

Declining Deer Hunters

Wisconsin's gun deer hunter numbers are continuing to decline



Applied Population Laboratory

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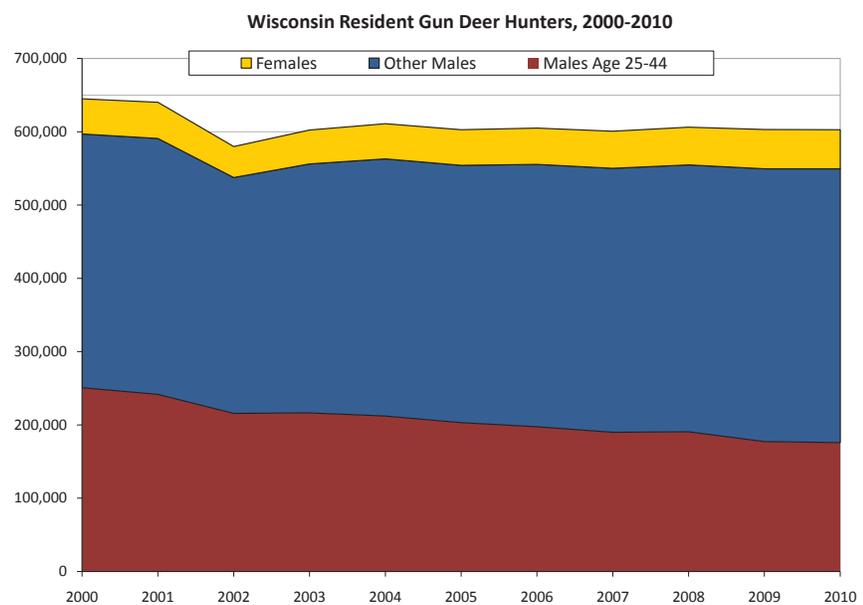
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Summary

The deer herd in the State of Wisconsin is largely kept in check by private hunters who purchase licenses and kill deer each fall. Not only is hunting vital to wildlife management efforts, but it is also an important cultural activity through which people become intricately connected to the natural world. However, the number of deer hunters in the state has declined in recent years, causing concern about the future of the herd, the sport, and conservation efforts. The number of gun deer hunting licenses sold to Wisconsin residents declined from 644,991 in 2000 to 602,791 in 2010. This is a decline of 6.5% in ten years, despite the fact that 10 and 11 year old hunters were added for the first time in 2009 and 2010. Declines have been most stark among males age 25-44, who have (in the recent past) hunted at high rates and killed a large number of deer.

This report is the result of a study undertaken by the Applied Population Laboratory at the University of Wisconsin-Madison at the request of the Wisconsin Department of Natural Resources Wildlife Division. It is a collaborative project between these two organizations with the goal of better understanding how the population of the state's hunters is changing over time and to project future deer hunters. The study takes a demographic approach investigating participation in deer hunting by age over time.

Despite the fact that the number of female hunters is increasing and the activity is becoming more popular among younger females, the number of female hunters remains too small to make up for the decline in male hunters. In 2010, 91% of gun deer licenses sold were to males. For this reason, this report focuses on understanding declines in the male gun deer hunter population.



We specifically examine the effects of time period, age, and generational differences on hunter participation rates. Regarding time period, we find that participation rates dropped markedly between 2001 and 2002 with the discovery of CWD. More importantly, rates continued to drop between 2004 and 2009 across all ages and generations, except those over age 65 who are hunting at higher rates than they have in the past. Still, age plays an important role in people's likelihood to hunt, with participation rates dropping off significantly after about age 65. At the same time, generational differences help to determine hunter participation rates. Males born during the Baby Boom (1946-1965) have been more likely to hunt than younger cohorts, regardless of age. Overall, recent declines in hunter numbers have occurred through two processes. First, relatively few young men born since 1980 (the Millennial Generation) have been recruited into hunting. Second, retention rates year to year among hunters age 30-55 have been relatively low over the last decade.

