

WHITE-TAILED DEER MANAGEMENT SUMMARY 1993-2010

Conservation Program
J. W. Jones Ecological Research Center



"LAND OF THE SLEEPING DEER"¹

Introduction

At the beginning of the 20th century, white-tailed deer (*Odocoileus virginianus*) herds reached critically low numbers throughout their range. Protection, reintroduction and recovery has created secure and, in many situations, ecologically destructive deer herds. Today's management challenge is to bring deer herds back into balance with their habitat and manage these herds in a responsible manner. Ichauway represents an example of a deer herd that has been managed to remain within its ecological bounds. During the Woodruff era the deer herd recovered from near extirpation to a herd that was managed below its carrying capacity of 2.7-4.6 deer/km² (7-12 deer/mi² 1993 estimates). In 1993 the Joseph W. Jones Ecological Research Center at Ichauway developed a formal white-tailed deer management program to maintain and manage the herd.

Management Goals and Objectives

Ichauway's *management goal* is to safely maintain a deer herd to: minimize negative ecological impact, maximize population health, and keep the herd's influence at a sustainable level. Ichauway is managed in a holistic manner that avoids emphasizing one commodity or creature over all others. While whitetail management is an important component, it is only one factor of a larger inclusive management program for the property. Ichauway's management objectives are to maintain an even sex ratio with less than 5.8 deer/km² (ranging between 3.8-5.8 deer/km² or 10-15 deer/mile²). This translates approximately to one deer per 20 ha (~50 acres). These densities were inherited from historic management and have been

¹ Ichauway or *Isawaya* is derived from the Creek Indian language, meaning "crouching deer" or "sleeping deer".

maintained by the harvest and habitat management strategy outlined below.



Management Strategy

Harvest management Employees request the privilege to hunt an area which is assigned by the Natural Resource Manager. Hunters must attend a brief meeting before the hunting season and acquire state hunter safety certification. The hunter's preseason meeting reviews the herds status, safety considerations, rules and the implications of the management decisions they make when harvesting an animal. Hunters are required to sign in and record when and where they are hunting so potential safety conflicts can be avoided. Hunting hours are before 8 am and after 5 pm on work days and before 9 am and after 4 pm on weekends and holidays. From 1994 through the 2007 seasons each hunter had one free choice harvest either buck or doe. Otherwise, hunters were required to harvest 2 does before another buck was harvested. These harvest guidelines were adjusted for the 2008 season encouraging an even harvest of each sex with an emphasis on buck harvest. In previous seasons hunters were discouraged from taking button bucks (0.5 year old male fawns) by becoming members of a local fraternity, the Button Buck Club (BBC). After the 2007 season button bucks were considered antlerless deer removing the stigma. Hunters are allowed to harvest immature bucks but a quality management philosophy influences most buck harvest. As a precaution against poaching, and for individual safety, all shots are recorded at the check station.

Habitat management An ecosystem approach is utilized to manage Ichaaway. This holistic management strategy seeks to manage all components of the property and not emphasize one aspect over all others. Management is focused on utilizing prescribed fire in the uplands, creating a longleaf pine overstory and herbaceous understory, and rehabilitating degraded areas to desired conditions. The principle management tool is prescribed fire with most areas burned on a two year rotation. The deer herd is also influenced by restoration activities on the property.

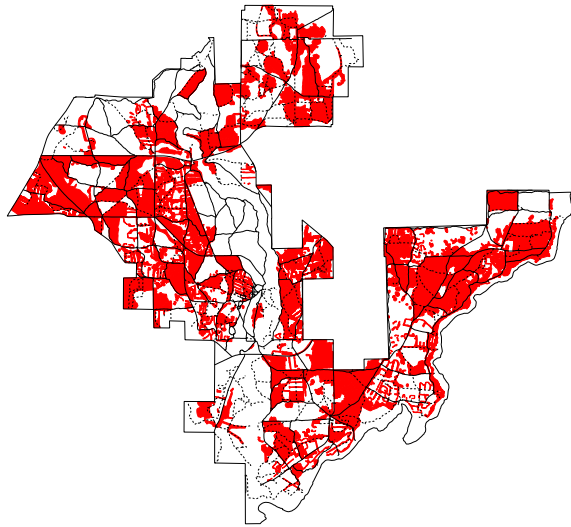


Figure 1: Hardwood removal (in red) on Ichaaway 1993-2009, 4,475+ ha (11,053+ acres) treated.

Hardwood removal Prior to 1993, hardwoods had encroached around wetlands, roads, urban areas, ring-around food plots, agricultural fields, and fire shadows along fire breaks. Since 1993, the Conservation staff and contract crews have removed 4,475+ ha (~11,053+ acres) of hardwoods (Figure 1). Hardwood removal is not complete and typically leaves 5-10 feet of hardwood basal area per acre. Hardwood mast is not seen as major driver of the whitetail herd.

Wildlife Plots A food plot program plants ≤ 20 ha (50 acres) of corn in 0.06 ha plots (~0.20 acres) to assist with harvest and supplement wildlife. Another 28 ha (70 acres) of peas, clover, and wheat are planted in early fall adjacent to the corn plots or in other isolated plots across the property. In 2009 corn was replaced by soybeans with marginal success. In 2010 corn was placed back into the foodplot rotation.

Methods:

Data Collection

Hunter effort Hunter sign-in information is recorded to identify hunter, location, timing and effort of hunters.

Harvest Once an animal is harvested it is carried to the check station where the Conservation staff record the following information: hunter, timing and duration of hunt, date, sex, weight (lbs), age, tail fat (1-5 scale; 1-poor, 5-fat), and any injuries or diseases. If a buck is harvested, information on the number of points and a gross green Boone and Crockett score is recorded. For harvested does, lactation is checked (Yes/No), late in the season a reproductive assessment is made on the ovaries and the uterus is checked for fetuses. Observations on each harvest record the following information: 1) location name and burn unit number; 2) number of bucks, does, fawns, or unidentified individuals seen during the hunt; 3) the individual who recorded the information. All jaw bones are checked for accuracy at the end of each season using standard tooth wear and replacement criteria. Each harvested individual and jaw bone is tagged with the harvest number, date and hunter.

Population indices Population parameters are monitored using several methods: spotlight counts, track counts, incidental observations and hunter observations. In fall 2008 a camera survey was initiated.

Spotlight count Beginning in 1992, two 12-mile spotlight transects were conducted across the property. From 1992 to 1999 these counts were done once a quarter for a total of 8 times a year. Offset distances were estimated to the nearest 10 yards. From 1999 to 2002 these transects were run a total of 4 times a year. Beginning in 2003 these same transects were run on six nights in March and September each year for a total of 12 times a year. In 2001 a digital range-finder and compass were employed to record distance, azimuth and offset to each observation. Since 2004 an infrared camera has been used to obtain a more accurate estimate of group size once animals are detected. From 1992-2006 a crew of 5 (1 driver, two spotters and two shiners) ran each transect beginning 20 minutes after dusk during uniform weather conditions. Two 1-million candle power lamps powered by 12 volt batteries were used to observe deer. Beginning in 2007 a Raytheon IR-250 Digital Infrared Camera is used for detecting and recording deer rather than spotlights. We plan to utilize this technique into the future due to the reduced man power and consistent ability to detect deer. All data have been analyzed using DISTANCE² software.

Track counts Beginning in 1994, 28 1-kilometer track count transects were distributed across the property. Transects are observed for three days in July and August

² <http://www.ruwpa.st-and.ac.uk/distance/>
Distance version 5.0 software used to analyze distance sampling surveys of wildlife populations.

each year and all tracks that intercept the line are recorded by species and location. From these counts an index of deer abundance can be estimated. Research on white-tailed deer populations of known density derived a conversion ratio of 1.6:1 tracks per km to deer per km² (Tyson 1959, and Daniels and Frels 1971). Using this ratio, an index in abundance can be derived for the deer herd.

Sex ratio Information on sex ratio is recorded from hunter stand observation records. Estimates of sex and doe to fawn ratio are derived.

Data and information management Prior to 1999 all deer information was managed in a spreadsheet format. In 2000 all data were Quality Assurance-checked, assimilated and migrated to SAS[®] datasets. Java-based programs were developed to provide data entry interfaces and to perform basic quality control on the datasets. SAS programs have also been developed to automate report generation to quickly summarize additional data.

Data Summaries

Hunter effort Hunter effort has remained relatively consistent through time. From 1994 to 2009, over 10,000 hours or 42 days per year were spent on the deer stand by an average of 60 hunters per year (Table 3). The 2010 season had the greatest number of hunters registered at 89. Roughly a third of all hunts each year occur in the morning and the remainder in the evening (Figure 3). Hunter effort is well dispersed across the property but could be intensified in some areas (Figure 4).

Harvest From the 1993-2007 seasons, the harvest goal of two does for every buck harvested were achieved (Figure 2). From 1994 to 2009, a total of 1572 deer (1084 does and 488 bucks) have been harvested with an average of 64 does harvested per season (range 11-94). Does in the 1.5 and 2.5 age classes typically compose 40-50% of the harvest (Figure 5). The low harvest in the 0.5 and 1.5 age classes is due to the sociological pressure of avoiding membership to the BBC. This is uncharacteristic of the standard J-shaped distribution of harvest seen on most properties with an indiscriminate harvest strategy. The age distribution from 1994-2007 seasons in Figure 6 were typically composed of 1.5, 2.5 and 3.5 year old does composed ~60% the harvest (Table 1). The decline in doe harvest and doe proportion of the sex ratio over the 2005-2007 seasons led to the need to adjust the harvest guidelines to 1M:1F harvest ratio beginning in the 2008 season. Emphasis on minimizing does harvest during the 2008 season was achieved with only 11 does harvested. Only 26 does were harvested in 2009 season. The reduced pressure on doe harvest should encourage recruitment, population growth, and evening of the sex ratio. The 2010 spotlight counts indicate that population increase has occurred.

Body weight The live body weight of all deer is recorded at the check station. Doe and buck weights plateau at maturity (2.5 years) with does weighing 120 lbs and bucks

| Season | Total Number of Does Harvested | Number of Does ≥ 3.5 Years of Age | Percent of Does ≥ 3.5 Years of Age |
|--------|--------------------------------|--|---|
| 2010 | 47 | 24 | 51 |
| 2009 | 26 | 6 | 23 |
| 2008 | 11 | 3 | 27 |
| 2007 | 53 | 15 | 28 |
| 2006 | 58 | 18 | 31 |
| 2005 | 63 | 11 | 17 |
| 2004 | 73 | 18 | 25 |
| 2003 | 66 | 24 | 36 |
| 2002 | 87 | 27 | 31 |
| 2001 | 80 | 24 | 30 |
| 2000 | 70 | 16 | 23 |
| 1999 | 61 | 15 | 25 |
| 1998 | 79 | 17 | 22 |
| 1997 | 70 | 15 | 21 |
| 1996 | 75 | 23 | 31 |
| 1995 | 71 | 21 | 30 |
| 1994 | 94 | 26 | 28 |
| 1993 | 30 | 9 | 30 |
| 1992 | 6 | 1 | 17 |

Table 1: Percentage of does ≥ 3.5 years of age.

just under 200 lbs on average. The increased variability in buck weight is due to when they are harvested relative to the rut. As can be seen in Figure 7 weights are very stable across all age classes (Table ??).

Herd health Each season a portion of the herd is found dead on the property and harvested individuals are checked for injury or disease (Table 6). Disease and injury of harvested deer is low across all years. This number is conservative in that an exhaustive search is not done on each harvested individual. Injuries are predominately found on bucks injured during the rut and are typically broken legs, crippled limbs or abscesses. Identified diseases are nasal bots; and in a couple of instances, epizootic hemorrhagic disease (EHD). A portion of animals found dead are killed in automobile collisions (Table 6). Tail fat score has been estimated on each harvested individual and shows that individuals are in average body condition (Table 7).

Doe harvest The consistently low percentage of does older than 3.5 years of age, is a consequence of the intensive doe harvest (Table 1, Figure 8). If the herd was expanding in size this proportion should increase as can be seen for the 2010 season when 51% of the does were ≥ 3.5 year of age. The reduced doe harvest in 2008 and 2009 lead to a greater proportion of the herd reaching 3.5 years of age. These percentages illustrate the consistent pressure placed on the doe segment of the herd.

