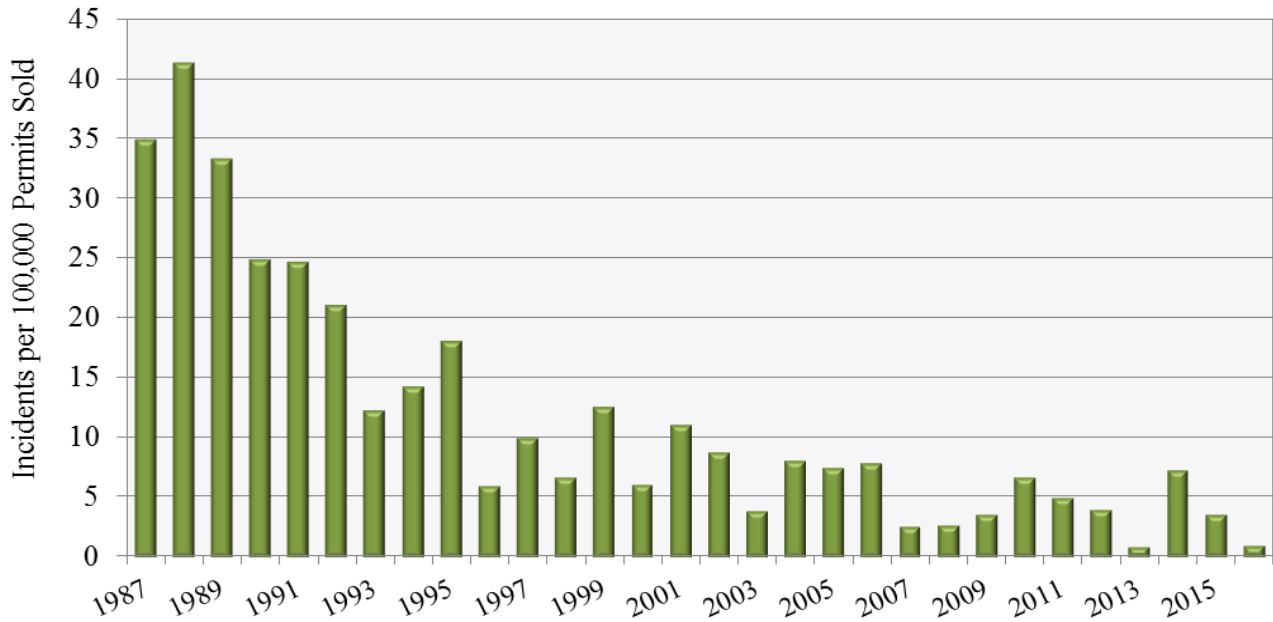


Figure 10. Number of hunting incidents during the spring turkey season in Missouri per 100,000 permits sold, 1987-2016.

REGULATION/LEGISLATION CHANGES

Beginning in 2016, crossbows became a legal method for all hunters during the fall archery deer and turkey season.

RESEARCH

Regional Turkey Population Monitoring for a Coordinated Harvest Management Strategy

In 2013, the MDC began a seven-year research project in partnership with the University of Missouri, University of Washington, and the National Wild Turkey Federation. The project involves five years of field-work capturing, marking, and radio-tracking turkeys in four northern Missouri counties. Data will be used to develop statistical population reconstruction (SPR) models, which the MDC's Wild Turkey Management Program will use to estimate turkey abundance, survival rates, harvest rates, recruitment, and population growth rate. Four of five capture seasons have been completed. The field work portion of the project will be completed in mid-March 2019.

Research objectives include:

1. Developing a regional turkey SPR model, which in addition to estimates of natural survival and harvest rates, will provide abundance and population growth rate.

2. Developing a user-friendly SPR modeling software program for future analysis of age-at-harvest and auxiliary data for turkeys and other harvested species in Missouri.
3. Estimating sex and age-class-specific seasonal and annual survival rates and cause-specific mortality rates.
4. Estimating age-class-specific harvest rates of male turkeys during the spring hunting season.
5. Estimating sex and age-specific harvest rates of turkeys during the fall hunting season.
6. Estimating reproductive parameters of female turkeys.

RELEVANT LINKS

- Missouri Department of Conservation
(<https://mdc.mo.gov>)
- 2016 Missouri Wild Turkey Brood Survey Results
(<https://huntfish.mdc.mo.gov/sites/default/files/downloads/2016TurkeyBroodSurvey.pdf>)

APPENDIX V

NEBRASKA

NEBRASKA WILD TURKEY STATUS REPORT – 2017

41st Midwest Deer & Wild Turkey Working Group Meeting – 28-30 August 2017, Honey Creek Resort State Park, Moravia, Iowa

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POPULATION STATUS

The 2017 April Rural Mail Carrier Survey was conducted 3-6 April 2017. We received 445 cards by 19 April 2017, of which 424 cards contained complete information necessary for processing. The results below (Tables 1 and Figure 1) are based on the complete cards. Rural Carriers made observations while traveling 176,863 miles or rural roads in 87 of Nebraska’s 93 counties. The 2017 July Rural Mail Carrier Survey was conducted 5-8 July 2017. We received 357 cards by 21 July 2017, of which 340 cards contained complete information needed for analysis (Tables 2 and Figure 2). Rural carriers made observations while traveling 147,629 miles of rural roads in 79 of Nebraska’s 93 counties.

TABLE 1. Wild turkey indices from the 2017 April Rural Mail Carrier Survey by pheasant management region. Carrier means are weighted by miles traveled per carrier.

Region	Mean Wild Turkeys/ 100 miles & 90% Confidence Limits	Percent Difference from:		
		2016	Mean 2012-2016	Mean 2007-2016
Central	4.85 (3.24-6.47)	15	-34	-39
Northeast	3.42 (1.58-5.26)	19	15	16
Panhandle	2.47 (0.76-4.18)	50	50	37
Sandhills	4.96 (2.58-7.33)	-17	-43	-54
Southeast	2.55 (1.73-3.38)	55	-15	-23
Southwest	9.99 (6.18-13.8)	-8	-16	-19
Statewide	4.22 (3.40-5.04)	13	-18	-23

FIGURE 1. Regional and statewide time series (2000-2017) of wild turkey population indices from the 2015 April Rural Mail Carrier Survey by pheasant management region.

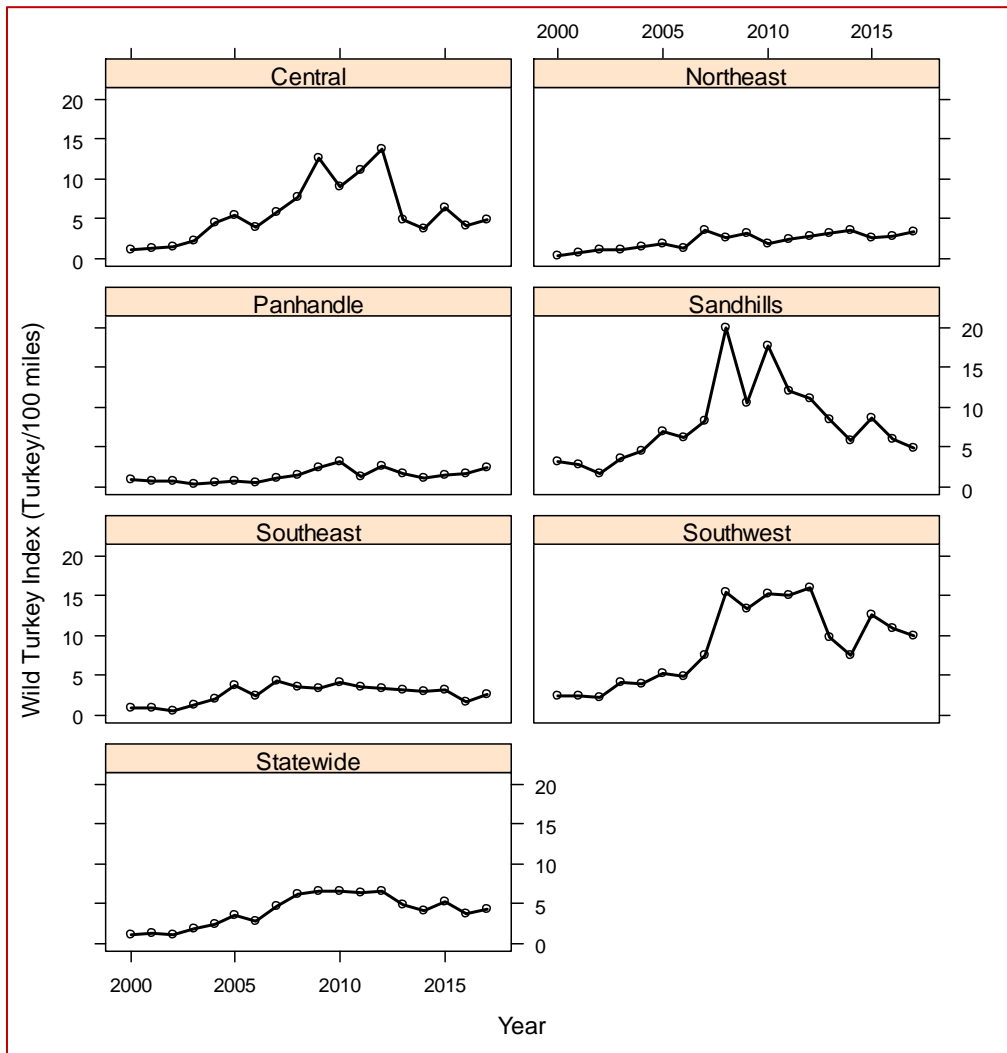
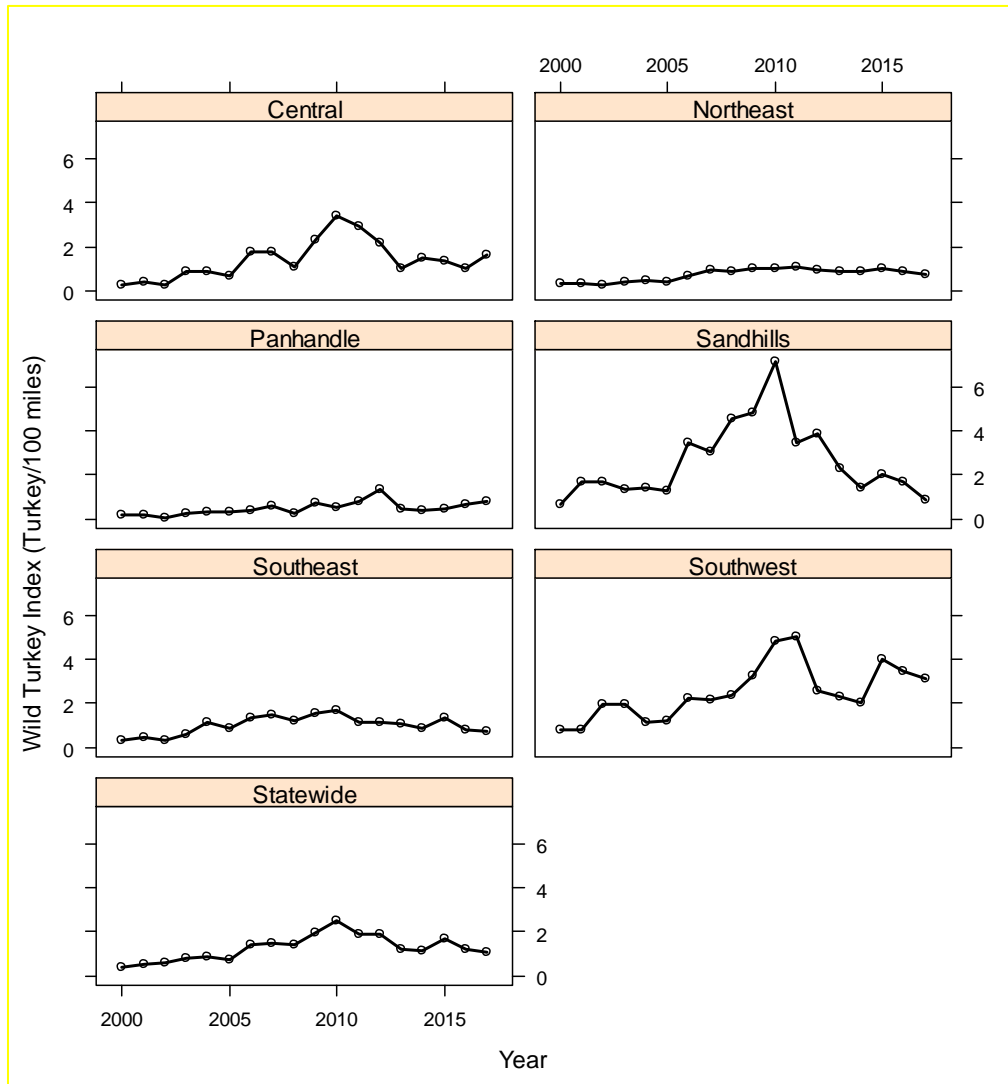


TABLE 2. Wild turkey indices by pheasant management region from the 2017 July Rural Mail Carrier Survey. Carrier means are weighted by miles traveled per carrier.

Region	Mean turkeys per 100 miles & 90% Confidence Limits	Percent Difference from:		
		2016	Mean 2012-2016	Mean 2007-2016
Central	1.60 (0.85-2.36)	60	15	-13
Northeast	0.75 (0.44-1.06)	-13	-18	-22
Panhandle	0.80 (0.00-1.62)	16	20	29
Sandhills	0.84 (0.27-1.40)	-50	-63	-76
Southeast	0.75 (0.56-0.94)	-6	-29	-39
Southwest	3.09 (1.43-4.76)	-10	26	3
Statewide	1.07 (0.85-1.29)	-10	-25	-34

FIGURE 2. Regional and statewide time series (2000–2017) of wild turkey abundance indices from the July Rural Mail Carrier Survey.