Projections of future hunters suggest that the male gun hunter population will decline more dramatically over the next ten to twenty years. We provide three future scenarios for male gun deer hunters using two different methodological approaches and making different assumptions about future participation rates and how they will vary by age and cohort. Overall, the models suggest that in 2020, the number of male gun hunters will drop to about 480,000 (compared to 549,505 in 2010). If current patterns continue, the number could drop to 400,000 or fewer by 2030.

Finally, a geographic analysis of the counties in which hunters reside indicates that most hunters live in urban areas, but hunter participation rates are highest in more rural areas of the state and particularly high in northern Wisconsin. Deer hunter retention rates among middle aged males have shown more decline in the eastern part of the state than in the west, with the most stark decline occurring in northeastern and southeastern Wisconsin. The proportion of 20-24 year olds who hunt (recruitment) declined in almost every county between 2000 (Generation X) and 2009 (Millennials). This decline was greater in eastern Wisconsin than in the western part of the state.

Hunter Participation Rates over Time

In order to understand how hunter numbers are changing, it is important to consider changes in the proportion of all Wisconsin males who deer hunt (hunter participation rates). We calculate participation rates by single year of age over time to examine the proportion of all Wisconsin males of a certain age who purchased deer hunting licenses in a particular year. Isolating these rates by age and examining them annually allows for a comparison of how participation has changed over time. In the chart below lighter colors represent earlier years, and darker blues represent more recent years, except for 2002 which is shown in red because this was the year that Chronic Wasting Disease (CWD) was discovered in the Wisconsin herd.

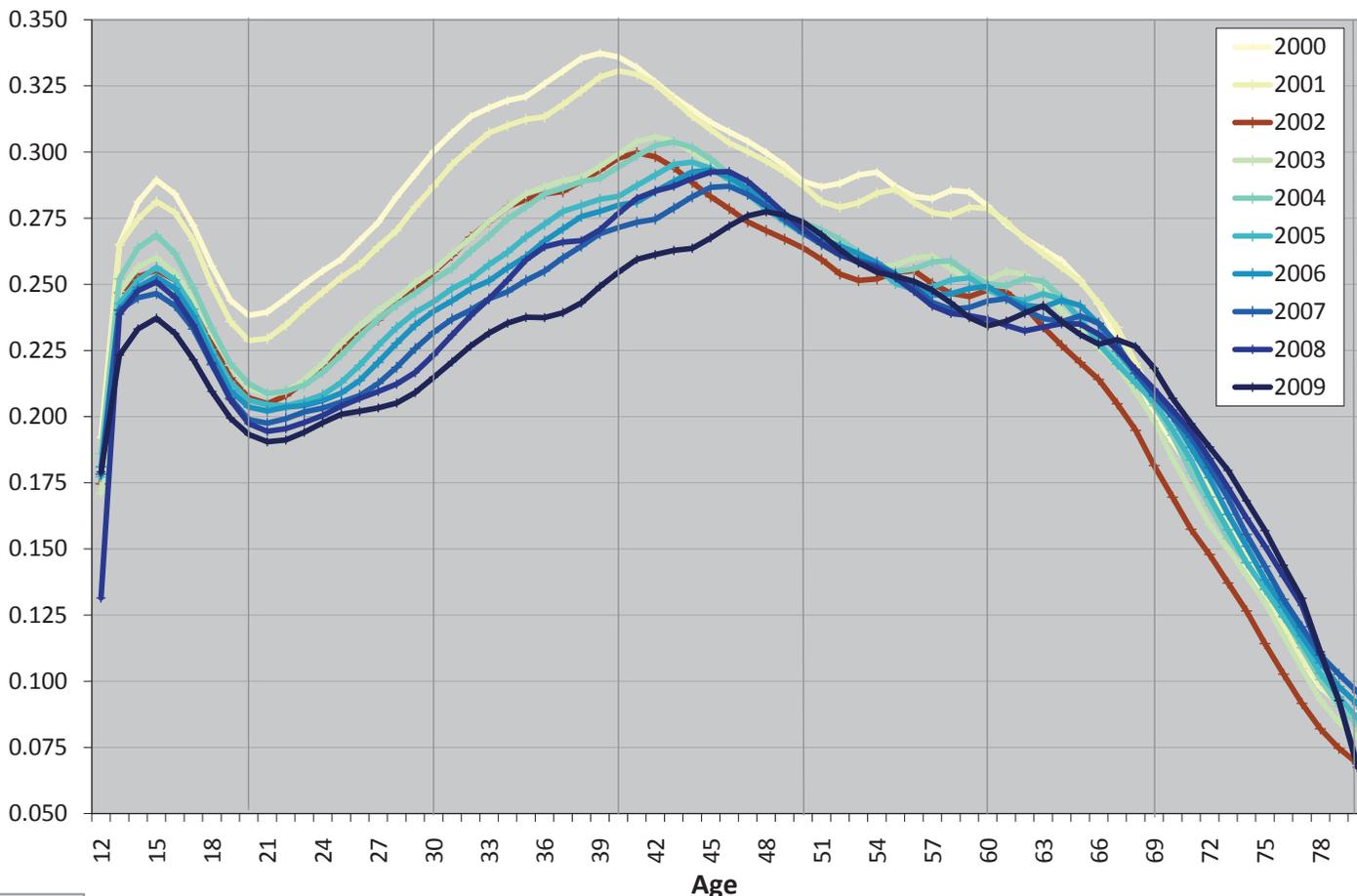
The chart can be read in two ways. One can follow the change in participation over time by age by comparing up and down the vertical axis at a specific age. For example, 33.5% of 40-year olds hunted in 2000, but only 25.5% of 40-year olds hunted in 2009. Alternatively, one can follow a cohort of hunters over time by looking at a particular age in one year in comparison to the participation rate one year older and one year later. For instance, the cohort of hunters who were age 39 in 2000 (born in 1961, later Baby Boomers) were the most likely people to hunt in 2000 with a 34% participation rate. In 2001, these same people were age 40 and 33% hunted. In 2009, the same cohort was 48 years old and 28% hunted. Despite this cohort's declining participation, they were still the most likely group to hunt in 2009.