Lactation The presence or absence of lactation provides evidence that a doe produced one or more fawns in the previous year. All does ≥ 2.5 years old should consistently

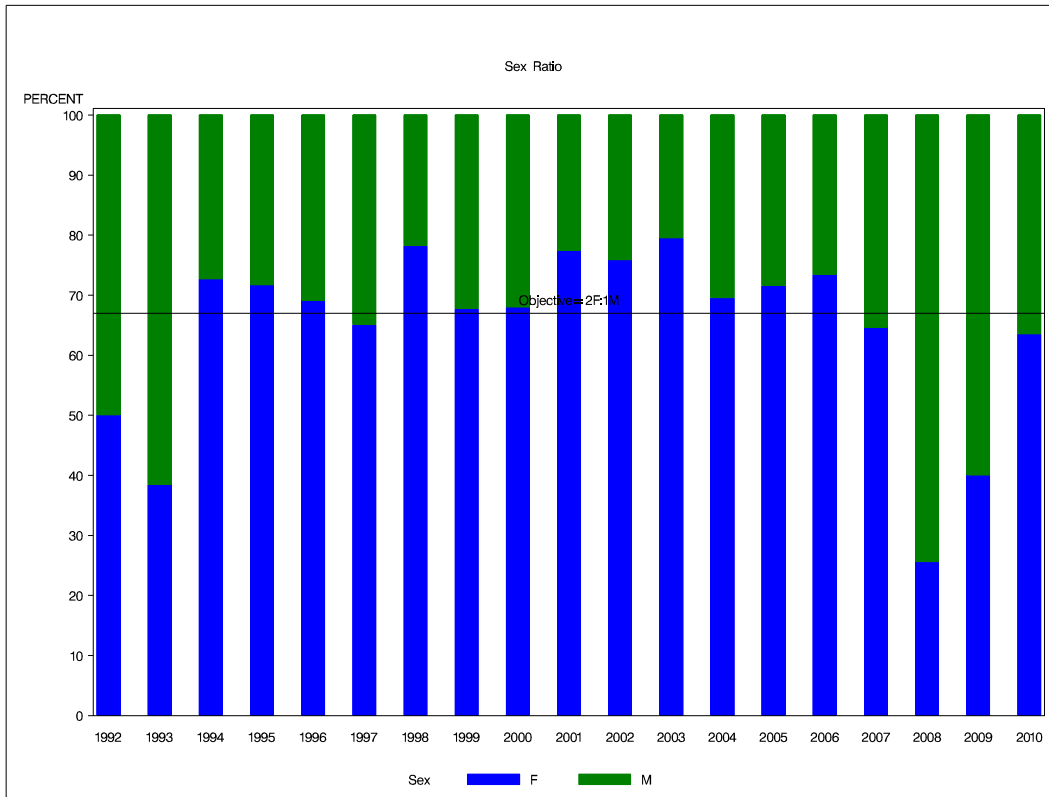


Figure 2: Sex ratio of harvested white-tailed deer by season at Ichauway.

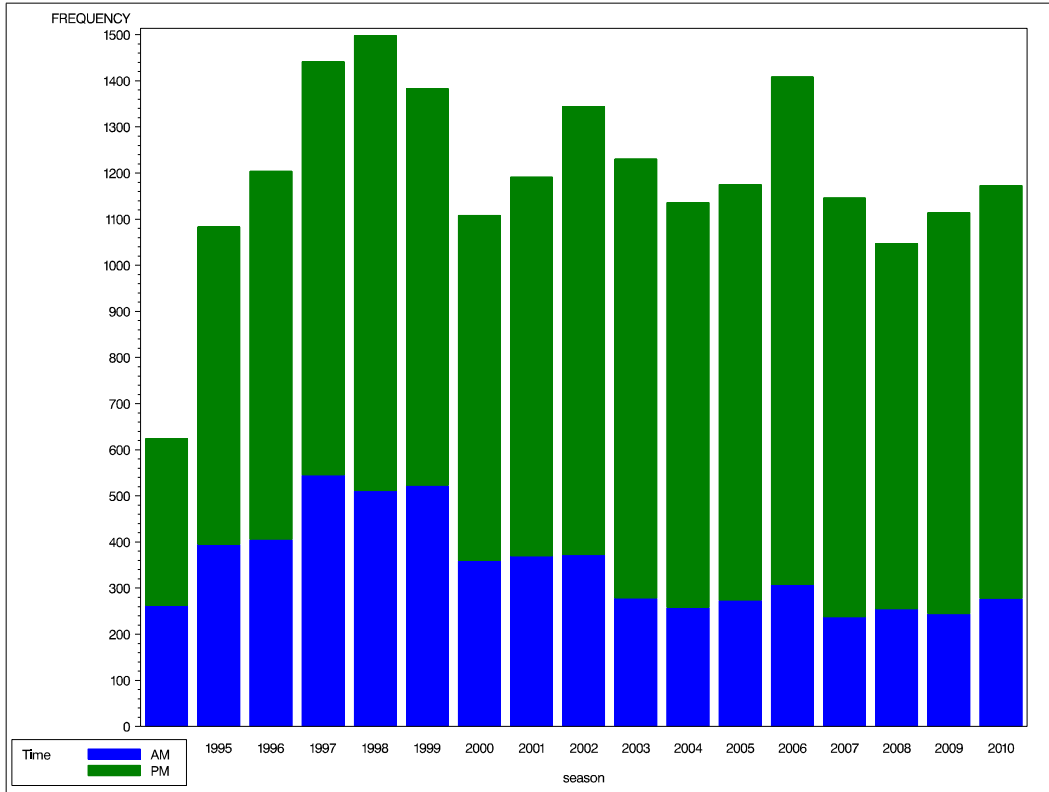


Figure 3: Timing of hunter effort by season at Ichauway.

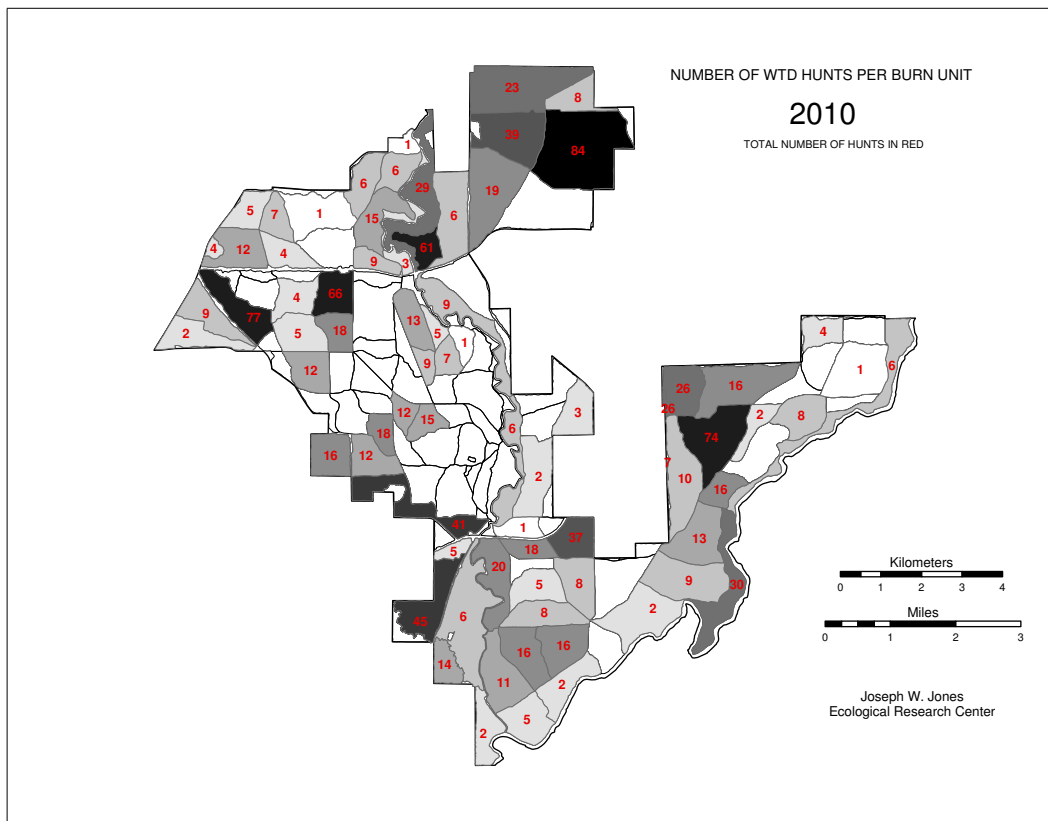


Figure 4: Total number of hunts per burn unit for the 2010 season.

produce twin fawns. If a doe is not lactating it either was not bred or produced young and lost its fawns to depredation, inexperience or weaned her fawns relative to the timing of harvest (Table 8). Yearling (1.5 year old) doe lactation rates are higher than normal with trends around 40%. In 2007 only 8% of the 1.5 year old does were found to be lactating at harvest which is the lowest percentage ever recorded. The 1.5 year old does that are bred were the first does born in the previous spring. The 1.5 year old lactating does most often do not produce and retain twins due to inexperience. Approximately 75% of the adult does are lactating when harvested (Figure 9). During the 2008 season an insufficient number of does were harvested to draw any trends. Breeding season often extends beyond two months in southwest Georgia.

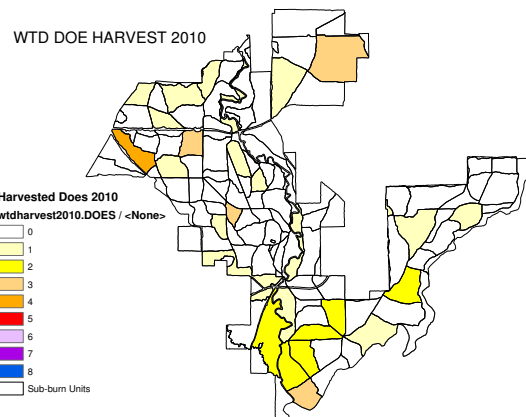


Figure 8: Map of doe harvest for the 2010 season.

Buck harvest The buck segment of the herd is managed for quality mature bucks, however there is no penalty for harvesting 1.5 year old bucks. All antlers are of typical form with a rare non-typical rack. A mature buck at 2.5 years averages a green BNC score of 96 (n=130 range 27-134). A 3.5 year buck averages a green BNC score of 119 (n=110, range 53-178). A 4.5 year buck averages a green BNC score of 120 (n=53, range 49-156). A 5.5+ year old buck averages a green BNC score of 124 (n=32, range 65-180). Antler characteristics have been consistent through time. The largest buck recorded was found dead at the end of the 2005 season with a gross BNC score of 180. Fifteen of the top 20

bucks harvested since 1993 have occurred since 2000. The basal diameter of 1.5 year old bucks averages 20mm (Table 12). This indicates forage available to the deer herd is of good to excellent quality and that the herd is not nutritionally limited. (Figure 10; Tables 9, 10 and 11).

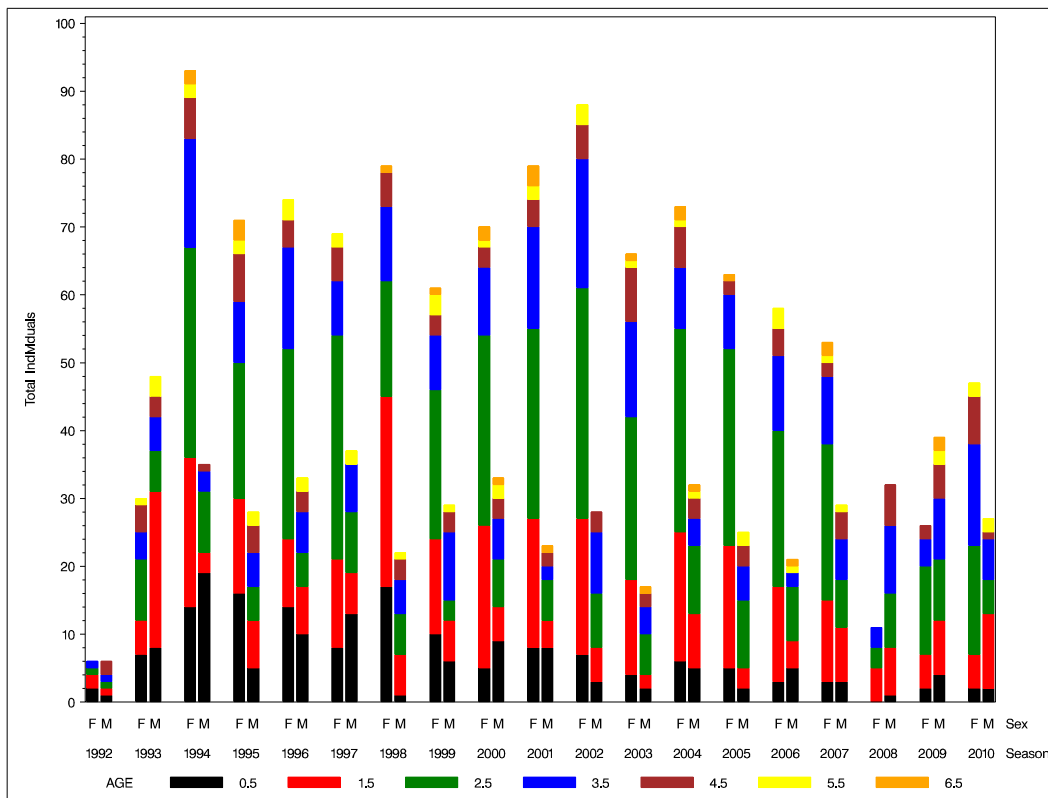


Figure 5: Age and sex distribution of white-tailed deer harvested at Ichauway. Each histogram bar represents a half year age class from 0.5 through 6.5 years of age.