HARVEST

2017 Spring Turkey Season

This year’s survey was composed and administered in-house using Snap Survey development software (Snap v11) and Snap Webhosting service. An initial invitation to participate in the survey for the spring 2017 season was sent to 17,086 permit buyers (65.8% of unique permit buyers), but 654 were bounced back as undeliverable, giving an effective sample size of 16,432 permitted hunters. Initial invitations were emailed on 23 June 2017, and a reminder email was sent to all non-responding hunters on 30 June 2017. The survey was closed on 10 July 2017. The survey was also available on the NGPC website for hunters who did not have valid emails associated with their permits. The website survey was open over the same period as the

invitation-only version. At the end of the survey period, responses had been received from 3,100 spring turkey hunters, representing 4,588 individual permits for the spring 2017 season. The raw response rate was, therefore, 18.9% and the permit response rate was 27.9%. Each survey respondent represented 7.2 spring 2017 permit buyers.

Permit sales for the spring 2017 season ($n = 33,174$) were 1.90% lower than spring 2016 sales ($n = 33,831$; Figure 3). Of permits sold, 4,822 (14.5%) were youth permits and 28,352 were statewide regular permits. Youth permits sales ($n = 4,822$) were 2.2% lower than in 2016 ($n = 4,932$), and statewide regular permit sales ($n = 28,352$) were 1.9% lower than in 2016 ($n = 28,899$). Of all unique permit buyers ($n = 25,980$), 78.3% bought only one permit, 15.9% bought two permits, and 5.8% bought three permits. Estimated total turkey harvest for the spring 2017 season was 20,431 turkeys. Of these, 1,862 were harvested on youth permits and 18,569 were harvested on regular statewide permits (Table 3, Figure 4). Overall, harvest was 8.0% lower during the spring 2017 season compared to spring 2016. Success during the spring 2017 season was 64.4%, with youth success lower at 41.5% and regular permit holders' success higher at 67.5% (Figure 5). Table 4 summarizes the 2017 spring season results.

TABLE 3. Spring turkey season harvest and success, 2011-2017.

Type	Statistic	Year						
		2011	2012	2013	2014	2015	2016	2017
Shotgun/ Regular	Permits	30,344	29,541	30,760	28,854	28,724	28,899	28,352
	Harvest	20,237	18,884	19,040	16,707	17,378	20,143	18,569
	Success	66.7%	65.9%	61.9%	57.9%	60.5%	69.7%	67.5%
Youth	Permits	6,385	5,979	6,144	5,576	5,416	4,932	4,822
	Harvest	3,065	2,535	2,402	2,253	2,616	1,993	1,862
	Success	48.0%	42.4%	39.1%	40.4%	48.3%	40.4%	41.5%

FIGURE 3. Spring turkey permit sales, 1964-2017.

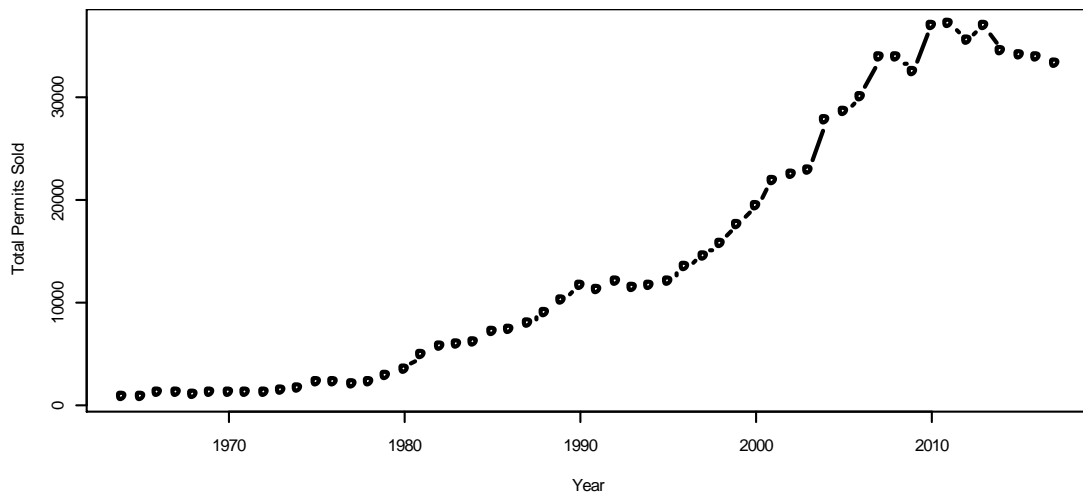


TABLE 4. Summary of spring 2017 turkey hunter survey responses and estimated harvest.

Residency	Permit Type	Permits Sold	Survey Permits	Reported Harvest	Success Rate	Estimated Harvest
Resident	Youth	3,572	317	108	34.1%	1,218
	Regular	15,907	1,799	1,042	57.9%	9,210
	Sub-Total	19,479	2,116	1,150	54.3%	10,428
Non-resident	Youth	1,250	233	120	51.5%	644
	Regular	12,445	2,239	1,683	75.2%	9,359
	Sub-Total	13,695	2,472	1,803	72.9%	10,003
Total		33,174	4,588	2,953	64.4%	20,431

FIGURE 4. Spring turkey harvest, 1964-2017.

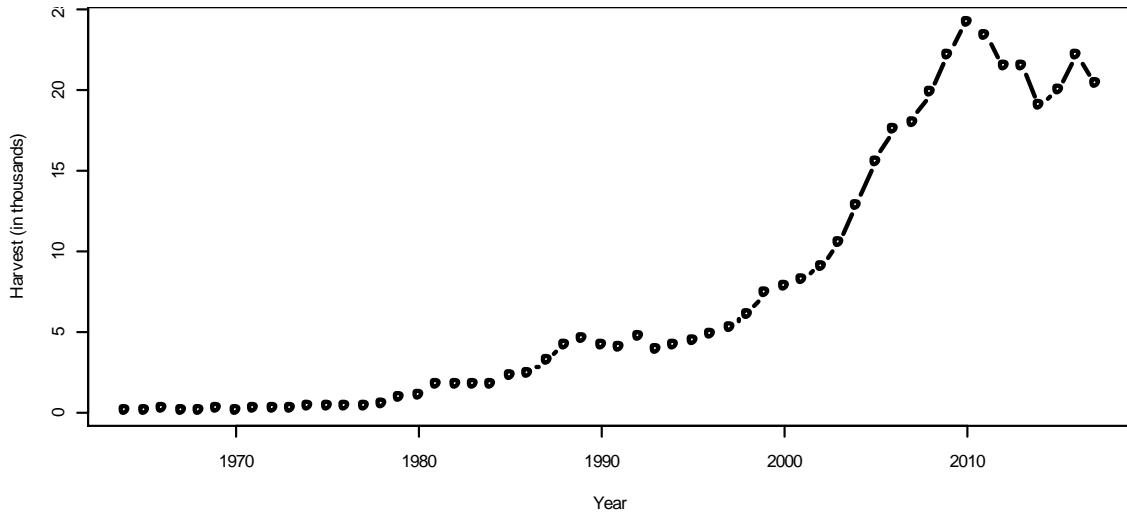
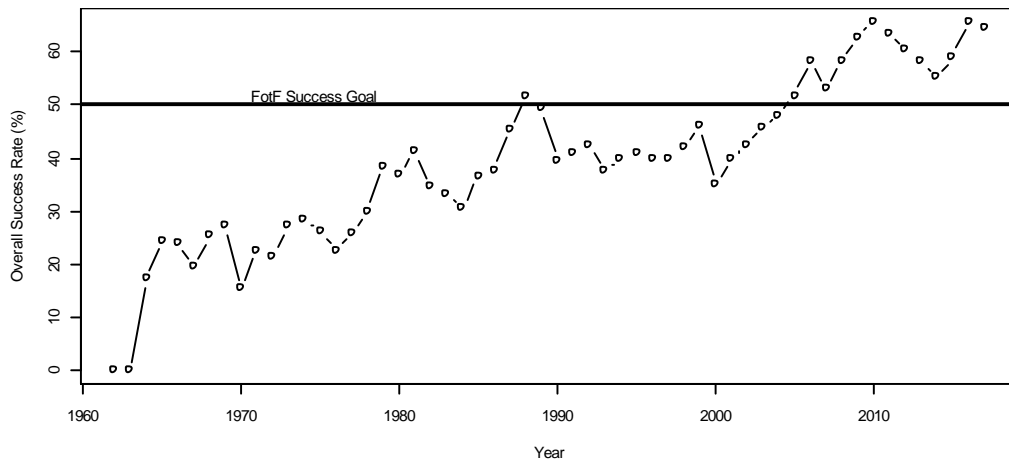


FIGURE 5. Spring turkey hunter success rate, 1964-2017. The horizontal line represents the success-rate goal established in the Focus on the Future plan (50% success).



2016 Fall Turkey Season

This year's survey was composed and administered in-house using Snap survey software and Snap WebHost service. An initial invitation to participate was sent to 5,356 (65.4%) of unique permit buyers on 20 March 2017, of which 5,105 were deliverable. A follow-up reminder was sent on 27 March 2017 to hunters who received the first invitation, but failed to respond. In addition to the email invitations, the survey was also available to hunters via the NGPC website, and promotional posts to agency social media were made on the date the initial invitations were sent, on the date the follow-up reminder was sent. The survey was closed to all participants on 3 April 2017, at which time 1,091 responses had been received, for a raw response rate of 21.4%. The responding hunters represented 1,291 individual permits, for a permit response rate of 25.3%. Each survey respondent represented 6.65 fall 2016 fall permit buyers.

Permit sales ($n = 8,589$) were 12% lower than for the fall 2015 turkey season ($n = 9,744$, Figure 6). Of permits sold for the fall 2016 season, 17.9% were youth permits ($n = 1,541$) and 82.1% were regular or landowner permits ($n = 7,048$). Estimated total fall 2016 harvest was 4,868 turkeys (Table 5, Figure 7), with youth harvesting 925 turkeys and regular/landowner permit holders harvesting 3,943 turkeys. Overall, harvest was 23.2% lower for the fall 2016 compared to fall 2015. Overall success rates for regular/landowner permit holders was 58.4%, and 60.1% for youth permit holders, giving an overall success rate of 58.7% (Figure 8). Table 6 summarizes the 2016 season harvest results.

TABLE 5. Fall turkey season harvest and success, 2008-2016.

Type		Year							
		2009	2010	2011	2012	2013	2014	2015	2016
Shotgun	Permits	12,738	12,241	11,482	12,449	10,836	10,175	9,744	8,589
	Harvest	10,853	10,356	8,405	8,362	6,748	7,003	6,336	4,868
	% Success	85.2	84.6	73.2	68.4	63.6	67.7	64.6	58.7

FIGURE 6. Fall turkey permit sales, 1962-2016

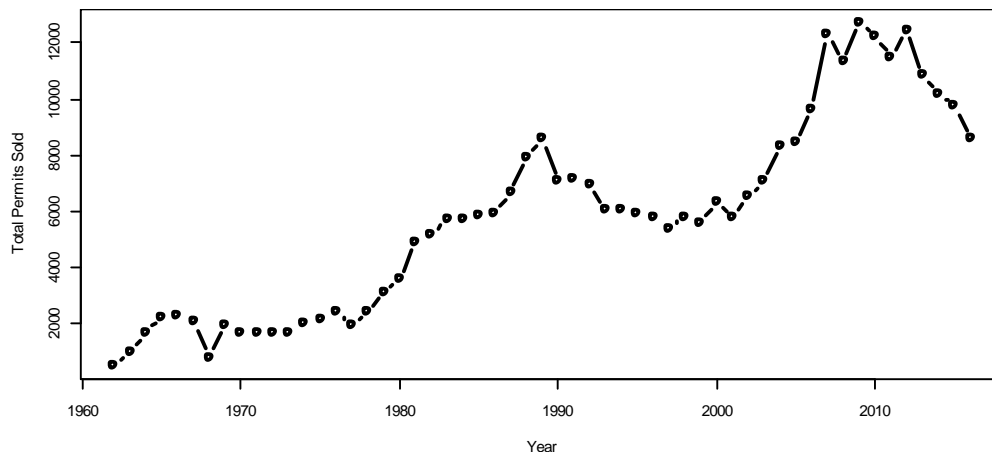


FIGURE 7. Fall turkey season harvest estimates, 1962-2016.