Comparing by age, participation rates declined steadily at almost every age between 2000 and 2009. Hunters over age 65 were the exception, experiencing increasing rates. Males age 25-44 experienced the most stark declines in participation. In 2000, 31% of Wisconsin males age 25-44 purchased gun deer hunting licenses in comparison to only 23% in 2009. At the same time the proportion of Wisconsin males who are recruited into hunting at a young age has been declining-- 29% of 15 year old males gun hunted in 2000 compared to only 24% in 2009.

In summary, this chart demonstrates that:

- Participation rates vary by age, dropping off markedly after age 65.
- Participation rates are declining over time at all ages under 65, and increasing moderately at age 65 and over.
- Following cohorts over time, after age 20 participation rates tend to decline very slightly each year over time.

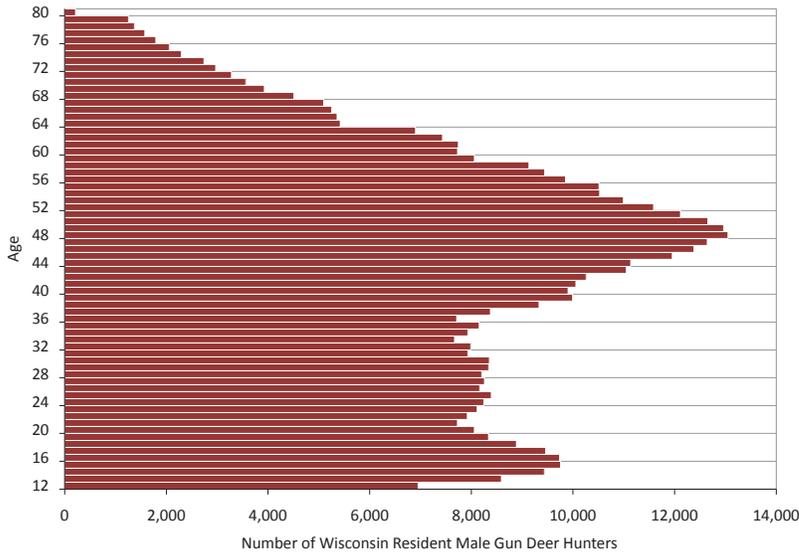
Male Gun Hunter Participation Rates, 2000-2009