Button bucks The BBC was initiated after the 1993 season in response to the hunting pressure placed on the buck fawn segment of the herd. Since its inception the proportion of button bucks has remained below our 10% objective averaging 6% from 1995-2010. (Figure 11). This club has served its purpose in moderating button buck harvest on Ichauway. Since the 2007 season button buck harvest has not incurred any penalties and is treated as an antlerless harvest.

Population Indices

Spotlight count The spotlight count trends prior to 2003 (Figure 12) are an artifact of sampling intensity and methodology rather than actual changes in the deer population. Since the winter of 2003 a more appropriate sampling intensity and methodology are being used to derive herd population estimates. Spotlight counts since 2004 indicate a flat trend with deer density averaging 12 deer per sq mile (range 7-18 deer per square mile). Due to the change in doe harvest population has increased approximately 50% since 2007 with the herd estimate of 930 individuals in the winter of 2010.

Track counts Track counts represent an index of deer abundance on Ichauway over the past 15 years (Figure 13). From tracks counts each summer, the herd appears to be relatively stable with an estimate of 13-17 deer/square mile.

Track count trend estimates show a positive relationship with the index growing annually at 2.2% from 1994-2004. This translates to an additional 12 animals in a herd of 600. Further examination of track count trends showed a positive relationship in track density on the southern end of the property, with track counts declining as you moved north. This is likely due to the refuge the river and creek hammocks provide that dominate the south end of the property.

Sex ratio Sex ratio appears to be declining with fewer does than bucks when all deer stand observations are pooled together (Table 2). The sex ratio in 2001 and 2002 is 1M:1F with a declining trend to the present season with more bucks than does 1M:0.72F (5 year average). Also doe to fawn ratios are relatively stable with 2 does for every fawn since 2001. Null observations where no deer are seen during a hunt remain stable at 53% since 2001. Sex ratios appear to have initially responded to the low does harvest in 2008 and 2009 with a 1M:1F sex ratio. This will need to be monitored and substantiated over the following seasons.

Conclusions:

Future Directions for Management

The 2009 season harvest regulations retained the 2008 harvest guidelines to minimize doe harvest with an even harvest sex ratio. With only 26 does harvested this should

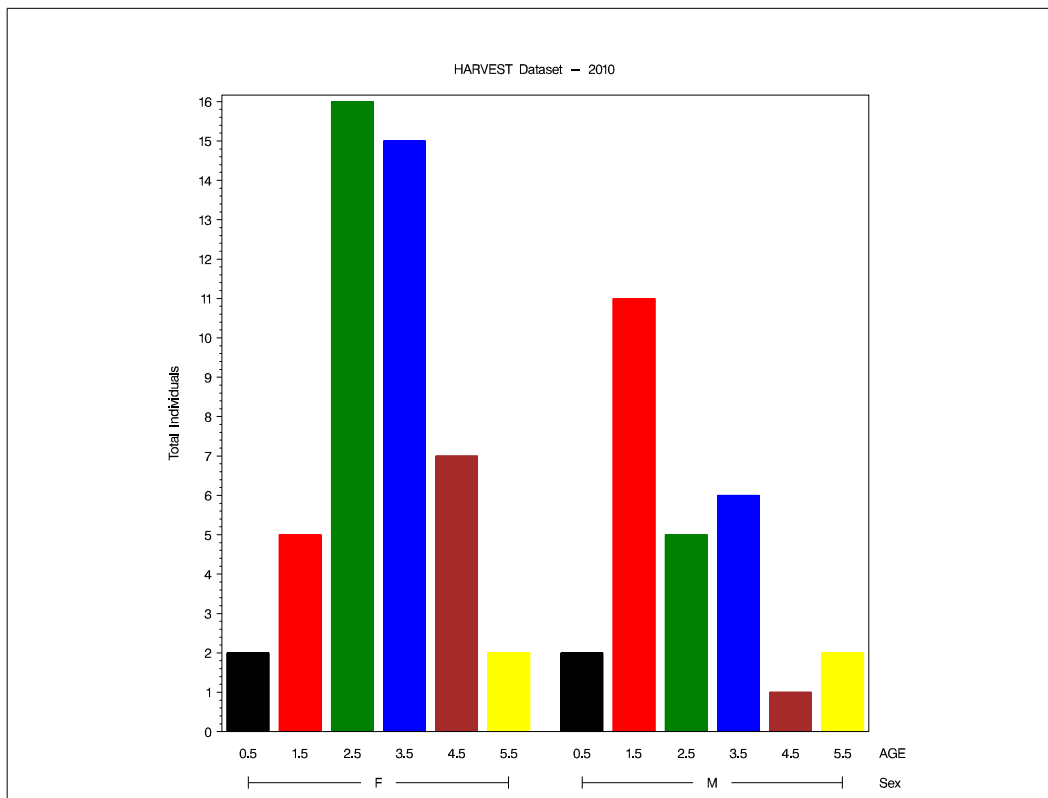


Figure 6: Age distribution of white-tailed deer harvested at Ichauway 2010 season.

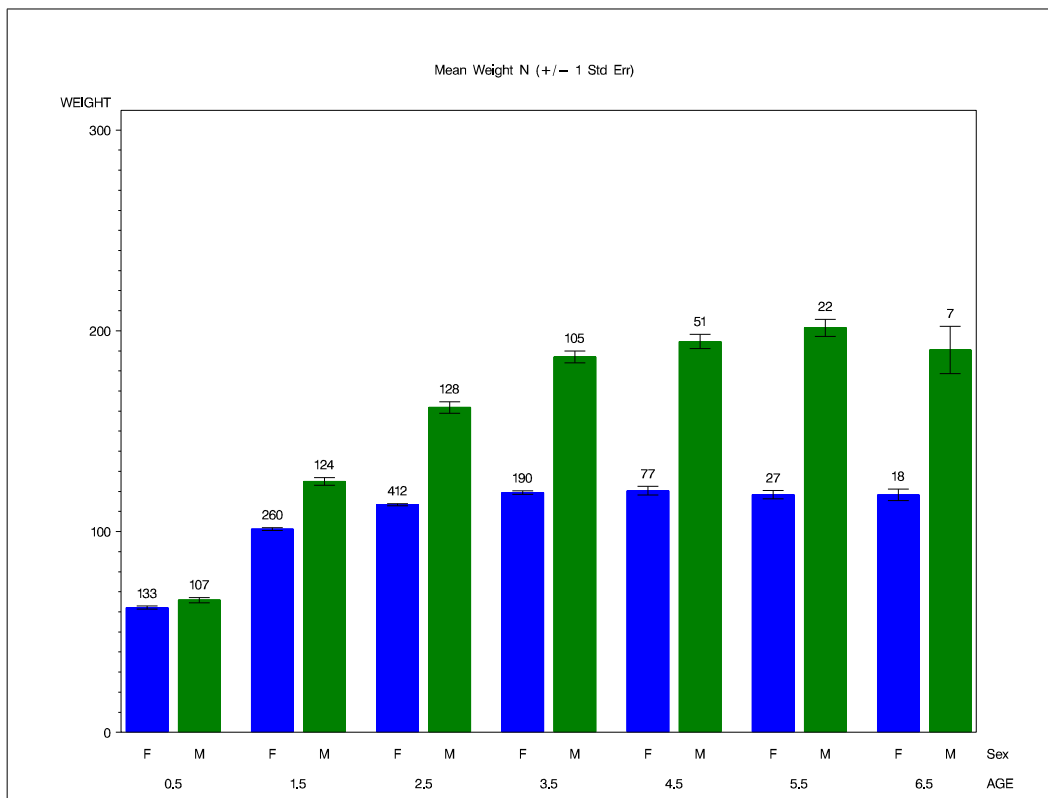


Figure 7: Body weights for all half year age classes from 1992-2010 season.

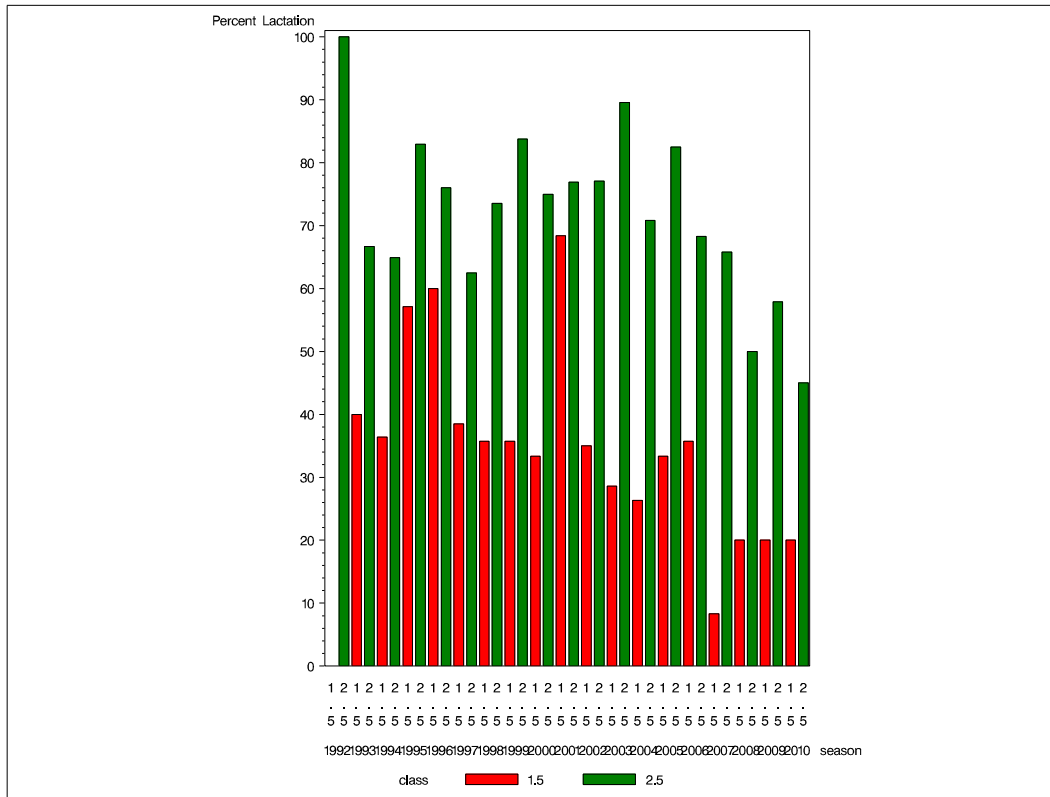


Figure 9: Percent lactation of does in the 1.5 age class and all mature does ≤ 2.5 year of age at Ichauway.

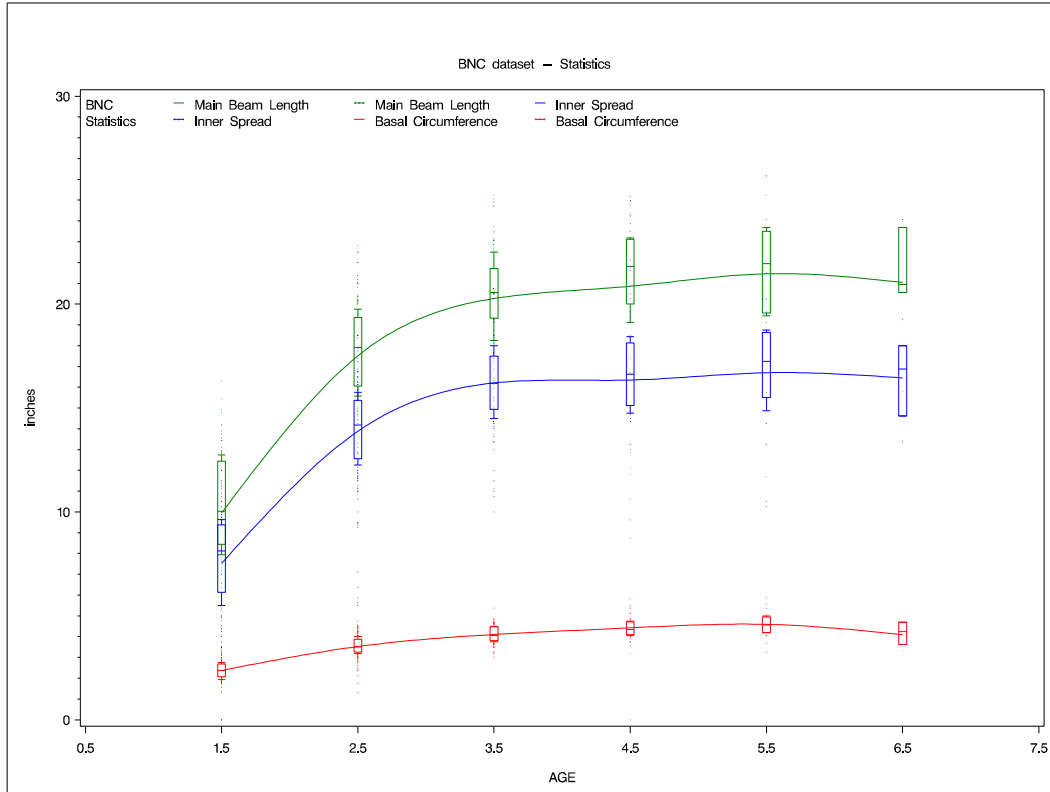


Figure 10: Main beam, inside spread and basal circumference from green Boone and Crocket measurements at Ichauway.