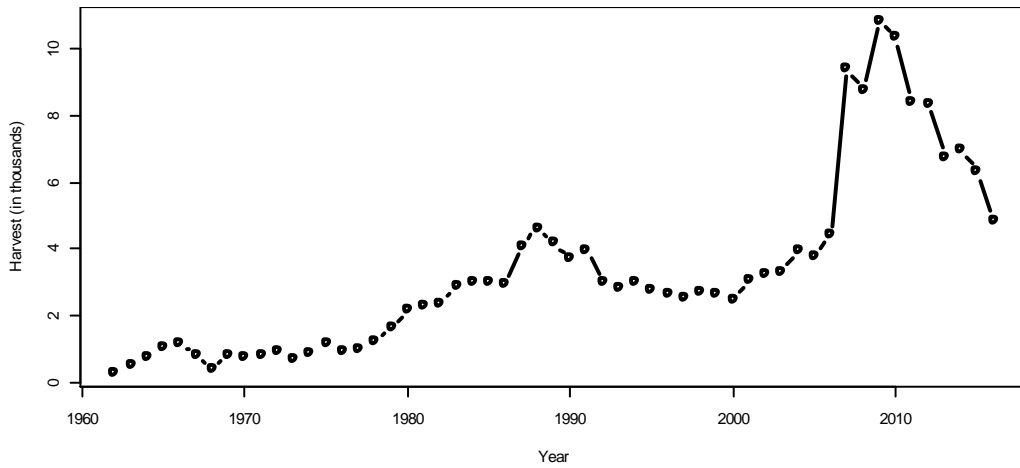
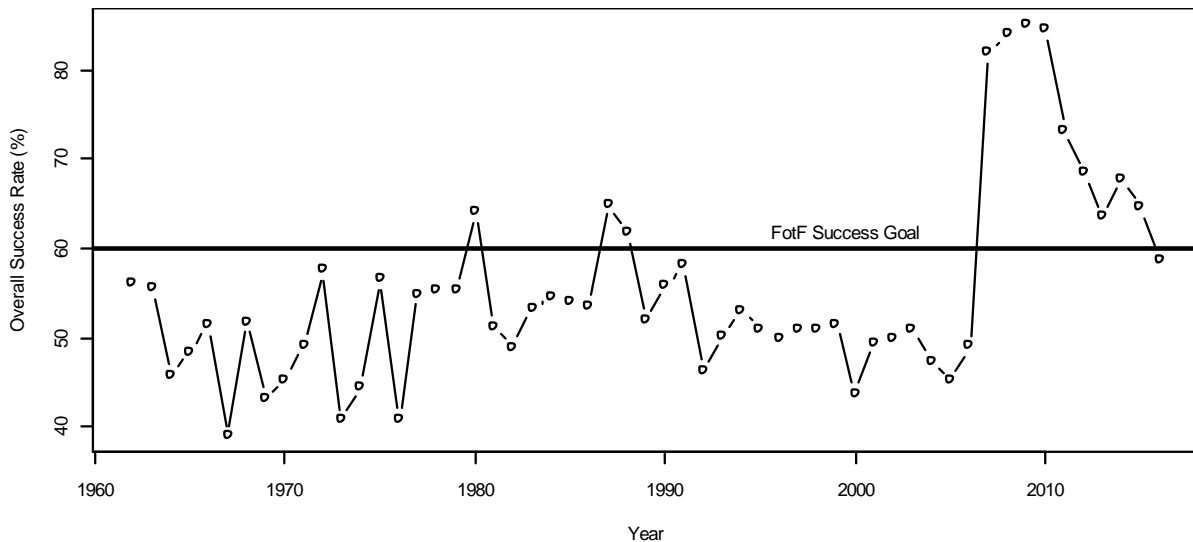


TABLE 6. Summary of fall 2016 turkey hunter survey responses and estimated harvest.

Residency	Permit Type	Permits Sold	Surveyed Permits	Reported Harvest	Success Rate	Estimated Harvest
Resident	Youth	1,313	201	119	59.2%	777
	Regular	6,230	862	445	51.6%	3,215
	Sub-total	7,543	1,063	564	53.1%	3,992
Non-Resident	Youth	228	37	24	64.9%	148
	Regular	818	191	170	89%	728
	Sub-total	1,046	228	194	85.1%	876
Total		8,589	1,291	782	58.7%	4,868

FIGURE 8. Fall turkey hunter success rate, 1962-2016. Horizontal line represents the success rate goal established in the Focus on the Future strategic plan. Note that starting in 2007 permits included a bonus tag, allowing the harvest of a second turkey.



APPENDIX W

NORTH DAKOTA

NORTH DAKOTA WILD TURKEY POPULATION STATUS REPORT – 2017

2017 Midwest Turkey Group Meeting Moravia, Iowa

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POPULATION STATUS

The Department uses several population techniques to obtain trends on our wild turkey population. We have a landowner survey that is sent to most landowners who have turkeys wintering on their land. Our district biologists and game wardens annually record observations of wild turkey hens, broods and poults on standardized pheasant brood routes during July and August. We also have our field staff collect incidental turkey brood data from June 1 to September 1.

Our 2016-2017 winter landowner survey of turkeys was inconclusive due to limited data. We have since discontinued the survey due to inconsistent data. Many landowners in the state are still reporting low turkey numbers and very few poults. Turkey production has been rather poor the last five of six years, especially in western one-third of the state primarily due to cool, wet springs, causing poor nesting success and poor young survival.

REPRODUCTION

The 2016 brood survey showed a decrease in the total number of adult turkey observed (-16.1%) and average brood size (-9.5%) from 2015. The number of poults per adult hen was up 27.2% and number of broods was up 18% from 2015. Age ratio is standing at 1.31 poults per adult (Table 1).

HARVEST

2017 Spring Turkey Season

The state uses twenty-two hunting units during the spring season. These units include all of North Dakota's 53 counties. During the spring of 2017, the entire state was open for wild turkey hunting except for unit 21 in the southwestern part of the state. This area has been closed for the past ten spring hunting seasons because of low turkey numbers in this unit.

Licenses are issued by weighted lottery after the number of gratis licenses is deducted from the total available. Only residents are eligible to apply for spring licenses, although one spring

license is provided to the NWTf for auction. The 2017 Spring Wild Turkey Proclamation provided the Outdoor Adventure Foundation with two turkey licenses, valid in any open unit, for the 2017 spring season. In accordance with N.D.C.C. 20.1-04-07(1) (c)), these two licenses shall be issued to a qualifying youth who has cancer or a life-threatening illness.

First time spring turkey hunters age 15 or younger can receive one spring license valid for the regular hunting season for a specific unit. As in the fall season, we provide only a one time period for hunting wild turkeys in the spring. You choose your weapon from shotguns, muzzle loading rifles, handguns and bow/arrows.

In spring 2017, the season opened April 8 and closed May 14 (36 days). Only one bearded or male wild could be harvested. A total of 6,810 applications (up 14 percent from 2016) were received for the 5,685 permits that were available. Of the 5,800 permits actually issued, 339 went to landowners, 274 to youth, and 5,187 to regular turkey hunters.

Data from the spring hunter harvest questionnaire showed that 4,566 of the license holders (79%) hunted. Hunters harvested 1,952 wild gobblers (down 16 percent from 2016) for a hunter success of 42.8 percent (Table 2, Figures 1 & 2).

2016 Fall Turkey Season

The state is divided into twenty-two hunting units and these areas include all 53 counties of North Dakota's (Figure 3). During the fall of 2016, twenty of 22 counties were open for wild turkey hunting. Unit 53 in the northwestern part of the state and unit 21 in the southwest were closed. These two units have been closed for the past nine fall hunting seasons because of low turkey numbers.

Licenses are issued by weighted lottery after gratis licenses are deducted from the total available. Only North Dakota residents are eligible to apply in the first lottery. If licenses remain after the first lottery, then nonresidents can apply.

North Dakota has no specific youth hunting season for wild turkeys in the fall. We also do not have a specific bow season for turkeys. We provide a one time period for hunting wild turkeys in the fall, and you can choose your weapon from shotguns, muzzle loading rifles, handguns and bow/arrows. During the fall of 2016, the season was held from October 08, 2016 through January 8, 2017. There were 3,510 permits available and 3,515 were issued (249 gratis and 3,266 general permits). This was a decrease of 145 permits available (-4 percent) over 2015.

From the wild turkey questionnaire, it was determined that 2361 license holders (67.2 percent) hunted during the fall. Hunters harvested 1,277 wild turkeys for a success of 39.3 percent (Table 3, Figures 4 & 5). A summary of the fall hunting statistics for ND since 1958 can be found in Table 3. Figure 4 is a graph of fall harvest statistics from 1980 – 2016. Data regarding sex and age of the harvest was determined by a voluntary sample of wing tips and breast feathers sent in by hunters, but data was still being compiled as of writing this report.

MISCELLANEOUS

Figure 1. Spring harvest statistics for wild turkeys in North Dakota, 1980 - 2017.

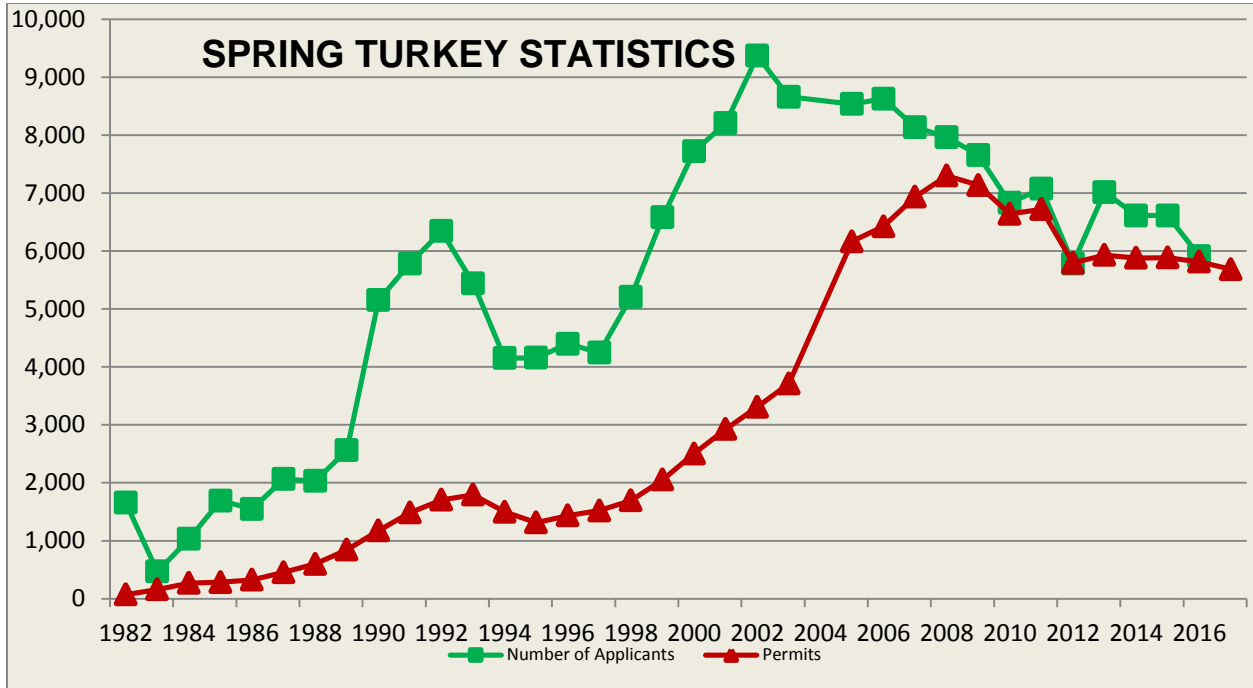


Figure 2. Spring wild turkey harvest of number of hunters and bag.

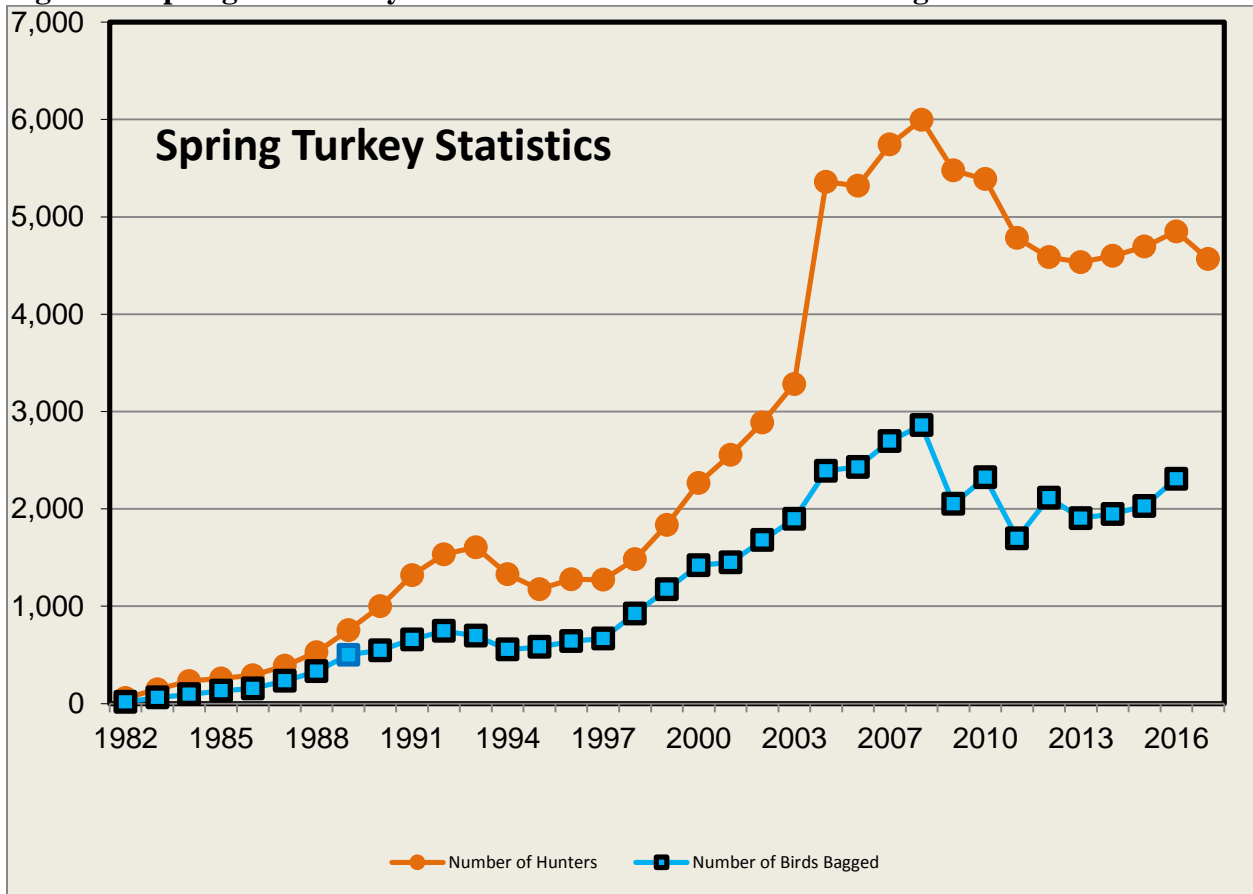


Figure 3. North Dakota Game and Fish Department Turkey Hunting Units

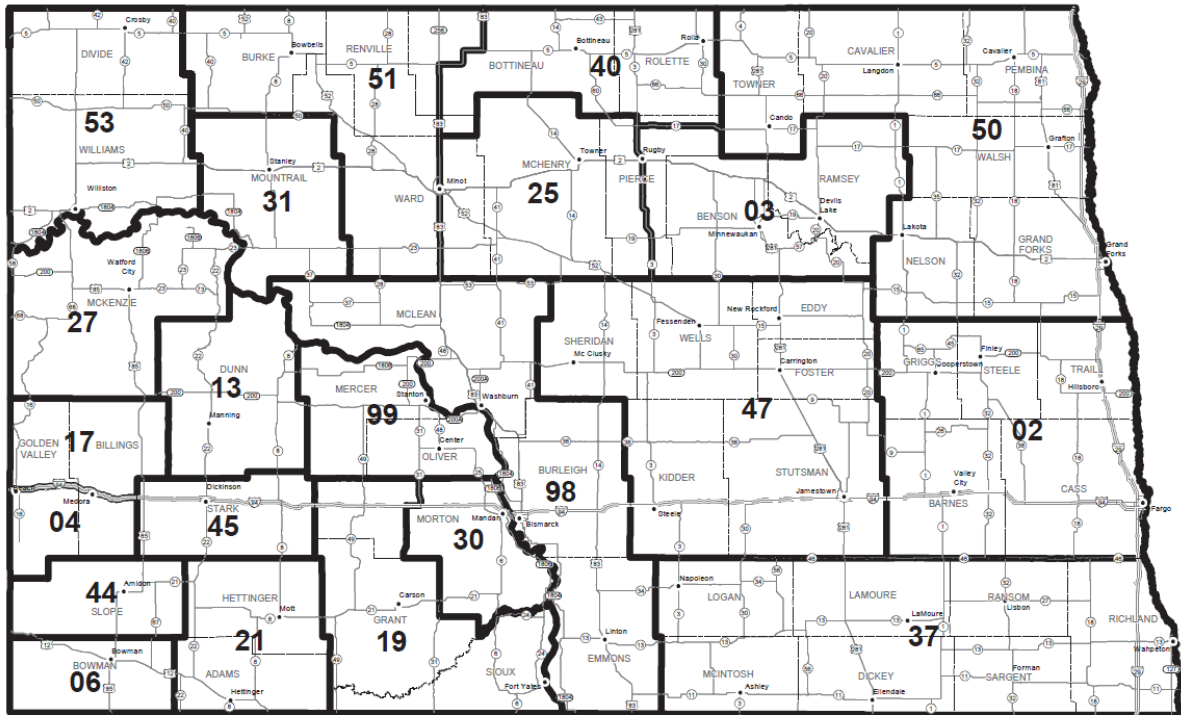


Table 1. Brood data for wild turkeys in North Dakota, 2009 - 2016.

PARAMETER	YEAR							% Change	
	2009	2010	2011	2012	2013	2014	2015	2016	2015 - 2016
Number of routes driven	267	266	374	379	376	386	411	388	-5.6%
Number of miles driven	5,313	5,249	9,012	9,043	9,416	9,781	10,209	9,919	-2.8%
Number of hours driven	396.5	407.2	617.0	615	638	638	696	633	-9.1%
Number of adult birds observed	82	99	124	251	164	208	342	287	-16.1%
Number of juvenile birds observed	114	126	68	192	162	238	352	376	6.8%
Number of broods observed	15	17	13	27	24	37	50	59	18.0%
Number of birds observed per 100 miles driven	3.7	4.3	2.1	5.0	3.6	4.6	6.8	6.7	-1.5%
Number of broods observed per 100 miles driven	0.3	0.3	0.1	0.3	0.3	0.4	0.5	0.6	20.0%
Number of juveniles per adult hen	3.1	3.2	1.2	1.2	1.9	2.5	1.79	2.04	14.0%
Number of birds observed per hour driven	0.49	0.55	0.31	0.72	0.51	0.70	1	1.05	5.0%
Number of broods observed per hour driven	0.04	0.04	0.02	0.04	0.04	0.06	0.07	0.09	28.6%
Age ratio (juvenile/adult)	1.39	1.27	0.55	0.76	0.99	1.14	1.03	1.31	27.2%
Average Brood Size	7.60	7.41	5.23	7.11	6.75	6.43	7.04	6.37	-9.5%

TABLE 2. North Dakota Spring Wild Turkey Hunting Seasons, 1976 - 2017.

Year	Number of Applicants	Number of Permits Available	Number of Permits Issued	Number of Hunters	Number of Birds Bagged	Percent Success
1976			30	22	9	40.9%
No Spring Wild Turkey Hunting Seasons 1977 through 1981						
1982	1,660	72	70	57	18	31.6%
1983	470	160	160	146	61	41.8%
1984	1,033	270	258	231	94	40.7%
1985	1,691	285	283	257	130	50.6%
1986	1,548	325	325	290	155	53.4%
1987	2,065	455	455	387	232	59.9%
1988	2,032	600	600	527	331	62.8%
1989	2,561	845	843	753	502	66.7%
1990	5,151	1,175	1,188	998	547	54.8%
1991	5,783	1,485	1,490	1,319	658	49.9%
1992	6,345	1,705	1,717	1,533	746	48.7%
1993	5,442	1,795	1,807	1,605	696	43.4%
1994	4,153	1,500	1,500	1,328	555	41.8%
1995	4,157	1,315	1,322	1,174	581	49.5%
1996	4,399	1,435	1,445	1,277	641	50.2%
1997	4,245	1,520	1,528	1,272	669	52.6%
1998	5,208	1,695	1,695	1,484	924	62.3%
1999	6,583	2,055	2,060	1,835	1,173	63.9%
2000	7,720	2,505	2,534	2,266	1,421	62.7%
2001	8,207	2,925	2,925	2,556	1,449	56.7%
2002	9,370	3,310	3,310	2,888	1,679	58.1%
2003	8,662	3,710	3,709	3,282	1,896	57.8%
2005	8,537	6,165	6,213	5,359	2,391	44.6%
2006	8,629	6,425	6,405	5,318	2,430	45.7%
2007	8,138	6,935	6,961	5,743	2,696	46.9%
2008	7,966	7,300	6,506	5,997	2,859	47.7%
2009	7,655	7,136	7,138	5,476	2,051	37.5%
2010	6,832	6,641	6,645	5,388	2,323	43.1%
2011	7,077	6,720	6,672	4,783	1,698	35.5%
2012	5,784	5,795	5,872	4,586	2,115	46.1%
2013	7,015	5,930	6,053	4,534	1,905	42.0%
2014	6,613	5,881	6,003	4,598	1,947	42.3%
2015	6,613	5,886	6,003	4,694	2,029	43.2%
2016	5,912	5,815	5,895	4,850	2,309	47.6%
2017	6,810	5,685	5,800	4,566	1,952	42.8%
Total Avg.	5,488	3,242	3,240	2,667	1,253	47.0%

Table 3. Fall harvest statistics for wild turkeys in North Dakota, 1958 - 2016.

Year	Number of applicants	Number of permits available	Number of permits issued *	Number of hunters	Number of birds bagged	Percent success	Average days hunted
1958			376	376	88	23.4	
1959	No Season		--	--	--	--	
1960	No Season		--	--	--	--	
1961			309	246	174	70.7	
1962			426	392	241	61.5	
1963			306	298	171	57.4	
1964			404	386	198	51.3	
1965			350	290	109	37.6	
1966	No Season		--	--	--	--	
1967			200	183	103	56.3	
1968			200	178	97	54.5	
1969			197	186	117	62.9	
1970			197	180	131	72.8	
1971			201	185	134	72.4	
1972			227	205	129	62.9	
1973			203	195	151	77.4	
1974			307	285	213	74.7	
1975			359	308	186	60.4	
1976			500	466	653	140.1	
1977			650	513	411	80.1	
1978			844	737	540	73.3	
1979	2,834	975	961	881	583	66.2	
1980	2,611	1,155	1,135	1,029	736	71.5	
1981	4,969	1,530	1,514	1,310	976	74.5	
1982	3,258	1,530	1,501	1,361	975	71.6	
1983	3,057	1,660	1,678	1,488	1,181	79.4	
1984	3,143	1,710	1,707	1,521	1,197	78.7	
1985	3,902	1,960	1,946	1,631	1,269	77.8	
1986	3,800	2,235	2,126	1,861	1,324	71.1	
1987	3,393	2,455	2,417	2,177	1,668	76.6	
1988	6,918	5,930	5,938	5,098	3,607	70.8	
1989	5,890	5,810	5,760	4,818	3,233	67.1	
1990	6,921	4,765	4,735	3,845	2,556	66.5	
1991	7,305	4,580	4,593	3,683	2,236	60.7	
1992	6,402	3,585	3,605	2,938	1,830	62.3	
1993	6,030	3,585	3,546	2,735	1,331	48.7	
1994	4,330	3,585	3,154	2,578	1,484	57.6	
1995	3,862	3,195	3,212	2,608	1,619	62.1	
1996	4,348	3,230	3,241	2,595	1,946	75.0	
1997	4,717	3,250	3,273	2,695	1,835	68.1	
1998	5,218	3,855	3,860	3,141	2,114	67.3	
1999	4,977	4,620	4,620	3,941	2,750	69.8	
2000	7,665	6,000	6,000	4,690	3,029	64.6	2.9
2001	8,119	6,510	6,622	5,224	3,083	59.0	2.9
2002	8,399	6,610	6,752	5,234	3,157	60.3	3.1
2003	8,048	9,095	8,896	6,886	4,410	64.0	2.8
2004	10,070	10,980	11,224	8,064	3,773	46.8	3.4
2005	9,334	9,230	9,331	6,722	3,191	47.5	3.3
2006	8,319	7,925	8,066	5,982	3,194	53.4	3.1
2007	8,138	8,025	6,961	5,743	2,696	46.9	3.0
2008	8,767	8,700	8,215	5,539	2,632	47.5	3.2
2009	7,126	6,805	6,804	4,274	1,851	43.3	3.1
2010	5,930	5,755	5,901	3,702	1,551	41.9	3.1
2011	4,692	4,630	4,708	3,145	1,259	40.0	3.5
2012	4,516	4,145	4,190	2,652	1,212	45.7	3.2
2013	4,401	4,020	4,066	2,583	1,012	39.2	3.7
2014	4,401	4,020	4,066	2,786	1,108	39.8	3.8
2015	3,972	3,655	3,629	2,524	1,114	44.1	3.7
2016	3,327	3,510	3,515	2,361	929	39.3	3.7
TOTAL	213,109	174,815	179,724	137,654	79,497		
AVG:	5,608	4,600	3,209	2,458	1,420	57.8%	3.3

* Includes lottery permits (10,504) plus gratis permits (720) in 2004.

† First year nonresidents were allowed to apply for fall turkey AFTER the first drawing for residents.

Figure 4. Fall harvest statistics for turkeys in North Dakota, 1980 - 2016.