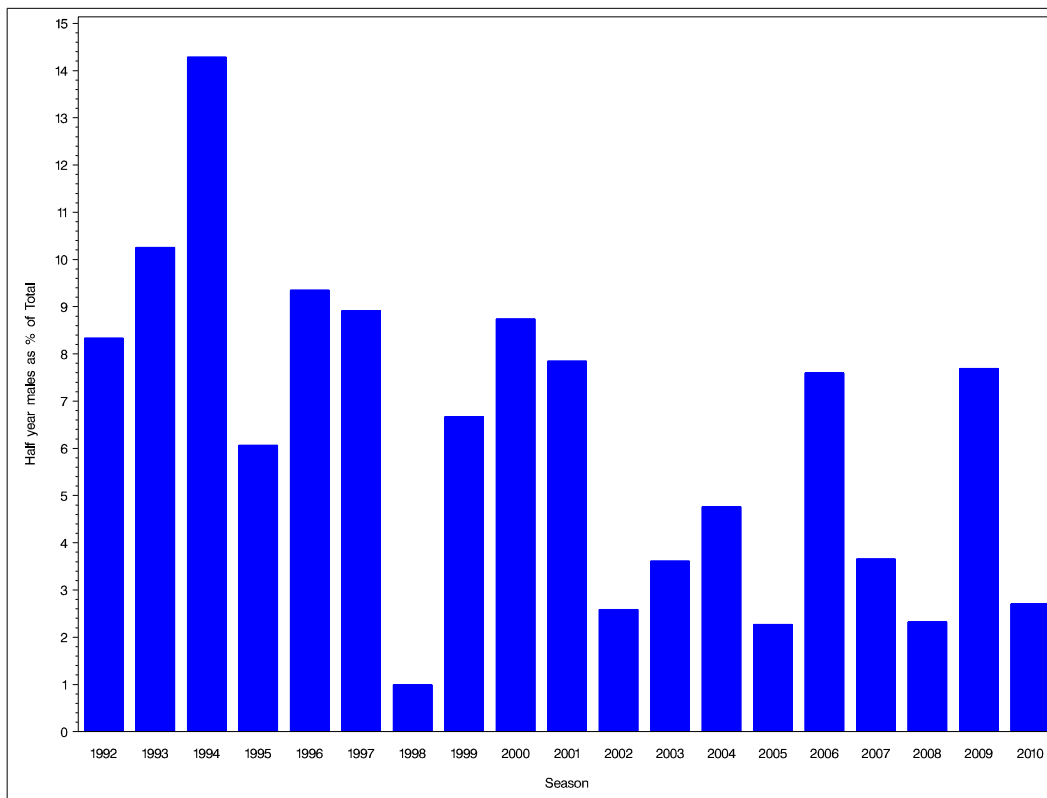


Figure 11: Percent of half year males (button bucks) taken in each harvest year.

accelerate population recruitment and aid transition to a 1:M:1F harvest strategy. The 2010 season saw heavier doe harvest but population estimates and herd indices show expansion and recovery of the population well above 15 deer per square mile. Monitoring populations dynamics will be critical to guide harvest strategy in response to this change in harvest management in the season ahead. Finally, Conservation staff will continue to refine protocols and develop more efficient methods to collect information on the deer herd.

Management Guidelines The deer population has responded to reduced doe harvest with a 50% population increase since 2007. Given the estimate of ~20 deer/square mile, the following harvest guidelines can be derived. Ichauway is ~45 sq miles \cong 930 deer with sex ratio roughly of 1 buck for every 0.81 does(5 year average) \cong 376 does in the population. Typical population models project that 25% of a population should be removed for population growth to remain flat. This translates to the need for approximately 94 does to be removed from the population each year to maintain no population growth. This includes the natural depredation of fawns or mature does due to injury, disease or old age removed from the population. The herd has responded to the reduction in doe harvest for 2008 and 2009 and now can sustain greater harvest of does. With a 50% growth in the overall population it is time to increase the doe harvest to begin controlling the herds impact on the property. The goal of the 2011 season should be to remove between

70-80 does from the population to moderate herd population growth. Since 1994, the hunters at Ichauway have successfully managed to keep the deer population in check and may have contributed skewing the sex ratio against does. Reduced harvest in some years can be attributed to population dynamics due to numerous associated factors such as droughts, fawn predation, increased incidence of road kills, and mast crop failures (1998 and 2002 seasons). Deer populations are dynamic and the harvest at Ichauway has followed the herd's trends over the past 16 years.

Economic value Deer leases in southwest Georgia have increased dramatically over the past ten years. As southwest Georgia's reputation for a high quality white-tailed deer herd has spread, deer leases have appreciably increased. Deer leases that were once 3-5 dollars an acre have increased to 10-15 dollars an acre.

Management considerations The dispersion and hunter pressure could be adjusted to place more pressure on a few areas with historically low hunting pressure. Poaching should be reduced by further securing boundaries with adequate fencing on public rights-of-way and a closed gate policy. Also, a renewed vigilance to established protocols and inspection of animals for disease or injury should be applied.

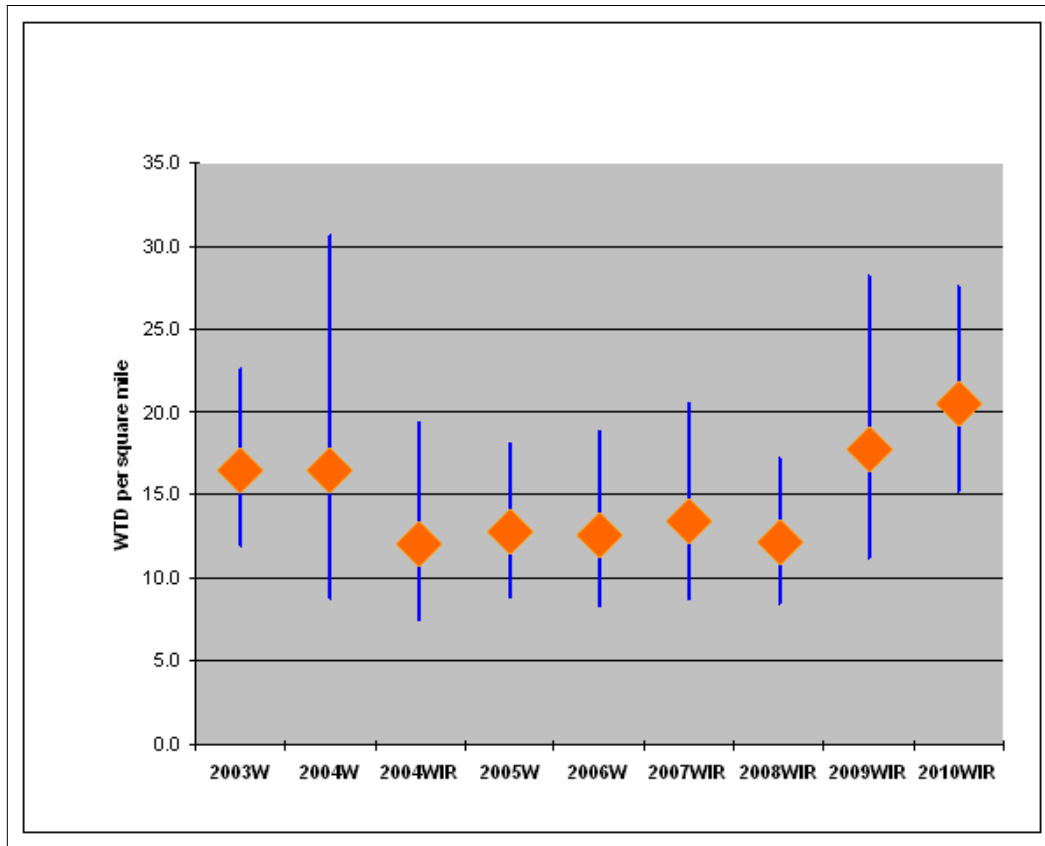


Figure 12: Spotlight count estimates of white-tailed deer density per square mile at Ichauway with 95% C.I.

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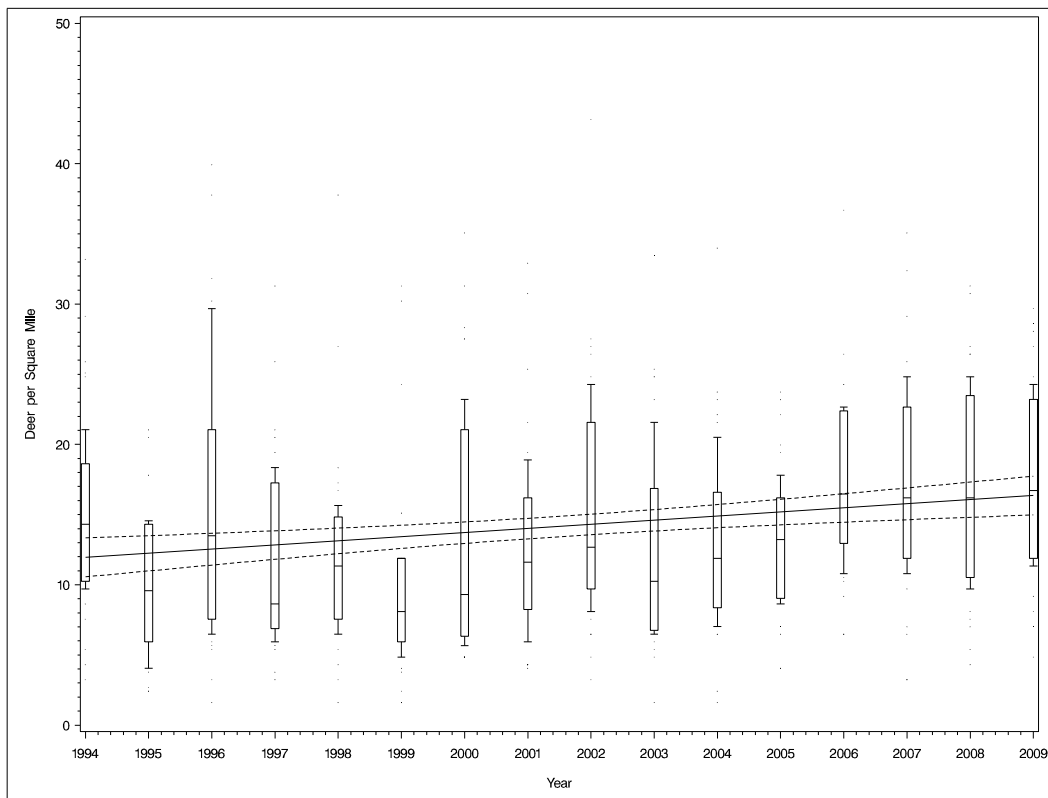


Figure 13: Track count estimate of white-tailed deer abundance per square mile at Ichauway with 95% C.I.

| Season | Hunts | Hunt Hours | Male:Female Ratio | Doe:Fawn Ratio | % of Hunts No Deer Observed |
|--------|-------|------------|-------------------|----------------|-----------------------------|
| 2001 | 269 | 364 | 0.94 | 1.76 | 65.4 |
| 2002 | 230 | 311 | 0.97 | 1.11 | 57.0 |
| 2003 | 123 | 156 | 0.46 | 2.13 | 48.8 |
| 2004 | 236 | 326 | 0.86 | 2.34 | 45.3 |
| 2005 | 269 | 361 | 0.76 | 2.46 | 53.9 |
| 2006 | 307 | 410 | 0.84 | 2.00 | 56.0 |
| 2007 | 312 | 398 | 0.68 | 1.75 | 60.3 |
| 2008 | 234 | 306 | 1.07 | 2.66 | 37.2 |
| 2009 | 208 | 278 | 0.63 | 1.60 | 52.9 |
| 2010 | 230 | 320 | 0.84 | 2.31 | 43.5 |
| | 242 | 323 | 0.80 | 2.01 | 52.0 |

Table 2: Sex and doe to fawn ratio from stand observations by year at Ichauway.