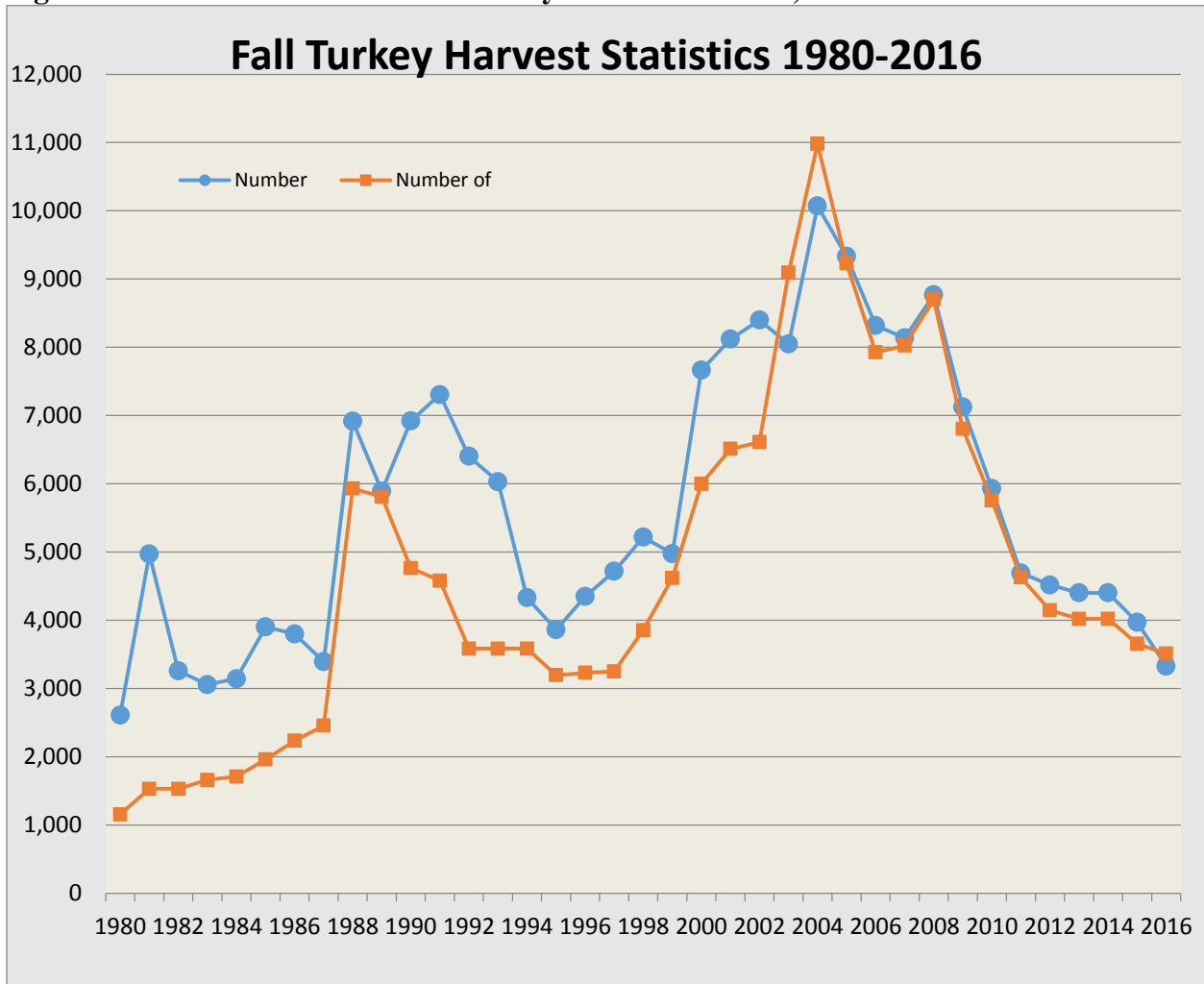
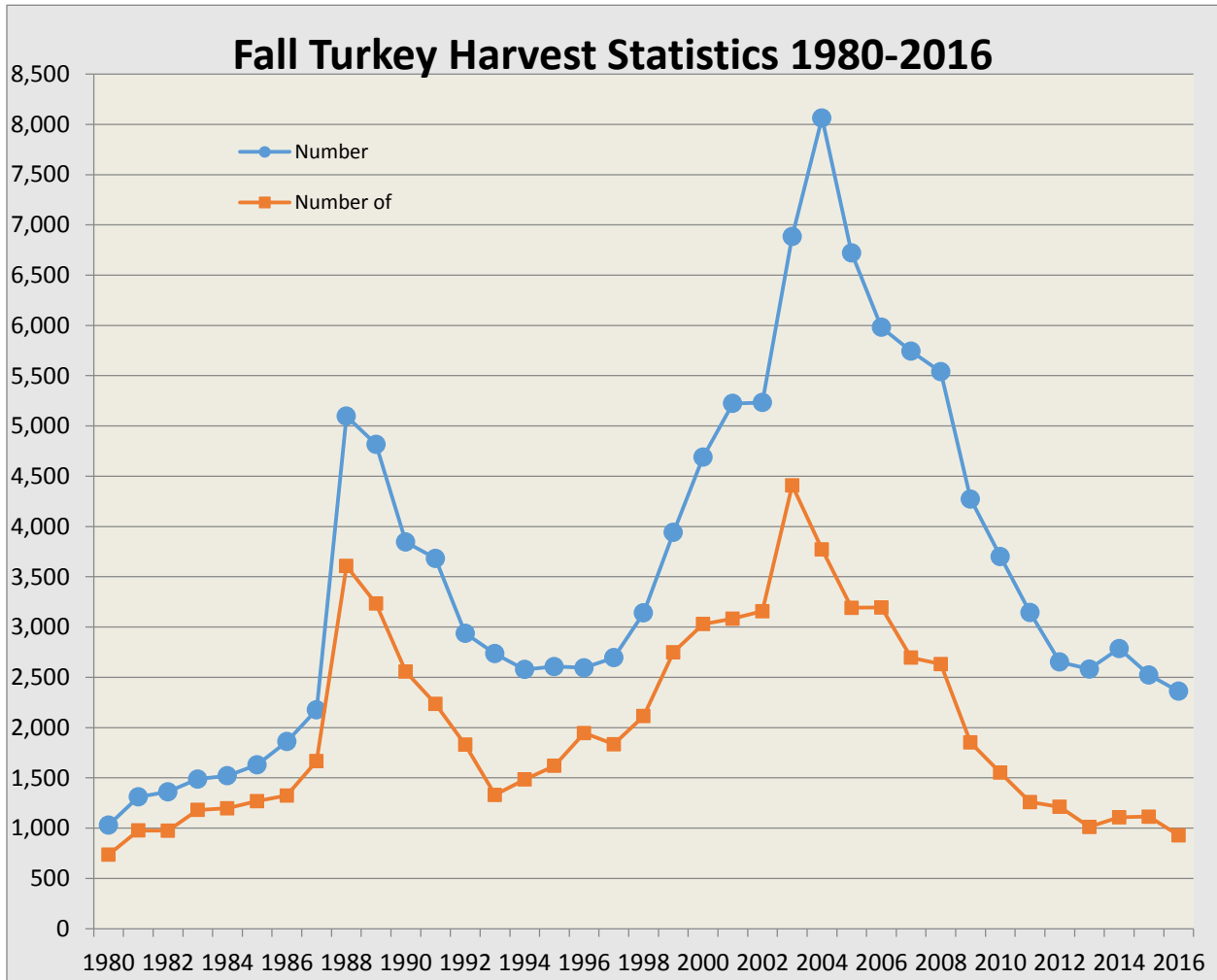


Figure 5. Fall harvest statistics for turkeys in North Dakota, 1980 - 2016.



APPENDIX X

OHIO



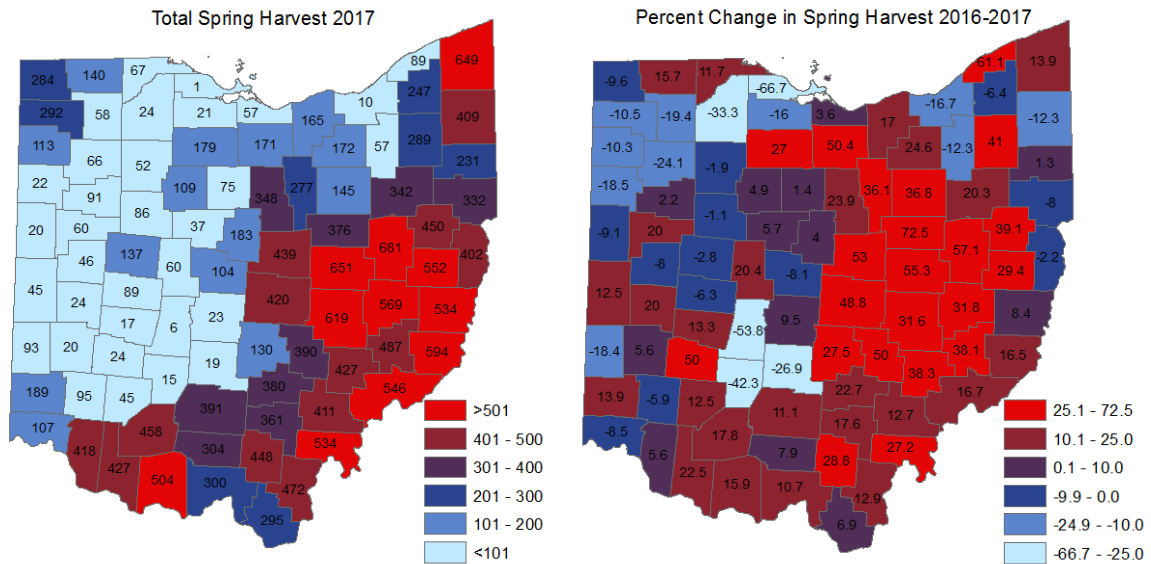
2017 OHIO WILD TURKEY PROGRAM REPORT

Mark Wiley

I. Current Harvest

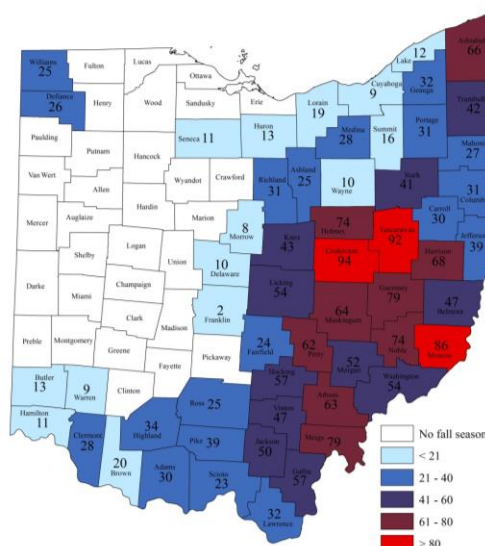
2017 Spring Season Summary

Hunters checked a total of 21,098 wild turkeys in Ohio during the combined spring hunting seasons in 2017, which is an 18.5% increase from 2016. Youth hunters checked 1,895 turkeys during the two-day youth season (April 22-23, 2017). Adult males, juvenile males, and bearded hens accounted for 73.0%, 25.8%, and 1.2% of the total spring harvest, respectively. Turkeys taken by shotgun, longbow (compound, recurve, etc.), and crossbow accounted for 97.7%, 1.5%, and 0.8% of the total spring harvest, respectively.



2016 Fall Season Summary

Hunters checked a total of 2,168 wild turkeys in Ohio during the fall season in 2016, which is a 41.1% increase from 2015. Adult males, juvenile males, adult females, and juvenile females accounted for 25.2%, 12.0%, 45.1% and 17.7% of the total fall harvest, respectively. Turkeys taken by shotgun, longbow (compound, recurve, etc.), and crossbow accounted for 62.9%, 14.7%, and 22.4% of the total fall harvest, respectively.



II. License and Season Information

CATEGORIES	
Resident Adult	For Ohio residents age 18-65 at the time of purchase.
Youth	For residents and nonresidents 17 years old and younger at the time of purchase.
Nonresident	For nonresidents age 18 and older at the time of purchase.
Apprentice	For residents and nonresidents who are accompanied by a licensed hunter.
Reduced-Cost Senior	For Ohio residents age 66 and older born on or after January 1, 1938.
Free Senior	For Ohio residents born on or before December 31, 1937.

LICENSES		COST
Hunting LICENSES	Resident Annual License	\$19
	Youth Annual License: Resident and Nonresident	\$10
	Nonresident Annual License	\$125
	Resident Reduced-Cost Senior License	\$10
	Resident Free Senior License: Ohio residents born on or before Dec. 31, 1937	Free
	Nonresident (Tourist) 3-day License: Not valid for deer, turkey, or furbearers	\$40
Apprentice LICENSES	Resident Annual License	\$19
	Youth Annual License: Resident and Nonresident	\$10
	Nonresident Annual License	\$125

PERMITS			
SPRING TURKEY PERMIT	COST	FALL TURKEY PERMIT	COST
Adult Permit: Resident & Nonresident	\$24	Adult Permit: Resident & Nonresident	\$24
Youth Permit: Resident & Nonresident	\$12	Youth Permit: Resident & Nonresident	\$12
Reduced-Cost Senior Permit: Resident Only	\$12	Reduced-Cost Senior Permit: Resident Only	\$12
Free Senior Permit: Resident Only	FREE	Free Senior Permit: Resident Only	FREE

Spring Season

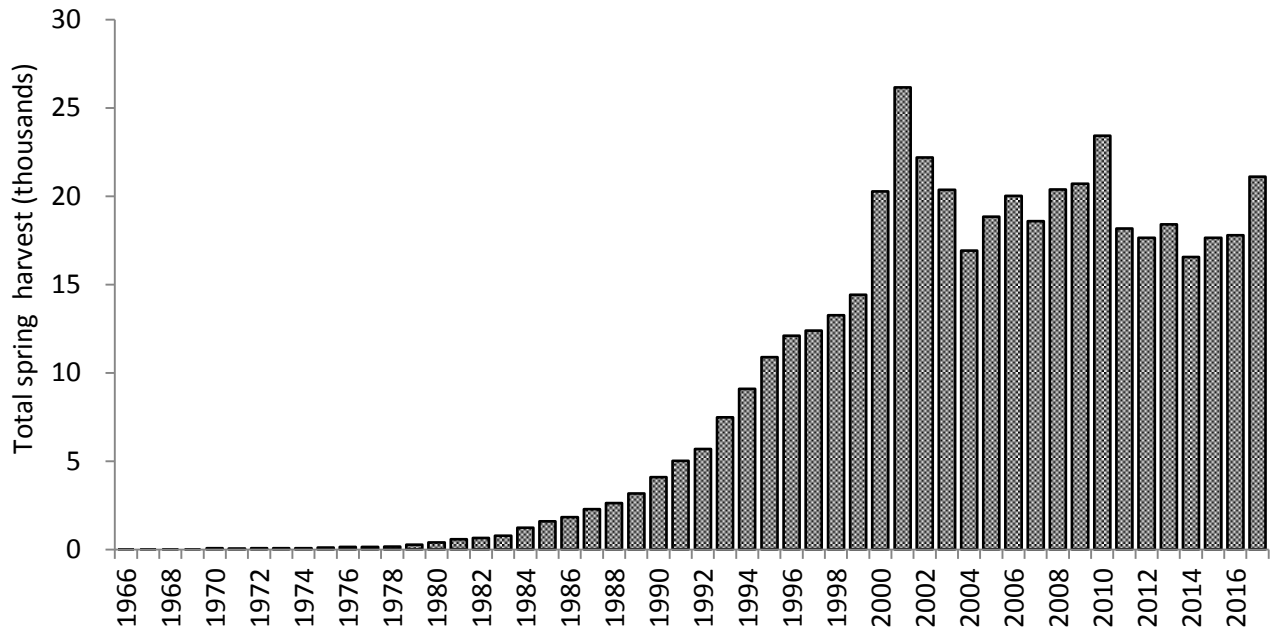
Ohio's spring turkey season includes a South Zone which opens for 4 weeks on the Monday closest to April 21st, and a Northeast Zone which opens for 4 weeks on the Monday closest to May 1st. In 2017, the South Zone season was April 24th-May 21st and the Northeast Zone season was May 1st-May 28th. The 2017 youth spring turkey season was open statewide during the Saturday and Sunday prior to the South Zone season. A spring turkey permit is required of residents and nonresidents in addition to a valid Ohio hunting license. The season bag limit is two bearded turkeys. Only one bearded turkey may be taken per day. Hunting hours are 30 minutes before sunrise to noon during the first two weeks of the season and 30 minutes before sunrise to sunset during the last two weeks of the season. A total of 65,486 spring permits were issued in 2017.

Ohio Spring Turkey Permit Sales 2011-2017

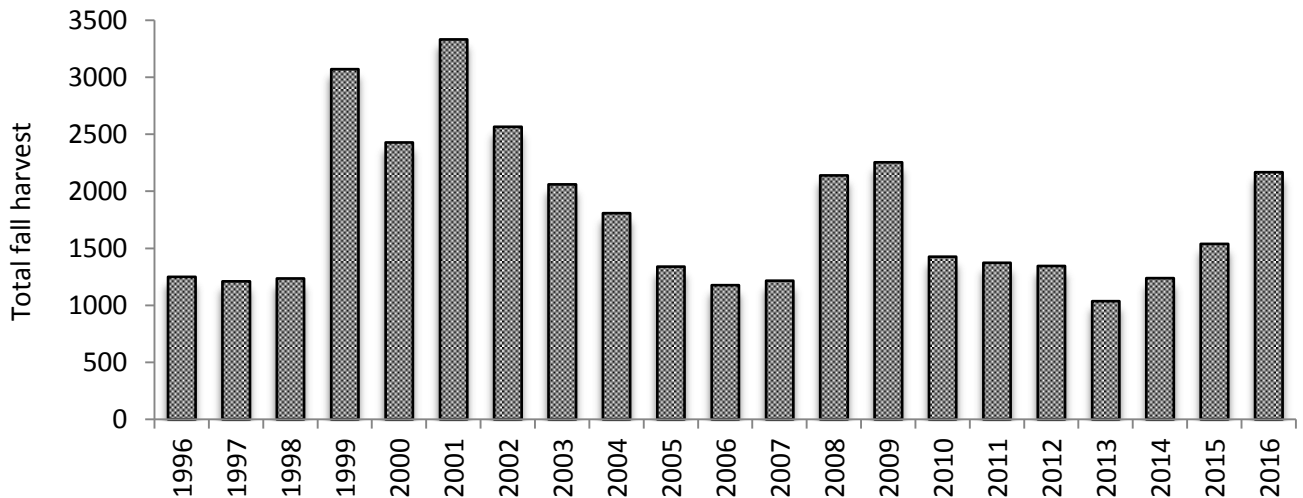
Year	Spring Turkey	Nonres. Spring	Youth Spring	Reduced Spring	Free Spring	Total Spring
2011	45,301	3,389	10,545	3,601	13,829	76,665
2012	42,009	3,151	9,933	3,743	11,455	70,291
2013	44,947	3,293	10,914	4,265	10,495	73,914
2014	42,501	3,542	10,030	4,424	8,463	68,960
2015	41,395	3,628	9,245	4,680	6,935	65,883
2016	41,876	3,975	9,304	5,139	6,142	66,436
2017	41,851	4,311	9,167	5,503	4,654	65,486

III. Historical Harvest

Ohio Spring Wild Turkey Harvest Totals



Ohio Fall Wild Turkey Harvest Totals

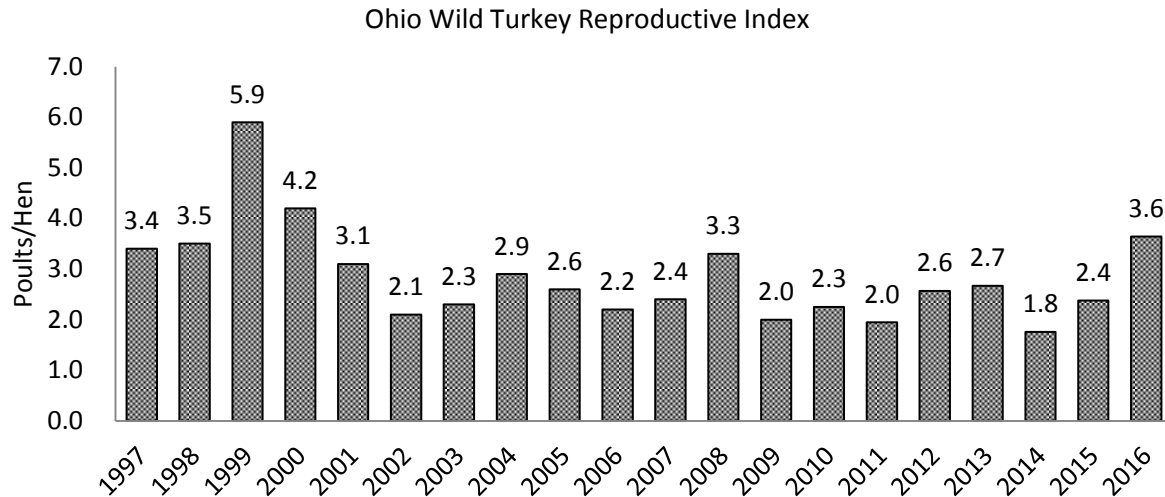


IV. Population Trends

Wild turkeys were extirpated from Ohio in 1904 and remained absent from the state for nearly half a century. The Ohio Department of Natural Resources (ODNR) successfully reintroduced wild turkeys to the state in the late-1950's. Until the late-2000's, ODNR utilized in-state translocation to expedite turkey range expansion. Ohio's current wild turkey population is estimated at 200,000 birds, with turkeys present in all 88 counties.

The ODNR conducts an annual turkey brood survey to estimate population growth. The brood survey relies on the public reports of all wild turkeys seen during June, July and August. Observations are submitted on the Turkey Brood Survey webpage at wildohio.gov. ODNR received 569 valid reports of hens and/or poults during

the 2016 survey, with a statewide average of 3.6 poults per adult hen. The 2016 average is the third highest on record and was largely influenced by eastern counties, most of which averaged >4.0 poults per hen.



Summary of observations from the Ohio Turkey Brood Survey during June-August, 2009-2016.

Year	No. observations ^a	No. hens	Hens with poults		Hens without poults		No. Poults	Poults/hen
			No.	%	No.	%		
2009	748	1,875	1,164	62.1	711	37.9	3,684	1.96
2010	856	2,148	1,473	68.6	675	31.4	4,835	2.25
2011	701	1,575	904	57.4	671	42.6	3,076	1.95
2012	453	1,006	702	69.8	304	30.2	2,593	2.58
2013	339	705	480	68.1	225	31.9	1,883	2.67
2014	961	2,401	1,374	57.2	1,027	42.8	4,245	1.77
2015	692	1,638	1,140	69.6	498	30.4	3,961	2.42
2016	569	1,250	964	77.1	286	22.9	4,547	3.64

^a Includes observations of hens and/or poults only

V. Management Units:

N/A

VI. Regulation/legislation Changes

Since 1996, the ODNR has maintained a limited either-sex fall wild turkey season to provide additional turkey hunting opportunity while protecting population growth and spring gobbler hunting. ODNR determines fall season eligibility at a county level, based largely on spring harvest criteria.

During 1996-2009, eligibility thresholds were set fairly high (e.g. total spring harvest >200 birds) to restrict opportunity during a time of population expansion. By 2009, Ohio's turkey range was fully stocked and many counties had viable turkey populations, but were unlikely to meet such restrictive spring harvest thresholds. ODNR therefore relaxed fall eligibility criteria after 2009. In 2017, spring harvest must (1) exceed 50 turkeys and (2) 1.0 turkeys/mi² forest cover on average over the past three springs for a county to be eligible for a fall season. Contiguity of open counties was also considered.

APPENDIX Y

ONTARIO

ONTARIO WILD TURKEY POPULATION STATUS REPORT – 2017

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POPULATION STATUS

Ontario’s turkey population is estimated at >70,000 birds. Turkey numbers are fluctuating naturally throughout southern Ontario where the population has been established for some time. The occupied breeding range continues to expand northward.

HARVEST

2017 Spring Turkey Season

Ontario has an open allocation framework for spring turkey hunting where hunters can get up to two tags to hunt bearded wild turkeys in any open Wildlife Management Unit (WMU). Fifty-one WMUs are currently open to spring turkey hunting. Hunters purchased approximately 58,000 turkey licences/tags and reported harvesting 7,763 turkeys in spring 2017. The significant increase in spring licences sold and harvest in spring 2017 is attributed to elimination of the turkey hunter safety course requirement beginning in 2017 (see below under regulation changes).

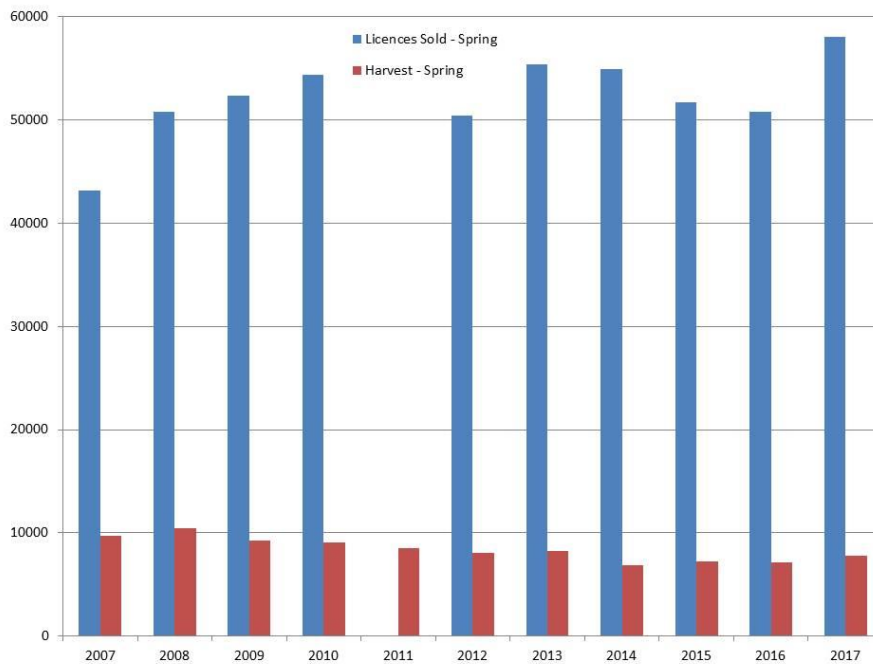


Figure 1. Spring turkey hunting licence sales and harvest from 2007-2017. Licence sales information is not available for 2011.

2016 Fall Turkey Season

A fall turkey hunting season was first opened in Ontario in 2008. Ontario maintains a conservative approach to fall hunting season management with population-based criteria for considering opening and closing fall seasons. The fall firearm season (shotgun, muzzleloading shotgun and bow) runs for 13 days in early to mid-October. There are currently twenty-two WMUs open to fall turkey hunting in Ontario. Hunters can purchase a single licence/tag to harvest one turkey of either-sex in the fall in any open WMU. In fall 2016 Ontario sold 3,461 licences/tags with hunters reporting harvest of 199 turkeys.

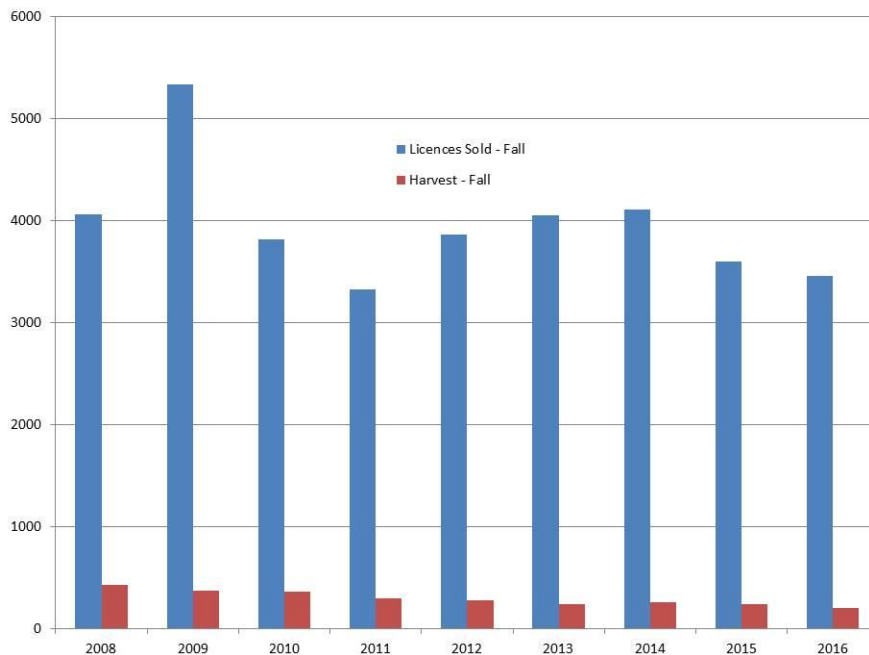


Figure 2. Fall turkey hunting licence sales and harvest.