Appendices**A Hunter Effort and Harvest per Season**

Table 3: Hunter effort and harvest per season.

| Season | AM | PM | Does Harvested | Bucks Harvested | Season Harvest | Hunters Per Season | Total Hunts Per Season | Hunts Per Hunter |
|--------|-----|------|----------------|-----------------|----------------|--------------------|------------------------|------------------|
| 2010 | 277 | 896 | 47 | 27 | 74 | 89 | 1173 | 13.2 |
| 2009 | 244 | 870 | 26 | 39 | 65 | 82 | 1114 | 13.6 |
| 2008 | 254 | 793 | 11 | 32 | 43 | 79 | 1047 | 13.3 |
| 2007 | 237 | 909 | 53 | 29 | 82 | 75 | 1146 | 15.3 |
| 2006 | 307 | 1101 | 58 | 21 | 79 | 72 | 1408 | 19.6 |
| 2005 | 273 | 902 | 63 | 25 | 88 | 69 | 1175 | 17.0 |
| 2004 | 257 | 879 | 73 | 32 | 105 | 69 | 1136 | 16.5 |
| 2003 | 278 | 952 | 66 | 17 | 83 | 67 | 1230 | 18.4 |
| 2002 | 372 | 972 | 87 | 28 | 115 | 70 | 1344 | 19.2 |
| 2001 | 369 | 822 | 80 | 23 | 103 | 63 | 1191 | 18.9 |
| 2000 | 359 | 749 | 70 | 33 | 103 | 57 | 1108 | 19.4 |
| 1999 | 522 | 861 | 61 | 29 | 90 | 58 | 1383 | 23.8 |
| 1998 | 511 | 987 | 79 | 22 | 101 | 65 | 1498 | 23.0 |
| 1997 | 545 | 896 | 70 | 37 | 107 | 53 | 1441 | 27.2 |
| 1996 | 405 | 799 | 75 | 33 | 108 | 49 | 1204 | 24.6 |
| 1995 | 395 | 688 | 71 | 28 | 99 | 46 | 1083 | 23.5 |
| 1994 | 262 | 362 | 94 | 33 | 127 | 28 | 624 | 22.3 |

B White-tailed Deer Harvest 2010

Table 4: White-tailed deer harvest 2010.

| Season | Sex | Age | Whitetail Deer Harvested | Non harvested Dead |
|--------|-----|-----|--------------------------------|--------------------------|
| 2010 | F | 0.5 | 2 | 1 |
| | | 1.5 | 5 | 0 |
| | | 2.5 | 16 | 1 |
| | | 3.5 | 15 | 0 |
| | | 4.5 | 7 | 0 |
| | | 5.5 | 2 | 0 |
| 2010 | F | | 47 | 2 |
| | M | 0.5 | 2 | 0 |
| | | 1.5 | 11 | 2 |
| | | 2.5 | 5 | 1 |
| | | 3.5 | 6 | 0 |
| | | 4.5 | 1 | 0 |
| | | 5.5 | 2 | 0 |
| 2010 | M | | 27 | 3 |

C Average Live Body Weights for All Harvested Animals

Table 5: Average live body weights for all animals harvested in lbs.

| Season | Age | Sex | Annual | | | Cumulative | | | Annual vs. Cumulative Mean Difference |
|--------|-----|-----|--------|--------|-----------|------------|--------|-----------|---------------------------------------|
| | | | N | Mean | Std. Dev. | N | Mean | Std. Dev. | |
| 2010 | 0.5 | F | 2 | 52.00 | 14.14 | 133 | 62.10 | 9.44 | -10.10 |
| | | M | 2 | 84.00 | 8.49 | 107 | 65.82 | 11.46 | 18.18 |
| | 1.5 | F | 5 | 102.40 | 13.15 | 260 | 101.25 | 10.76 | 1.15 |
| | | M | 11 | 121.82 | 12.03 | 124 | 124.95 | 16.57 | -3.13 |
| | 2.5 | F | 16 | 110.75 | 9.82 | 412 | 113.35 | 10.80 | -2.60 |
| | | M | 5 | 167.20 | 17.37 | 128 | 161.81 | 22.88 | 5.39 |
| | 3.5 | F | 15 | 122.67 | 13.70 | 190 | 119.43 | 12.79 | 3.24 |
| | | M | 6 | 172.33 | 18.34 | 105 | 186.93 | 38.13 | -14.60 |
| | 4.5 | F | 7 | 119.14 | 17.10 | 77 | 120.34 | 13.84 | -1.19 |
| | | M | 1 | 144.00 | | 51 | 194.69 | 26.25 | -50.69 |
| 5.5 | F | 2 | 122.00 | 9.90 | 27 | 118.37 | 11.15 | 3.63 | |
| | M | 2 | 183.00 | 12.73 | 22 | 201.50 | 20.91 | -18.50 | |
| 2009 | 0.5 | F | 2 | 62.00 | 14.14 | 131 | 62.25 | 9.35 | -0.25 |
| | | M | 4 | 58.00 | 10.46 | 105 | 65.48 | 11.29 | -7.48 |
| | 1.5 | F | 5 | 105.00 | 5.83 | 255 | 101.23 | 10.74 | 3.77 |
| | | M | 8 | 128.50 | 13.98 | 113 | 125.26 | 16.90 | 3.24 |
| | 2.5 | F | 13 | 108.62 | 11.99 | 396 | 113.45 | 10.84 | -4.84 |
| | | M | 9 | 145.78 | 28.43 | 123 | 161.59 | 23.13 | -15.82 |
| | 3.5 | F | 4 | 118.75 | 8.38 | 175 | 119.15 | 12.72 | -0.40 |
| | | M | 9 | 167.22 | 23.99 | 99 | 187.82 | 38.23 | -20.60 |
| | 4.5 | F | 2 | 115.00 | 4.24 | 70 | 120.46 | 13.59 | -5.46 |
| | | M | 5 | 179.60 | 14.79 | 50 | 195.70 | 25.50 | -16.10 |
| 5.5 | M | 2 | 187.50 | 3.54 | 20 | 203.35 | 20.90 | -15.85 | |
| | M | 2 | 179.00 | 8.49 | 7 | 190.43 | 18.47 | -11.43 | |
| 2008 | 0.5 | M | 1 | 53.00 | | 101 | 65.77 | 11.23 | -12.77 |
| | | F | 5 | 95.20 | 17.53 | 250 | 101.15 | 10.81 | -5.95 |
| | 1.5 | M | 7 | 130.14 | 5.08 | 105 | 125.01 | 17.16 | 5.13 |
| | | F | 3 | 107.33 | 4.16 | 383 | 113.62 | 10.78 | -6.28 |
| | 2.5 | M | 8 | 139.00 | 59.01 | 114 | 162.84 | | -23.84 |
| | | F | 3 | 121.67 | 7.64 | 171 | 119.16 | 12.82 | 2.50 |
| | 3.5 | M | 10 | 172.50 | 31.97 | 90 | 189.88 | 38.38 | -17.38 |
| | | M | 6 | 184.67 | 25.13 | 45 | 197.49 | 25.96 | -12.82 |
| 2007 | 0.5 | F | 3 | 66.67 | 10.07 | 129 | 62.26 | 9.34 | 4.41 |
| | | M | 3 | 64.33 | 6.66 | 100 | 65.90 | 11.20 | -1.57 |
| | 1.5 | F | 12 | 105.00 | 8.24 | 245 | 101.27 | 10.65 | 3.73 |
| | | M | 8 | 120.88 | 13.59 | 98 | 124.64 | 17.73 | -3.77 |
| | 2.5 | F | 23 | 114.13 | 11.33 | 380 | 113.67 | 10.80 | 0.46 |
| | | M | 7 | 162.29 | 22.47 | 106 | 164.64 | 22.11 | -2.36 |
| | 3.5 | F | 10 | 122.60 | 15.20 | 168 | 119.12 | 12.90 | 3.48 |
| | | M | 6 | 197.83 | 18.38 | 80 | 192.05 | 38.20 | 5.78 |
| | 4.5 | F | 2 | 126.50 | 6.36 | 68 | 120.62 | 13.73 | 5.88 |
| | | M | 4 | 177.75 | 21.23 | 39 | 199.46 | 25.87 | -21.71 |
| 5.5 | F | 1 | 98.00 | | 25 | 118.08 | 11.39 | -20.08 | |
| | M | 1 | 215.00 | | 18 | 205.11 | 21.38 | 9.89 | |
| 6.5 | F | 2 | 118.00 | 11.31 | 18 | 118.28 | 12.51 | -0.28 | |
| | F | 3 | 53.67 | 8.74 | 126 | 62.15 | 9.34 | -8.48 | |
| 2006 | 0.5 | M | 5 | 66.80 | 7.29 | 97 | 65.95 | 11.32 | 0.85 |
| | | F | 14 | 94.71 | 12.78 | 233 | 101.08 | 10.74 | -6.37 |
| | 1.5 | M | 4 | 106.25 | 22.51 | 90 | 124.98 | 18.00 | -18.73 |
| | | F | 23 | 109.04 | 9.39 | 357 | 113.64 | 10.78 | -4.59 |

Continued on next page

Table 5

| Season | Age | Sex | Annual | | | Cumulative | | | Annual vs. Cumulative Mean Difference |
|--------|-----|-----|--------|--------|-----------|------------|--------|-----------|---------------------------------------|
| | | | N | Mean | Std. Dev. | N | Mean | Std. Dev. | |
| | | M | 8 | 162.00 | 18.05 | 99 | 164.81 | 22.15 | -2.81 |
| | 3.5 | F | 11 | 112.18 | 16.24 | 158 | 118.90 | 12.77 | -6.72 |
| | | M | 2 | 160.00 | 5.66 | 74 | 191.58 | 37.58 | -31.58 |
| | 4.5 | F | 4 | 125.50 | 14.55 | 66 | 120.44 | 13.90 | 5.06 |
| | 5.5 | F | 3 | 120.33 | 8.50 | 24 | 118.92 | 10.80 | 1.42 |
| | | M | 1 | 182.00 | | 17 | 204.53 | 21.91 | -22.53 |
| | 6.5 | M | 1 | 148.00 | | 5 | 195.00 | 23.26 | -47.00 |
| 2005 | 0.5 | F | 5 | 64.00 | 13.69 | 123 | 62.36 | 9.28 | 1.64 |
| | | M | 2 | 76.00 | 0.00 | 92 | 65.90 | 11.53 | 10.10 |
| | 1.5 | F | 18 | 97.11 | 10.23 | 219 | 101.49 | 10.50 | -4.38 |
| | | M | 3 | 121.33 | 8.50 | 86 | 125.85 | 17.23 | -4.52 |
| | 2.5 | F | 29 | 111.69 | 8.39 | 334 | 113.95 | 10.81 | -2.26 |
| | | M | 10 | 147.60 | 54.04 | 91 | 165.05 | | -17.45 |
| | 3.5 | F | 8 | 116.00 | 6.30 | 147 | 119.40 | 12.39 | -3.40 |
| | | M | 5 | 195.80 | 25.01 | 72 | 192.46 | 37.68 | 3.34 |
| | 4.5 | F | 2 | 129.50 | 0.71 | 62 | 120.11 | 13.95 | 9.39 |
| | | M | 3 | 212.67 | 20.53 | 35 | 201.94 | 25.47 | 10.72 |
| | 5.5 | M | 2 | 206.50 | 12.02 | 16 | 205.94 | 21.84 | 0.56 |
| | 6.5 | F | 1 | 108.00 | | 16 | 118.31 | 13.03 | -10.31 |
| 2004 | 0.5 | F | 6 | 63.17 | 7.33 | 118 | 62.29 | 9.13 | 0.88 |
| | | M | 5 | 71.20 | 9.83 | 90 | 65.68 | 11.59 | 5.52 |
| | 1.5 | F | 19 | 95.58 | 13.24 | 201 | 101.88 | 10.45 | -6.30 |
| | | M | 8 | 107.50 | 19.69 | 83 | 126.01 | 17.43 | -18.51 |
| | 2.5 | F | 30 | 108.27 | 12.46 | 305 | 114.17 | 11.00 | -5.90 |
| | | M | 10 | 167.00 | 19.22 | 81 | 167.21 | 23.09 | -0.21 |
| | 3.5 | F | 9 | 120.78 | 13.07 | 139 | 119.60 | 12.63 | 1.18 |
| | | M | 4 | 203.75 | 10.31 | 67 | 192.21 | 37.09 | 11.54 |
| | 4.5 | F | 6 | 110.33 | 18.64 | 60 | 119.80 | 14.12 | -9.47 |
| | | M | 3 | 206.67 | 17.56 | 32 | 200.94 | 25.91 | 5.73 |
| | 5.5 | F | 1 | 113.00 | | 21 | 118.71 | 11.27 | -5.71 |
| | | M | 1 | 220.00 | | 14 | 205.86 | 23.33 | 14.14 |
| | 6.5 | F | 2 | 120.50 | 20.51 | 15 | 119.00 | 13.23 | 1.50 |
| | | M | 1 | 191.00 | | 4 | 206.75 | 7.21 | -15.75 |
| 2003 | 0.5 | F | 4 | 68.00 | 3.92 | 112 | 62.24 | 9.24 | 5.76 |
| | | M | 2 | 64.00 | 2.83 | 85 | 65.35 | 11.69 | -1.35 |
| | 1.5 | F | 14 | 105.07 | 9.92 | 182 | 102.54 | 9.93 | 2.53 |
| | | M | 2 | 124.00 | 5.66 | 75 | 127.99 | 15.47 | -3.99 |
| | 2.5 | F | 24 | 111.08 | 10.66 | 275 | 114.81 | 10.66 | -3.73 |
| | | M | 6 | 163.83 | 22.15 | 71 | 167.24 | 23.69 | -3.41 |
| | 3.5 | F | 14 | 118.57 | 9.94 | 130 | 119.52 | 12.65 | -0.94 |
| | | M | 4 | 215.00 | 20.41 | 63 | 191.48 | 36.45 | 23.52 |
| | 4.5 | F | 8 | 104.38 | 43.70 | 54 | 120.85 | 13.12 | -16.48 |
| | | M | 2 | 198.50 | 37.48 | 29 | 200.34 | 26.80 | -1.84 |
| | 5.5 | F | 1 | 123.00 | | 20 | 119.00 | 11.50 | 4.00 |
| | 6.5 | F | 1 | 117.00 | | 13 | 118.77 | 12.95 | -1.77 |
| | | M | 1 | 201.00 | | 3 | 212.00 | 9.90 | -11.00 |
| 2002 | 0.5 | F | 7 | 61.71 | 9.98 | 108 | 62.03 | 9.32 | -0.31 |
| | | M | 3 | 63.67 | 2.08 | 83 | 65.39 | 11.83 | -1.72 |
| | 1.5 | F | 20 | 103.95 | 11.81 | 168 | 102.33 | 9.93 | 1.62 |
| | | M | 5 | 128.40 | 11.61 | 73 | 128.10 | 15.62 | 0.30 |
| | 2.5 | F | 34 | 114.68 | 10.68 | 251 | 115.17 | 10.61 | -0.49 |
| | | M | 8 | 169.38 | 31.22 | 65 | 167.55 | 23.91 | 1.82 |
| | 3.5 | F | 19 | 117.53 | 11.53 | 116 | 119.63 | 12.97 | -2.10 |