HUNTING INCIDENTS

Ontario has had 10 turkey hunting incidents since 2004 with the most recent occurring in fall 2015. All but one involved a shotgun and most have involved a hunter mistaking another for a turkey. As with other hunting incidents in Ontario the shooter typically has many years of hunting experience.

REGULATION/LEGISLATION CHANGES

Regulation Changes in Place for 2017

Ontario consulted on the first significant package of changes to turkey hunting regulations since the turkey management plan was approved in 2007. This resulted in the following amendments:

1. Ontario's mandatory wild turkey hunter education course requirement was eliminated and key components were incorporated into Ontario's regular hunter education course.
2. A spring wild turkey hunting season was opened in WMU 36 (north of Sault Ste. Marie) and a fall wild turkey hunting season in WMU 94 (Windsor area).

3. A fall bows-only hunting season for wild turkey was opened from October 1-31 in all Wildlife Management Units that have a fall firearm wild turkey hunting season.
4. The opening date of the spring wild turkey hunting season was standardized to be April 25th every year. Previously the season opened April 25 unless that date fell on a weekend.
5. Shot size number 7 was approved for wild turkey hunting in addition to shot sizes 4, 5 and 6.
6. The minimum bow requirements for hunting wild turkey were clarified in the regulations to match the requirements for white-tailed deer (e.g. minimum draw weight and length).

Proposed Changes for 2019

Ontario recently consulted on proposed significant changes to hunting licenses, game seals and hunter reporting. If approved, the changes would lead to a single consolidated license document instead of separate physical licenses for each species, affect how and when an individual must attach a tag/game seal to a harvested animal, and require all hunters holding a tag to hunt game wildlife to report on their hunting activity and harvest (applies to moose, elk, white-tailed deer, black bear, wolf/coyote and wild turkey). Other related aspects of the proposal include use of QR codes with embedded information on licenses and tags, an option for hunters to print licenses and tags at home, and automatic tracking and enforcement of hunter reporting penalties. MNRF expects decisions on these proposals later this fall and construction of a new licensing system to deliver approved changes beginning in November 2018.

RESEARCH

MNRF initiated a research project on wild turkeys in winter 2016-17 in the Mixedwood Plains landscape east of Peterborough.

Objectives of the project are:

- 1) to evaluate several different methods for estimating turkey population size and distribution, including use of citizen science;
- 2) to evaluate demographics and resource use relative to an earlier study on the Bruce Peninsula, and
- 3) to examine some aspects of social behaviour and genetics of wild turkeys.

EMERGING OR EVOLVING ISSUES

MNRF has some concern about the use of hunting techniques like reaping and fanning as the approach is generally contrary to what we teach hunters about safe turkey hunting practices. Ontario would be interested to hear the experience of other jurisdictions as these techniques become more popular.

Some concern about avian pox being reported in more areas of the province and the potential implications for populations.

RELEVANT LINKS

Wild Turkey Manage Plan for Ontario (2007) - <https://www.ontario.ca/document/wild-turkey-management-plan-2007>

Ontario Hunting Regulation Summary - <https://www.ontario.ca/document/ontario-hunting-regulations-summary>

APPENDIX Z

SOUTH DAKOTA

SOUTH DAKOTA WILD TURKEY POPULATION STATUS REPORT – 2017

Midwest Wild Turkey Working Group Meeting – August–2017 Chariton, Iowa

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POPULATION STATUS

Three subspecies (eastern, Rio Grande, and Merriam’s turkeys) occur in the state at varying levels. Eastern turkeys are most common in the eastern riparian/cropland habitats. Rio Grande turkeys occur in smaller populations in eastern and south-central South Dakota. Merriam’s turkeys primarily occur west of the Missouri River in prairie riparian and ponderosa pine habitats.

We collect winter flock count data at winter concentration sites for each region of the state during January through March. Field staff attempt to find winter flocks throughout the region; each flock was counted for a total number birds and at least a subsample of birds were classified by gender and age (male versus female and subadult versus adult).

In 2016-17, the following were results for winter flock counts by region.

Region 1 Black Hills: 500 were classified by age and gender (99 adult male, 212 adult females, 70 juvenile males, and 119 juvenile females)

Region 1 Prairie: 0 were classified by age and gender (0 adult male, 0 adult females, 0 juvenile males, and 0 juvenile females)

Region 2: 17 were classified by age and gender (17 adult male, 0 adult females, 0 juvenile males, and 0 juvenile females)

Region 3: 100 were classified by age and gender (25 adult male, 42 adult females, 27 juvenile males, and 6 juvenile females)

Region 4: 290 were classified by age and gender (19 adult male, 110 adult females, 56 juvenile males, and 105 juvenile females)

Demographic Model for the Black Hills:

We also have a demographic prediction model based on previous research from the Black Hills. We have incorporated precipitation data and correlated that information with reproduction and poult survival. We have broken out the results by southern, central, and the northern Black Hills. This year we incorporated data from the first year of the northern Black Hills Merriam’s turkey study. The results for the 2016 models are presented below.

DEMOGRAPHIC MODEL RESULTS 2016

THE SOUTHERN BLACK HILLS MODEL

After running 100,000 simulations that asymptotic growth rate had a mean lambda of 1.19. The standard deviation was 0.15 (95% C.I. = 0.90-1.47).

THE CENTRAL BLACK HILLS MODEL

After running 100,000 simulations that asymptotic growth rate had a mean lambda of 0.97. The standard deviation was 0.12 (95% C.I. = 0.74-1.19).

THE NORTHERN BLACK HILLS MODEL

After running 100,000 simulations that asymptotic growth rate had a mean lambda of 0.76. The standard deviation was 0.11 (95% C.I. = 0.55-0.97).

MEAN LAMBDA FOR THE ENTIRE BLACK HILLS MODEL

Averaging the 3 areas for the Black Hills gives a mean lambda of 0.97. The standard deviation was 0.13 (95% C.I. = 0.73-1.21).

REPRODUCTION

From August 1 to September 30 we collected turkey brood survey data in West River counties outside of the Black Hills and throughout the Black Hills. Results of this survey are used in developing management and harvest strategies.

Total turkeys classified in the prairie were 370 hens and 976 young from 110 observations. Ratio of young/hen was 2.64 and the ratio of hens without broods/100 hens with broods was 18.21. A total of 94 broods were observed on the prairie resulting in a mean brood size of 3.42 +/- 0.46 (90% C.I.).

In the Black Hills, 555 hens and 1790 young were classified from 220 observations. Ratio of young/hen was 3.22 and the ratio of hens without broods/100 hens with broods was 20.92. A total of 195 broods were observed in the Black Hills resulting in a mean brood size of 4.52 +/- 0.31 (90% C.I.).

HARVEST

2016 Spring Turkey Season

In 2016, South Dakota Game, Fish, and Parks sold a total of 16,713 turkey hunting licenses (Fig. 1). Wild turkey harvest has declined from its peak but has stabilized over the last couple years (Fig. 2, 3). In spring, 2016, it was estimated that 5,272 wild turkeys were harvested with an increase in the Black Hills harvest (Fig. 3).

2016 Fall Turkey Season

Fall harvest on the prairie was reduced primarily by the state closing many units based on management objectives and only 246 turkeys were harvested (67 hens, 173 gobblers, 5 unknown). For mentored fall hunting, youth harvested 84 turkeys. In the Black Hills there were 84 turkey harvested (21 hens, 62 gobblers) with harvest remaining low due to objectives (Fig. 4).

HUNTING INCIDENTS

None to report.

REGULATION/LEGISLATION CHANGES

None to report.

RESEARCH

A research study on Merriam's turkeys in the northern Black Hills through Montana State University is now in its second year of study. This study has already provided needed vital rate information for modeling wild turkey population growth from the northern Black Hills, and will continue to provide more information this coming year.

A research study on eastern wild turkeys is in the first year of data collection for 2017 in Grant County South Dakota. This study has a graduate student from West Virginia University studying survival and reproduction of eastern turkeys. This study will collect needed vital rate data for turkeys in that area. We received a national NWTF research grant of \$16,000 for this study.

EMERGING OR EVOLVING ISSUES

A survey of spring turkey hunters is going to be conducted in 2017-18 statewide to determine if rifles are still valued and utilized by hunters during spring. In the past surveyed South Dakota hunters have been split 50:50 in whether they think rifles should be an option for spring hunting.

RELEVANT LINKS

The final Wild Turkey Management Plan for South Dakota has been completed and approved by the Commission for 2016-2020. This version differs markedly from the previous version with a more in-depth literature review, and a comprehensive approach to future management with specific objectives for each Region.

<http://gfp.sd.gov/hunting/big-game/turkey/wild-turkey-management-plan.aspx>

Fig. 1. Number of turkey licenses sold for the state of South Dakota from 1995-2016.

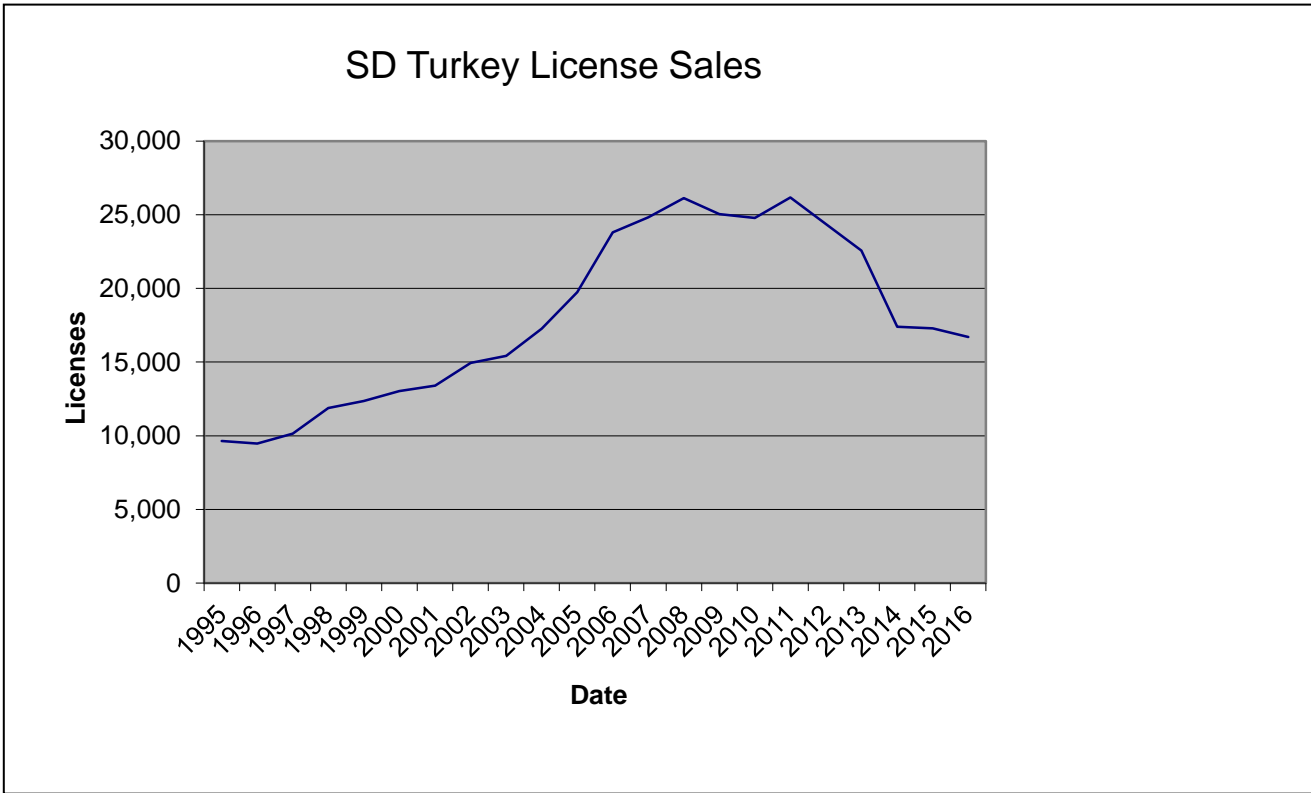


Fig. 2. State turkey harvest projections for South Dakota from 1995-2016.