Continued on next page

Table 5

| Season | Age | Sex | Annual | | | Cumulative | | | Annual vs. Cumulative Mean Difference |
|--------|-----|-----|--------|--------|-----------|------------|--------|-----------|---------------------------------------|
| | | | N | Mean | Std. Dev. | N | Mean | Std. Dev. | |
| | | M | 9 | 204.67 | 22.63 | 59 | 189.88 | 35.31 | 14.79 |
| | 4.5 | F | 5 | 126.40 | 3.29 | 46 | 123.72 | 13.27 | 2.68 |
| | | M | 3 | 196.00 | 14.42 | 27 | 200.48 | 26.82 | -4.48 |
| | 5.5 | F | 3 | 114.00 | 12.17 | 19 | 118.79 | 11.79 | -4.79 |
| 2001 | 0.5 | F | 8 | 59.63 | 8.72 | 101 | 62.05 | 9.33 | -2.42 |
| | | M | 8 | 64.25 | 8.71 | 80 | 65.45 | 12.04 | -1.20 |
| | 1.5 | F | 19 | 103.68 | 7.02 | 148 | 102.11 | 9.68 | 1.58 |
| | | M | 4 | 119.25 | 21.09 | 68 | 128.07 | 15.92 | -8.82 |
| | 2.5 | F | 28 | 114.64 | 11.08 | 217 | 115.24 | 10.62 | -0.60 |
| | | M | 6 | 177.00 | 16.59 | 57 | 167.30 | 23.02 | 9.70 |
| | 3.5 | F | 15 | 117.60 | 7.26 | 97 | 120.04 | 13.25 | -2.44 |
| | | M | 2 | 220.00 | 5.66 | 50 | 187.22 | 33.10 | 32.78 |
| | 4.5 | F | 4 | 118.00 | 20.93 | 41 | 123.39 | 14.01 | -5.39 |
| | | M | 2 | 201.00 | 5.66 | 24 | 201.04 | 28.22 | -0.04 |
| | 5.5 | F | 2 | 115.50 | 0.71 | 16 | 119.69 | 11.93 | -4.19 |
| | 6.5 | F | 3 | 116.33 | 9.29 | 12 | 118.92 | 13.58 | -2.58 |
| | | M | 1 | 187.00 | | 2 | 217.50 | | -30.50 |
| 2000 | 0.5 | F | 5 | 61.20 | 11.39 | 93 | 62.26 | 9.39 | -1.06 |
| | | M | 9 | 66.67 | 6.20 | 72 | 65.58 | 12.37 | 1.08 |
| | 1.5 | F | 21 | 106.90 | 8.57 | 129 | 101.88 | 10.01 | 5.03 |
| | | M | 5 | 131.80 | 17.67 | 64 | 128.63 | 15.36 | 3.18 |
| | 2.5 | F | 28 | 121.14 | 12.35 | 189 | 115.33 | 10.58 | 5.81 |
| | | M | 7 | 161.43 | 17.08 | 51 | 166.16 | 23.71 | -4.73 |
| | 3.5 | F | 10 | 128.90 | 13.81 | 82 | 120.49 | 14.07 | 8.41 |
| | | M | 6 | 175.33 | 18.61 | 48 | 185.85 | 32.27 | -10.52 |
| | 4.5 | F | 3 | 123.33 | 16.29 | 37 | 123.97 | 13.34 | -0.64 |
| | | M | 3 | 223.33 | 23.09 | 22 | 201.05 | 29.57 | 22.29 |
| | 5.5 | F | 1 | 124.00 | | 14 | 120.29 | 12.76 | 3.71 |
| | | M | 2 | 215.00 | 14.14 | 13 | 204.77 | 23.94 | 10.23 |
| | 6.5 | F | 2 | 124.00 | 11.31 | 9 | 119.78 | 15.39 | 4.22 |
| | | M | 1 | 248.00 | | 1 | 248.00 | | 0.00 |
| 1999 | 0.5 | F | 10 | 63.00 | 10.47 | 88 | 62.32 | 9.34 | 0.68 |
| | | M | 6 | 61.33 | 11.41 | 63 | 65.43 | 13.08 | -4.10 |
| | 1.5 | F | 14 | 99.50 | 9.98 | 108 | 100.90 | 10.02 | -1.40 |
| | | M | 6 | 130.00 | 18.89 | 59 | 128.36 | 15.31 | 1.64 |
| | 2.5 | F | 22 | 112.05 | 10.20 | 161 | 114.32 | 9.94 | -2.28 |
| | | M | 3 | 167.67 | 27.10 | 44 | 166.91 | 24.50 | 0.76 |
| | 3.5 | F | 8 | 127.50 | 14.26 | 72 | 119.32 | 13.80 | 8.18 |
| | | M | 10 | 187.30 | 17.30 | 42 | 187.36 | 31.84 | -0.06 |
| | 4.5 | F | 3 | 116.00 | 11.14 | 34 | 124.03 | 13.34 | -8.03 |
| | | M | 3 | 179.00 | 16.09 | 19 | 197.53 | 29.25 | -18.53 |
| | 5.5 | F | 3 | 103.67 | 6.51 | 13 | 120.00 | 13.27 | -16.33 |
| | | M | 1 | 240.00 | | 11 | 202.91 | 25.45 | 37.09 |
| | 6.5 | F | 1 | 129.00 | | 7 | 118.57 | 17.06 | 10.43 |
| 1998 | 0.5 | F | 17 | 58.65 | 8.99 | 78 | 62.23 | 9.26 | -3.58 |
| | | M | 1 | 76.00 | | 57 | 65.86 | 13.16 | 10.14 |
| | 1.5 | F | 28 | 103.57 | 10.50 | 94 | 101.11 | 10.06 | 2.47 |
| | | M | 6 | 133.67 | 13.25 | 53 | 128.17 | 15.00 | 5.50 |
| | 2.5 | F | 17 | 114.76 | 9.05 | 139 | 114.68 | 9.89 | 0.08 |
| | | M | 6 | 163.50 | 14.69 | 41 | 166.85 | 24.65 | -3.35 |
| | 3.5 | F | 11 | 123.45 | 11.40 | 64 | 118.30 | 13.51 | 5.16 |
| | | M | 5 | 186.60 | 16.15 | 32 | 187.38 | 30.07 | -0.78 |
| | 4.5 | F | 5 | 122.00 | 21.39 | 31 | 124.81 | 13.46 | -2.81 |

Continued on next page

Table 5

| Season | Age | Sex | Annual | | | Cumulative | | | Annual vs. Cumulative Mean Difference |
|--------|-----|-----|--------|--------|-----------|------------|--------|-----------|---------------------------------------|
| | | | N | Mean | Std. Dev. | N | Mean | Std. Dev. | |
| | | M | 3 | 229.33 | 30.02 | 16 | 201.00 | 30.41 | 28.33 |
| | 5.5 | M | 1 | 168.00 | | 10 | 199.20 | 23.03 | -31.20 |
| | 6.5 | F | 1 | 92.00 | | 6 | 116.83 | 17.91 | -24.83 |
| 1997 | 0.5 | F | 8 | 62.25 | 11.34 | 61 | 63.23 | 9.13 | -0.98 |
| | | M | 13 | 69.23 | 17.37 | 56 | 65.68 | 13.24 | 3.55 |
| | 1.5 | F | 13 | 104.31 | 7.88 | 66 | 100.06 | 9.78 | 4.25 |
| | | M | 6 | 129.17 | 8.68 | 47 | 127.47 | 15.36 | 1.70 |
| | 2.5 | F | 33 | 116.36 | 11.38 | 122 | 114.67 | 10.03 | 1.69 |
| | | M | 9 | 180.78 | 25.75 | 35 | 167.43 | 25.92 | 13.35 |
| | 3.5 | F | 8 | 123.25 | 18.68 | 53 | 117.23 | 13.77 | 6.02 |
| | | M | 7 | 189.57 | 22.69 | 27 | 187.52 | 29.04 | 2.05 |
| | 4.5 | F | 5 | 121.00 | 13.00 | 26 | 125.35 | 11.88 | -4.35 |
| | 5.5 | F | 2 | 126.50 | 7.78 | 10 | 124.90 | 10.05 | 1.60 |
| | | M | 2 | 194.50 | 13.44 | 9 | 202.67 | 21.48 | -8.17 |
| 1996 | 0.5 | F | 14 | 63.36 | 7.75 | 53 | 63.38 | 8.86 | -0.02 |
| | | M | 10 | 66.70 | 10.78 | 43 | 64.60 | 11.85 | 2.10 |
| | 1.5 | F | 10 | 102.50 | 6.87 | 53 | 99.02 | 10.00 | 3.48 |
| | | M | 7 | 112.00 | 52.43 | 41 | 127.22 | 16.12 | -15.22 |
| | 2.5 | F | 28 | 116.21 | 10.78 | 89 | 114.04 | 9.47 | 2.17 |
| | | M | 5 | 191.20 | 43.27 | 26 | 162.81 | 26.00 | 28.39 |
| | 3.5 | F | 15 | 116.47 | 14.50 | 45 | 116.16 | 12.67 | 0.31 |
| | | M | 6 | 200.83 | 39.75 | 20 | 186.80 | 26.96 | 14.03 |
| | 4.5 | F | 4 | 128.50 | 14.08 | 21 | 126.38 | 11.72 | 2.12 |
| | | M | 3 | 185.67 | 17.21 | 13 | 194.46 | 26.73 | -8.79 |
| | 5.5 | F | 3 | 128.00 | 12.17 | 8 | 124.50 | 11.13 | 3.50 |
| | | M | 2 | 189.00 | 15.56 | 7 | 205.00 | 24.12 | -16.00 |
| 1995 | 0.5 | F | 16 | 64.69 | 12.21 | 39 | 63.38 | 9.33 | 1.30 |
| | | M | 5 | 61.80 | 4.02 | 33 | 63.97 | 12.34 | -2.17 |
| | 1.5 | F | 14 | 96.00 | 9.23 | 43 | 98.21 | 10.53 | -2.21 |
| | | M | 7 | 130.57 | 19.21 | 34 | 130.35 | 15.70 | 0.22 |
| | 2.5 | F | 20 | 111.45 | 9.60 | 61 | 113.05 | 8.69 | -1.60 |
| | | M | 5 | 168.60 | 18.68 | 21 | 156.05 | 17.39 | 12.55 |
| | 3.5 | F | 9 | 112.78 | 17.03 | 30 | 116.00 | 11.89 | -3.22 |
| | | M | 5 | 193.60 | 41.49 | 14 | 180.79 | 23.23 | 12.81 |
| | 4.5 | F | 7 | 117.71 | 9.71 | 17 | 125.88 | 11.50 | -8.17 |
| | | M | 4 | 181.75 | 35.05 | 10 | 197.10 | 29.77 | -15.35 |
| | 5.5 | F | 2 | 122.00 | 19.80 | 5 | 122.40 | 11.47 | -0.40 |
| | | M | 2 | 207.50 | 38.89 | 5 | 211.40 | 25.67 | -3.90 |
| | 6.5 | F | 3 | 117.00 | 16.09 | 5 | 121.80 | 14.66 | -4.80 |
| 1994 | 0.5 | F | 14 | 61.71 | 6.68 | 23 | 62.48 | 6.76 | -0.76 |
| | | M | 19 | 66.00 | 21.26 | 28 | 64.36 | 13.09 | 1.64 |
| | 1.5 | F | 22 | 99.09 | 12.23 | 29 | 99.28 | 11.08 | -0.18 |
| | | M | 3 | 155.00 | 8.89 | 27 | 130.30 | 14.75 | 24.70 |
| | 2.5 | F | 31 | 114.74 | 8.18 | 41 | 113.83 | 8.23 | 0.91 |
| | | M | 9 | 146.00 | 57.53 | 16 | 152.13 | 17.51 | -6.13 |
| | 3.5 | F | 16 | 116.44 | 6.79 | 21 | 117.38 | 8.86 | -0.94 |
| | | M | 3 | 207.33 | 4.62 | 9 | 173.67 | 19.82 | 33.67 |
| | 4.5 | F | 6 | 131.33 | 11.55 | 10 | 131.60 | 9.27 | -0.27 |
| | | M | 1 | 180.00 | | 6 | 207.33 | 23.57 | -27.33 |
| | 5.5 | F | 2 | 123.00 | 1.41 | 3 | 122.67 | 1.41 | 0.33 |
| | 6.5 | F | 2 | 129.00 | 1.41 | 2 | 129.00 | | 0.00 |
| 1993 | 0.5 | F | 7 | 64.00 | 5.86 | 9 | 63.67 | 6.67 | 0.33 |
| | | M | 8 | 60.00 | 25.86 | 9 | 60.89 | | -0.89 |

Continued on next page

Table 5

| Season | Age | Sex | Annual | | | Cumulative | | | Annual vs. Cumulative Mean Difference |
|--------|-----|-----|--------|--------|-----------|------------|--------|-----------|---------------------------------------|
| | | | N | Mean | Std. Dev. | N | Mean | Std. Dev. | |
| | 1.5 | F | 5 | 101.00 | 6.08 | 7 | 99.86 | 5.50 | 1.14 |
| | | M | 23 | 128.39 | 31.01 | 24 | 127.21 | 13.67 | 1.18 |
| | 2.5 | F | 9 | 110.22 | 7.84 | 10 | 111.00 | 7.84 | -0.78 |
| | | M | 6 | 164.67 | 17.24 | 7 | 160.00 | 17.24 | 4.67 |
| | 3.5 | F | 4 | 122.50 | 15.07 | 5 | 120.40 | 15.07 | 2.10 |
| | | M | 5 | 188.20 | 17.78 | 6 | 156.83 | 16.89 | 31.37 |
| | 4.5 | F | 4 | 132.00 | 2.94 | 4 | 132.00 | 3.21 | 0.00 |
| | | M | 3 | 201.33 | 12.90 | 5 | 212.80 | 22.02 | -11.47 |
| | 5.5 | F | 1 | 122.00 | | 1 | 122.00 | | 0.00 |
| | | M | 3 | 214.00 | 14.42 | 3 | 214.00 | 19.80 | 0.00 |
| 1992 | 0.5 | F | 2 | 62.50 | 17.68 | 2 | 62.50 | | 0.00 |
| | | M | 1 | 68.00 | | 1 | 68.00 | | 0.00 |
| | 1.5 | F | 2 | 97.00 | 8.49 | 2 | 97.00 | | 0.00 |
| | | M | 1 | 100.00 | | 1 | 100.00 | | 0.00 |
| | 2.5 | F | 1 | 118.00 | | 1 | 118.00 | | 0.00 |
| | | M | 1 | 132.00 | | 1 | 132.00 | | 0.00 |
| | 3.5 | F | 1 | 112.00 | | 1 | 112.00 | | 0.00 |
| | | M | 1 | 0.00 | | 1 | 0.00 | | 0.00 |
| | 4.5 | M | 2 | 230.00 | 14.14 | 2 | 230.00 | | 0.00 |

D Percent Occurrence of Deer Found Dead, Road Killed, or Suffering from Disease or Injury after Harvest

Table 6: Percent occurrence of deer found dead, associated road kills, or suffering from disease or injury after harvest.

| Season | Number Road Kill | Percent Road Kill | Number Found Dead | Percent Found Dead | Number Diseased | Percent Diseased | Number Injured | Percent Injured |
|--------|------------------|-------------------|-------------------|--------------------|-----------------|------------------|----------------|-----------------|
| 2010 | 5 | 6.3 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 2009 | 3 | 4.3 | 2 | 2.9 | 0 | 0.0 | 0 | 0.0 |
| 2008 | 4 | 8.2 | 2 | 4.1 | 0 | 0.0 | 0 | 0.0 |
| 2007 | 10 | 10 | 4 | 4.2 | 0 | 0.0 | 0 | 0.0 |
| 2006 | 4 | 4.7 | 2 | 2.4 | 5 | 5.9 | 1 | 1.2 |
| 2005 | 7 | 6.8 | 8 | 7.8 | 0 | 0.0 | 2 | 1.9 |
| 2004 | 5 | 4.2 | 9 | 7.6 | 2 | 1.7 | 3 | 2.5 |
| 2003 | 9 | 9.5 | 3 | 3.2 | 0 | 0.0 | 1 | 1.1 |
| 2002 | 0 | 0.0 | 5 | 4.2 | 1 | 0.8 | 0 | 0.0 |
| 2001 | 2 | 1.9 | 2 | 1.9 | 0 | 0.0 | 1 | 0.9 |
| 2000 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 1.0 |
| 1999 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 2.2 |
| 1998 | 2 | 1.9 | 3 | 2.8 | 1 | 0.9 | 2 | 1.9 |
| 1997 | 4 | 3.4 | 8 | 6.7 | 2 | 1.7 | 2 | 1.7 |
| 1996 | 1 | 0.9 | 5 | 4.4 | 0 | 0.0 | 1 | 0.9 |
| 1995 | 1 | 1.0 | 0 | 0.0 | 1 | 1.0 | 2 | 2.0 |
| 1994 | 5 | 3.5 | 7 | 5.0 | 0 | 0.0 | 1 | 0.7 |
| 1993 | 4 | 4.8 | 0 | 0.0 | | | 1 | 1.2 |
| 1992 | 0 | 0.0 | 0 | 0.0 | 1 | 8.3 | 0 | 0.0 |
| | 3.5 | 3.8 | 3.2 | 3.0 | .72 | 1.1 | 1.1 | 1.0 |

E Average Tail Fat Body Score for All Harvested Deer

Table 7: Average tail fat body score for all deer harvested at Ichauway.

| Season | 0.5 | | 1.5 | | 2.5 | | 3.5 | | 4.5 | | 5.5 | | 6.5 | |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | M | F | M | F | M | F | M | F | M | F | M | F | M | F |
| 2010 | 1.5 | 1.0 | 2.2 | 2.8 | 2.0 | 2.7 | 2.7 | 2.5 | 1.0 | 2.3 | 1.5 | 3.0 | | |
| 2009 | 1.0 | 1.5 | 2.0 | 2.8 | 1.6 | 2.3 | 2.4 | 3.5 | 2.0 | 2.0 | 2.0 | | 2.0 | |
| 2008 | 1.0 | | 1.3 | 2.2 | 2.0 | 2.3 | 1.7 | 2.7 | 2.2 | | | | | |
| 2007 | 1.3 | 1.3 | 1.6 | 2.8 | 2.0 | 2.8 | 2.5 | 3.6 | 1.5 | 3.5 | 3.0 | 3.0 | | 2.0 |
| 2006 | 1.4 | 1.0 | 1.5 | 2.4 | 2.0 | 2.3 | 1.5 | 2.3 | | 2.8 | 3.0 | 2.3 | 1.0 | |
| 2005 | 2.0 | 1.4 | 2.3 | 2.1 | 2.4 | 2.6 | 2.2 | 2.5 | 2.0 | 3.0 | 3.5 | | | 2.0 |
| 2004 | 1.4 | 1.3 | 2.0 | 2.2 | 2.4 | 2.4 | 2.3 | 3.1 | 3.0 | 2.7 | 4.0 | 3.0 | 1.0 | 3.0 |
| 2003 | 1.5 | 1.5 | 1.5 | 2.1 | 2.2 | 2.3 | 2.8 | 2.4 | 1.0 | 2.3 | | 2.0 | 1.0 | 2.0 |
| 2002 | 2.0 | 1.6 | 2.0 | 2.8 | 2.3 | 2.5 | 2.2 | 2.6 | 3.3 | 2.2 | | 2.7 | | |
| 2001 | 1.3 | 1.4 | 2.0 | 2.1 | 2.5 | 2.5 | 3.5 | 2.3 | 2.0 | 1.8 | | 2.0 | 2.0 | 1.3 |
| 2000 | 1.7 | 1.2 | 1.8 | 2.4 | 1.9 | 2.2 | 2.0 | 2.7 | 2.3 | 2.3 | 1.5 | 2.0 | 3.0 | 1.5 |
| 1999 | 1.7 | 1.7 | 2.0 | 2.1 | 2.0 | 2.3 | 2.3 | 3.1 | 2.0 | 2.3 | 3.0 | 1.7 | | 3.0 |
| 1998 | 1.0 | 1.4 | 2.0 | 2.3 | 1.3 | 2.4 | 1.4 | 2.3 | 2.3 | 2.2 | 1.0 | | | |
| 1997 | 1.8 | 1.9 | 2.3 | 2.2 | 2.1 | 2.5 | 2.1 | 2.6 | | 2.6 | 2.5 | 2.5 | | |
| 1996 | 2.2 | 2.0 | 2.7 | 2.8 | 2.8 | 3.0 | 2.8 | 2.7 | 2.0 | 2.8 | 3.0 | 3.7 | | |
| 1995 | 2.6 | 2.6 | 2.5 | 2.9 | 2.4 | 2.9 | 2.4 | 2.8 | 1.8 | 2.6 | 2.0 | 3.0 | | 2.7 |
| 1994 | 2.2 | 2.2 | 3.3 | 2.5 | 2.8 | 2.5 | 2.7 | 2.6 | 2.0 | 2.7 | | 3.0 | | 3.0 |
| 1993 | 3.1 | 3.1 | 3.5 | 3.6 | 3.6 | 3.2 | 3.8 | 3.8 | 3.7 | 3.5 | 3.7 | 4.0 | | |
| | 1.7 | 1.7 | 2.1 | 2.5 | 2.2 | 2.5 | 2.4 | 2.8 | 2.1 | 2.6 | 2.6 | 2.7 | 1.7 | 2.3 |

F Doe Lactation rates by Age and Season

Table 8: Doe lactation rates by age and season

| Season | Age | N | No. Lactating | Percent Lactation | Percent Lactation ≥ 2.5 year and older |
|--------|-----|----|---------------|-------------------|--|
| 2010 | 1.5 | 5 | 1 | 20% | |
| | 2.5 | 16 | 9 | 56% | |
| | 3.5 | 15 | 4 | 27% | |
| | 4.5 | 7 | 4 | 57% | |
| | 5.5 | 2 | 1 | 50% | |
| 2010 | | 45 | 19 | 42% | 45% |
| 2009 | 1.5 | 5 | 1 | 20% | |
| | 2.5 | 13 | 7 | 54% | |
| | 3.5 | 4 | 3 | 75% | |
| | 4.5 | 2 | 1 | 50% | |
| 2009 | | 24 | 12 | 50% | 58% |
| 2008 | 1.5 | 5 | 1 | 20% | |
| | 2.5 | 3 | 2 | 67% | |
| | 3.5 | 3 | 1 | 33% | |
| 2008 | | 11 | 4 | 40% | 50% |
| 2007 | 1.5 | 12 | 1 | 8% | |
| | 2.5 | 23 | 15 | 65% | |
| | 3.5 | 10 | 7 | 70% | |
| | 4.5 | 2 | 2 | 100% | |
| | 5.5 | 1 | 1 | 100% | |
| | 6.5 | 2 | 0 | 0% | |
| 2007 | | 50 | 26 | 57% | 66% |
| 2006 | 1.5 | 14 | 5 | 36% | |
| | 2.5 | 23 | 14 | 61% | |
| | 3.5 | 11 | 10 | 91% | |
| | 4.5 | 4 | 3 | 75% | |
| | 5.5 | 3 | 1 | 33% | |
| 2006 | | 55 | 33 | 59% | 68% |
| 2005 | 1.5 | 18 | 6 | 33% | |
| | 2.5 | 29 | 24 | 83% | |
| | 3.5 | 8 | 7 | 88% | |
| | 4.5 | 2 | 2 | 100% | |
| | 6.5 | 1 | 0 | 0% | |
| 2005 | | 58 | 39 | 61% | 83% |
| 2004 | 1.5 | 19 | 5 | 26% | |
| | 2.5 | 30 | 22 | 73% | |
| | 3.5 | 9 | 7 | 78% | |
| | 4.5 | 6 | 4 | 67% | |
| | 5.5 | 1 | 1 | 100% | |
| | 6.5 | 2 | 0 | 0% | |
| 2004 | | 67 | 39 | 57% | 71% |
| 2003 | 1.5 | 14 | 4 | 29% | |
| | 2.5 | 24 | 22 | 92% | |
| | 3.5 | 14 | 11 | 79% | |
| | 4.5 | 8 | 8 | 100% | |
| | 5.5 | 1 | 1 | 100% | |
| | 6.5 | 1 | 1 | 100% | |
| 2003 | | 62 | 47 | 83% | 90% |
| 2002 | 1.5 | 20 | 7 | 35% | |
| | 2.5 | 34 | 25 | 74% | |
| | 3.5 | 19 | 16 | 84% | |