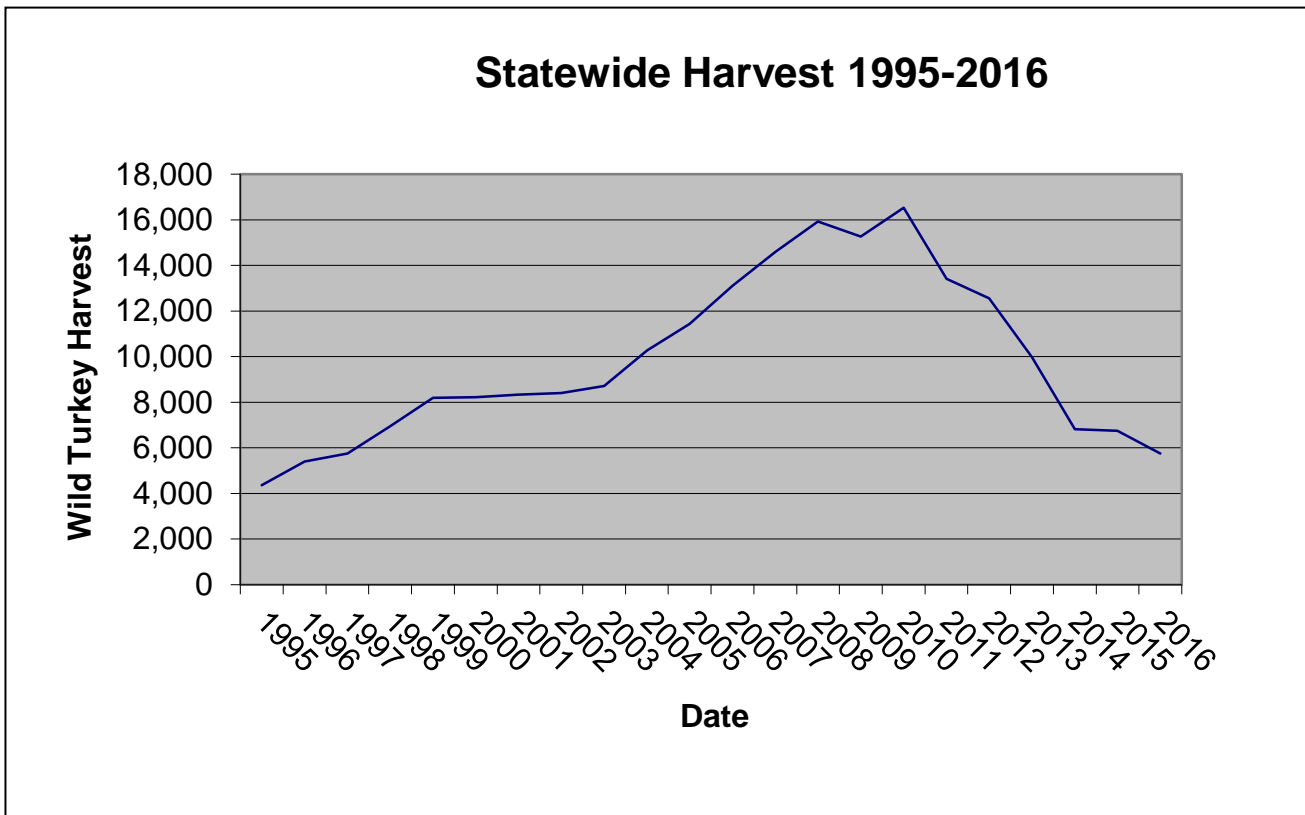


Fig. 3. Black Hills spring harvest projections from 1995-2016.

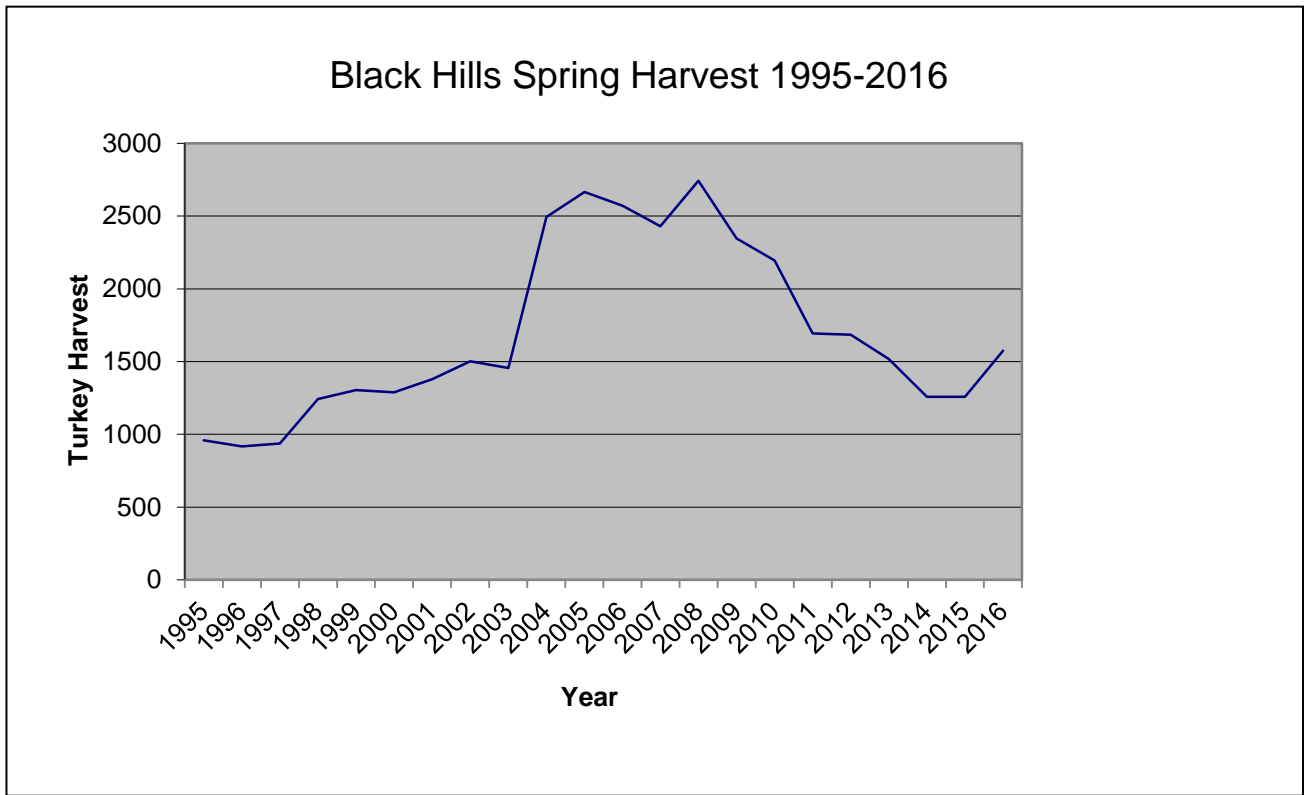
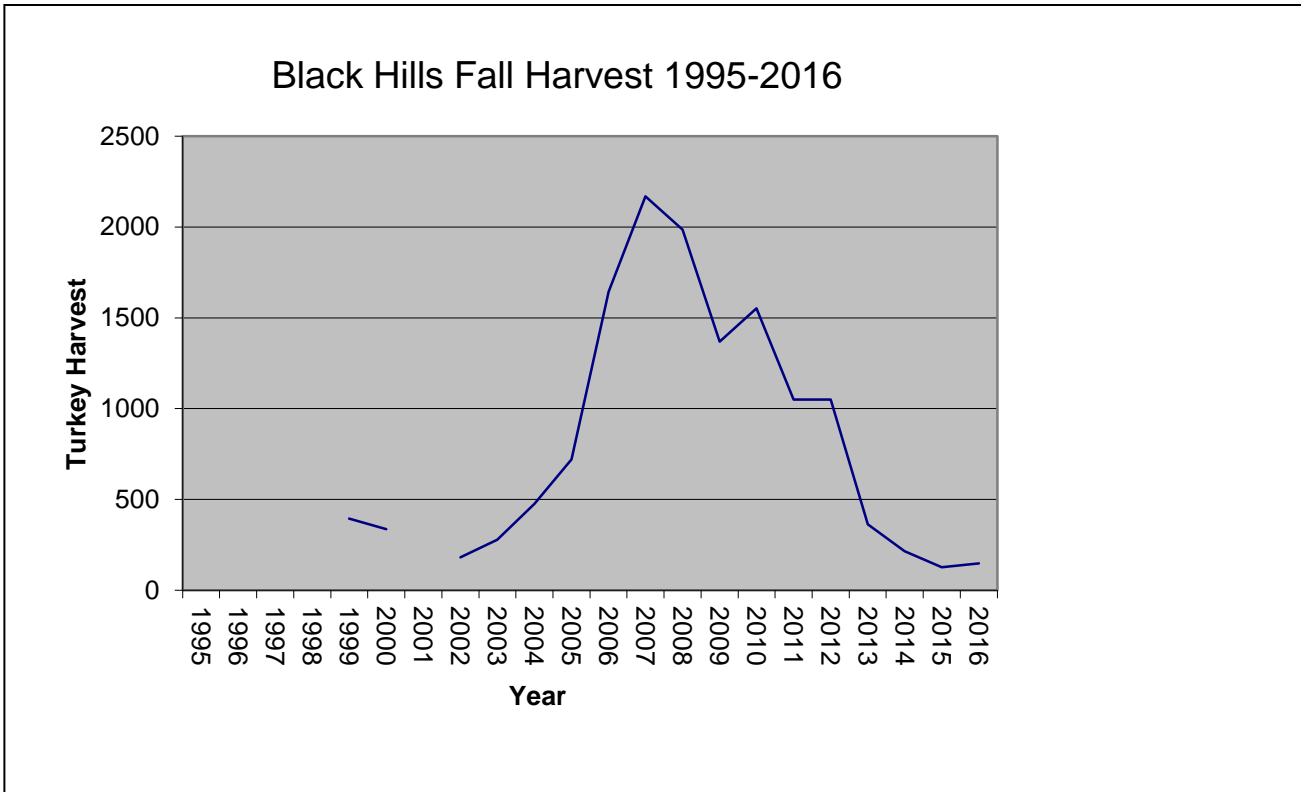


Fig. 4. Black Hills fall harvest projections from 1995-2016.



APPENDIX AA

WISCONSIN

WISCONSIN WILD TURKEY POPULATION STATUS REPORT – 2017

41st Midwest Wild Turkey Working Group Meeting – August 28-30, 2017 Honey Creek Resort State Park – Moravia, Iowa

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POPULATION STATUS

Wisconsin's wild turkey population expanded quickly from initial releases in 1976 in the southwestern part of the state, with the first spring season opening less than a decade after initial colonization in the area. Over the ensuing quarter century, turkeys and turkey hunting expanded into all 72 counties in Wisconsin. The first statewide spring season took place in 2006. The population appeared to stabilize in the last decade based on population indices, with a consistent annual harvest of about 41,000 birds per year since 2011.

REPRODUCTION

Brood surveys are conducted annually in Wisconsin, and run from mid-June thru mid-August. DNR field staff record observations of turkey and other gamebird broods opportunistically while out in the field conducting their daily work. In 2017, the number of turkey broods observed per hour increased by an estimated 47.8% over 2016. The average brood size observed, however, decreased from 4.5 poults/brood in 2016 to 4.1 poults/brood in 2017.

HARVEST

2017 Spring Turkey Season

For the 2017 spring turkey season, 212,456 permits were issued and 43,305 birds were harvested (a 4.8% decrease from 2016). Statewide permit success was 20.4% (uncorrected for participation). Percent adult toms harvested was 81.7%.

2016 Fall Turkey Season

For the 2016 fall turkey season, 67,906 permits were issued and 4,992 birds were harvested (2.6% increase from fall 2015). Of the birds harvested, 47% were gobblers and 53% were hens. Statewide permit success was 7.4% (uncorrected for participation).

HUNTING INCIDENTS

No turkey hunting incidents occurred in Wisconsin for the 2016 fall and 2017 spring seasons.

REGULATION/LEGISLATION CHANGES

A bill was introduced to end the fall turkey season on the same day as pheasant, archery deer, and fisher (trapping) seasons. The bill did not make it out of committee. In anticipation of the legislation, Wisconsin DNR did submit a rule change to make the last day of fall turkey season consistent with the other seasons previously mentioned; the rule is currently under legislative review.

RESEARCH

Wild Turkey Distribution and Patch Occupancy Across Northern Wisconsin

- Research on turkeys in northern WI has been sparse at best
 - Northern populations are well beyond historic range
 - Much of our knowledge originates from populations in the southern 2/3's of the state
 - Goal is to obtain a baseline understanding of the current distribution and potential mechanisms that influence turkey distribution (i.e., land cover composition and/or configuration) to help direct future management strategies
 - Using the updated Wiscland 2.0 land cover data layer, as well as CropScape data layers for analyses
- 4-year field study (2014-2017)
 - 136 survey routes in 2014
 - 21 additional routes added prior to 2015
 - 157 total survey routes for 2015-2017
 - Routes are located in all counties north of Hwy 8 (Turkey Management Zones 4, 6, & 7).
 - Each route surveyed ~3 times/year during late March – mid-May
 - 1,815 total surveys over 4 years
- Recently finished formatting data for analysis and have begun running the first round of occupancy models

Turkey Distribution and Patch Occupancy in Southeast Wisconsin

- Unlike much of the southern 2/3's of Wisconsin which is (very generally) an equal matrix of forest and agriculture, land cover in southeast Wisconsin predominantly consists of agriculture, and is also the most heavily populated (human population) portion of the state
- Yet, turkeys are common and hunters in this area (Turkey Management Zone 2) routinely have the highest spring harvest success rates
- Goal is to better understand how turkeys are distributed relative to the dispersion of (relatively little) forest cover

- Would lead to better informed decision making regarding how land cover attributes influence local turkey population densities and potentially how permit levels could influence local turkey densities and hunter densities, and vice versa
- 3-year field study (2016-2018)
 - 103 survey routes distributed across the southern half of Turkey Management Zone 2
- Wrapped up 2nd field season this past spring
- Similar to northern study, plan is to build occupancy models that account for imperfect detection to evaluate factors that influence turkey distribution.

EMERGING OR EVOLVING ISSUES

N/A

RELEVANT LINKS

N/A

MISCELLANEOUS

N/A