Continued on next page

Table 8

| Season | Age | N | No. Lactating | Percent Lactation | Percent Lactation ≥ 2.5 year and older |
|--------|-----|----|---------------|-------------------|--|
| | 4.5 | 5 | 5 | 100% | |
| | 5.5 | 3 | 1 | 33% | |
| 2002 | | 81 | 54 | 65% | 77% |
| 2001 | 1.5 | 19 | 13 | 68% | |
| | 2.5 | 28 | 18 | 64% | |
| | 3.5 | 15 | 13 | 87% | |
| | 4.5 | 4 | 4 | 100% | |
| | 5.5 | 2 | 2 | 100% | |
| | 6.5 | 3 | 3 | 100% | |
| 2001 | | 71 | 53 | 87% | 77% |
| 2000 | 1.5 | 21 | 7 | 33% | |
| | 2.5 | 28 | 20 | 71% | |
| | 3.5 | 10 | 7 | 70% | |
| | 4.5 | 3 | 3 | 100% | |
| | 5.5 | 1 | 1 | 100% | |
| | 6.5 | 2 | 2 | 100% | |
| 2000 | | 65 | 40 | 79% | 75% |
| 1999 | 1.5 | 14 | 5 | 36% | |
| | 2.5 | 22 | 17 | 77% | |
| | 3.5 | 8 | 7 | 88% | |
| | 4.5 | 3 | 3 | 100% | |
| | 5.5 | 3 | 3 | 100% | |
| | 6.5 | 1 | 1 | 100% | |
| 1999 | | 51 | 36 | 83% | 84% |
| 1998 | 1.5 | 28 | 10 | 36% | |
| | 2.5 | 17 | 10 | 59% | |
| | 3.5 | 11 | 10 | 91% | |
| | 4.5 | 5 | 4 | 80% | |
| | 6.5 | 1 | 1 | 100% | |
| 1998 | | 62 | 35 | 73% | 74% |
| 1997 | 1.5 | 13 | 5 | 38% | |
| | 2.5 | 33 | 20 | 61% | |
| | 3.5 | 8 | 5 | 63% | |
| | 4.5 | 5 | 3 | 60% | |
| | 5.5 | 2 | 2 | 100% | |
| 1997 | | 61 | 35 | 64% | 63% |
| 1996 | 1.5 | 10 | 6 | 60% | |
| | 2.5 | 28 | 22 | 79% | |
| | 3.5 | 15 | 13 | 87% | |
| | 4.5 | 4 | 3 | 75% | |
| | 5.5 | 3 | 0 | 0% | |
| 1996 | | 60 | 44 | 60% | 76% |
| 1995 | 1.5 | 14 | 8 | 57% | |
| | 2.5 | 20 | 14 | 70% | |
| | 3.5 | 9 | 8 | 89% | |
| | 4.5 | 7 | 7 | 100% | |
| | 5.5 | 2 | 2 | 100% | |
| | 6.5 | 3 | 3 | 100% | |
| 1995 | | 55 | 42 | 86% | 83% |
| 1994 | 1.5 | 22 | 8 | 36% | |
| | 2.5 | 31 | 16 | 52% | |
| | 3.5 | 16 | 13 | 81% | |
| | 4.5 | 6 | 4 | 67% | |
| | 5.5 | 2 | 2 | 100% | |

Continued on next page

Table 8

| Season | Age | N | No. Lactating | Percent Lactation | Percent Lactation ≥ 2.5 year and older |
|--------|-----|----|---------------|-------------------|--|
| | 6.5 | 2 | 2 | 100% | |
| 1994 | | 79 | 45 | 73% | 65% |
| 1993 | 1.5 | 5 | 2 | 40% | |
| | 2.5 | 9 | 4 | 44% | |
| | 3.5 | 4 | 3 | 75% | |
| | 4.5 | 4 | 4 | 100% | |
| | 5.5 | 1 | 1 | 100% | |
| 1993 | | 23 | 14 | 72% | 67% |
| 1992 | 1.5 | 2 | 0 | 0% | |
| | 2.5 | 1 | 1 | 100% | |
| | 3.5 | 1 | 1 | 100% | |
| 1992 | | 4 | 2 | 67% | 100% |

G Mean Main Beam Length for each Age Class by Year

Table 9: Mean main beam length in inches for each age class by year at Ichauway

| Season | 1.5 | 2.5 | 3.5 | 4.5 | 5.5 | 6.5 |
|--------|-------|-------|-------|-------|-------|-------|
| 2010 | 10.84 | 18.28 | 21.31 | 18.44 | 20.16 | |
| 2009 | 11.39 | 14.86 | 19.53 | 21.25 | 22.59 | 22.31 |
| 2008 | 9.42 | 17.56 | 20.50 | 19.41 | 11.69 | |
| 2007 | 9.13 | 17.33 | 20.52 | 18.84 | 26.19 | |
| 2006 | 6.96 | 17.73 | 19.67 | | 23.19 | 20.94 |
| 2005 | 10.23 | 17.08 | 21.72 | 22.50 | 23.25 | 25.50 |
| 2004 | 7.91 | 18.73 | 22.31 | 22.42 | 25.25 | 23.69 |
| 2003 | 9.28 | 18.05 | 19.55 | 22.69 | | 20.56 |
| 2002 | 10.85 | 17.59 | 20.84 | 22.06 | | |
| 2001 | 7.21 | 16.67 | 20.22 | 22.86 | | 21.63 |
| 2000 | 11.71 | 18.29 | 19.95 | 18.38 | 18.66 | 15.81 |
| 1999 | 11.11 | 18.58 | 20.31 | 19.94 | 23.50 | |
| 1998 | 8.45 | 17.55 | 18.03 | 20.38 | 22.81 | |
| 1997 | 10.50 | 18.32 | 20.89 | 23.19 | 20.46 | |
| 1996 | 10.41 | 19.23 | 18.26 | 22.65 | 19.84 | |
| 1995 | 11.99 | 18.28 | 20.24 | 19.91 | 23.88 | |
| 1994 | 10.02 | 17.57 | 21.73 | 21.31 | | |
| 1993 | 10.40 | 17.02 | 20.13 | 23.42 | 21.06 | |
| 1992 | | 9.25 | 19.56 | | | |
| | 9.88 | 17.26 | 20.28 | 21.15 | 21.61 | 21.49 |

H Mean Inside Spread for each Age Class by Year

Table 10: Mean inside spread in inches for each age class by year at Ichauway.

| Season | 1.5 | 2.5 | 3.5 | 4.5 | 5.5 | 6.5 |
|--------|------|-------|-------|-------|-------|-------|
| 2010 | 8.43 | 13.55 | 16.15 | 14.38 | 16.63 | |
| 2009 | 8.40 | 11.40 | 15.25 | 17.33 | 18.25 | 16.31 |
| 2008 | 7.19 | 13.81 | 16.01 | 16.88 | 10.50 | |
| 2007 | 7.66 | 13.84 | 15.98 | 16.88 | 16.25 | |
| 2006 | 4.54 | 14.27 | 14.00 | | 16.75 | 16.88 |
| 2005 | 7.63 | 13.39 | 15.65 | 17.63 | 19.56 | 19.50 |
| 2004 | 5.71 | 14.77 | 18.13 | 15.58 | 21.50 | 19.25 |
| 2003 | 7.63 | 14.00 | 16.03 | 18.19 | | 15.63 |
| 2002 | 8.63 | 13.81 | 16.13 | 17.33 | | |
| 2001 | 6.63 | 14.65 | 17.25 | 16.16 | | 17.38 |
| 2000 | 9.38 | 14.33 | 15.70 | 14.31 | 16.19 | 13.38 |
| 1999 | 9.30 | 15.42 | 17.13 | 17.29 | 17.38 | |
| 1998 | 6.63 | 13.60 | 16.38 | 17.09 | 18.00 | |
| 1997 | 8.75 | 14.92 | 16.67 | 19.38 | 15.75 | |
| 1996 | 7.89 | 14.33 | 15.61 | 16.17 | 14.06 | |
| 1995 | 8.54 | 14.13 | 15.75 | 15.59 | 17.25 | |
| 1994 | 6.46 | 13.39 | 17.71 | 16.63 | | |
| 1993 | 8.34 | 13.38 | 16.30 | 17.21 | 15.92 | |
| 1992 | | 9.50 | 14.00 | | | |
| | 7.65 | 13.71 | 16.09 | 16.71 | 16.71 | 16.90 |

I Mean Basal Circumference for Main Beam for each Age Class by Year

Table 11: Mean basal circumference for main beam in inches for each age class by year at Ichauway.

| Season | 1.5 | 2.5 | 3.5 | 4.5 | 5.5 | 6.5 |
|--------|------|------|------|------|------|------|
| 2010 | 2.17 | 3.73 | 4.03 | 3.75 | 4.91 | |
| 2009 | 2.54 | 3.01 | 3.69 | 4.28 | 4.78 | 4.16 |
| 2008 | 2.04 | 3.51 | 4.02 | 4.18 | 3.25 | |
| 2007 | 2.33 | 3.41 | 4.17 | 3.94 | 4.75 | |
| 2006 | 1.73 | 3.38 | 3.96 | | 4.44 | 3.75 |
| 2005 | 2.31 | 3.39 | 4.20 | 5.08 | 4.91 | 5.63 |
| 2004 | 2.21 | 3.62 | 4.39 | 5.19 | 4.19 | 4.38 |
| 2003 | 2.28 | 3.53 | 4.26 | 4.22 | | 4.69 |
| 2002 | 2.40 | 3.68 | 4.36 | 4.21 | | |
| 2001 | 1.90 | 3.64 | 4.28 | 4.48 | | 4.25 |
| 2000 | 2.54 | 3.53 | 3.76 | 4.41 | 5.00 | 3.31 |
| 1999 | 2.59 | 3.94 | 4.03 | 4.46 | 5.88 | |
| 1998 | 2.34 | 3.35 | 4.25 | 4.63 | 4.19 | |
| 1997 | 2.73 | 3.86 | 4.38 | 4.75 | 3.79 | |
| 1996 | 2.49 | 3.95 | 3.87 | 5.00 | 4.53 | |
| 1995 | 2.57 | 3.41 | 3.86 | 4.14 | 4.97 | |
| 1994 | 2.42 | 3.51 | 4.48 | 4.50 | | |
| 1993 | 2.51 | 3.48 | 4.33 | 4.46 | 4.31 | |
| 1992 | | 3.25 | 4.00 | | | |
| | 2.34 | 3.53 | 4.12 | 4.45 | 4.56 | 4.31 |

J Mean Basal Diameter by Age Class in mm

Table 12: Mean Basal Diameter by Age Class

| Season | 1.5 | | | 2.5 | | | 3.5 | | | 4.5+ | | |
|--------|-----|---------|--------|-----|---------|---------|-----|---------|--------|------|---------|--------|
| | N | MEAN | STD | N | MEAN | STD | N | MEAN | STD | N | MEAN | STD |
| 2003 | 2 | 21.3250 | 0.0354 | 7 | 31.1500 | 5.1578 | 5 | 37.7000 | 1.6229 | 3 | 38.2667 | 1.1184 |
| 2004 | 5 | 20.8100 | 3.5191 | 11 | 30.3091 | 3.6852 | 5 | 38.5300 | 5.0094 | 5 | 42.0800 | 5.5391 |
| 2005 | 3 | 20.5000 | 2.6282 | 10 | 29.7650 | 6.3839 | 5 | 35.1500 | 3.2621 | 6 | 44.0417 | 4.0447 |
| 2006 | 2 | 15.7250 | 3.0759 | 8 | 29.9688 | 4.3793 | 3 | 32.9000 | 1.6889 | 2 | 37.5000 | 0.9192 |
| 2007 | 6 | 22.4083 | 4.2318 | 6 | 38.5750 | 10.9068 | 5 | 36.2100 | 3.4039 | 5 | 36.4700 | 5.9318 |
| 2008 | 7 | 20.4429 | 1.5849 | 8 | 29.1750 | 3.3010 | 10 | 33.7400 | 3.7711 | 7 | 36.1714 | 2.7777 |
| 2009 | 6 | 21.7500 | 1.1118 | 9 | 24.9444 | 5.7282 | 7 | 31.4071 | 2.2995 | 9 | 39.4500 | 4.5119 |
| 2010 | 10 | 19.2500 | 1.9549 | 5 | 31.2500 | 4.5441 | 6 | 34.8583 | 3.7212 | 3 | 38.6667 | 7.9552 |
| | | 20.2764 | 2.2678 | | 30.6422 | 5.5108 | | 35.0619 | 3.0974 | | 39.0808 | 4.0998 |