Aging Hunters

The chart on the previous page shows that for males, participation tends to peak at middle ages, then to drop off steadily after about age 65. When people are more likely to hunt at certain ages in comparison to others, hunter numbers could shift dramatically as the composition of the total population of Wisconsin shifts in age. For example, in 2009, 40% of Wisconsin resident hunters were between ages 43 and 63 (the Baby Boom generation). What will happen to the number of Wisconsin hunters as these hunters get older and reach the ages where participation rates tend to drop off? The combination of a large number of potential hunters (people overall) in the Baby Boom generation *and* relatively high *rates* of participation for Baby Boomers has contributed to large numbers of hunters over the last several years. Can we expect this to continue?

Age Structure: Wisconsin Deer Hunters (2009)



The chart at left shows the age structure of Wisconsin resident male gun deer hunters in 2009. The bulge in hunters age 43-55 (late Baby Boomers) is dramatic. There are about 154,000 hunters in this twelve year age range, whereas there are only 105,400 hunters following them at ages 24-36. This is a difference of over 48,000 hunters. What kind of effect will this age bulge have on the number of future hunters as the Baby Boomers grow older? One of the reasons for projected declines in the hunter population over the next ten to twenty years, is the aging of hunters. Still, the effect of aging may be moderated if the Baby Boom generation remains more likely to hunt as they reach older ages than the generations who came before them. The Baby Boomers *are* different than their predecessors in many ways, including that they are more wealthy, more healthy, and participate more in outdoor recreation.

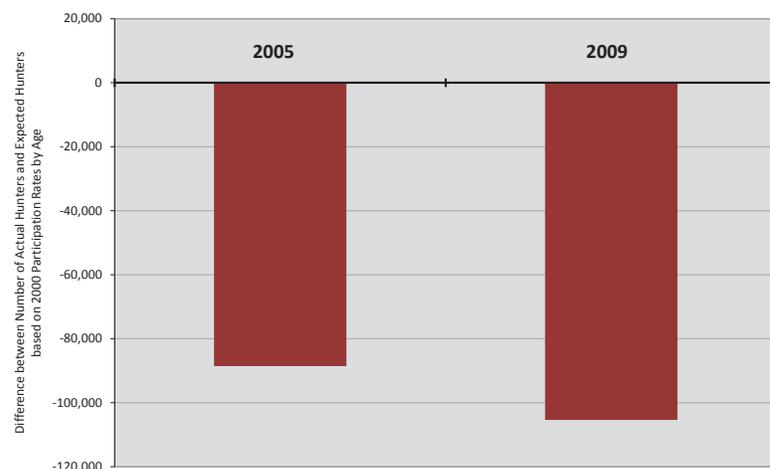
Of greater concern than the aging of the Baby Boomers are the considerably smaller cohorts of younger hunters and weak recruitment into hunting at younger ages. These factors are already having significant impacts on the hunter population and should be expected to have more dramatic effects in the coming years. Age effects are only part of the story. Participation rates have declined steadily since 2000, *controlling for changes in age*.

The chart at right shows the difference between the number of actual hunters in 2005 and in 2009 and the number of hunters there *would have been if* participation rates by age had remained constant since 2000. This “what might have been” type of scenario shows the number of hunters that have been lost due to declining participation rates over time and by cohort, or those lost that are *not* due to changes in the age structure. If age-specific participation rates had not declined, then there would have been about 52,000 *more* male hunters in 2009 than there were in 2000. Instead, there were 54,000 *less*, for a total difference of over 105,000 hunters lost due to change over time and weak recruitment.

All of this suggests that although age effects are important, they do not adequately explain recent hunter decline. Subsequently, population projections based on constant rate share methods (such as the constant rate model shown later in this report) should be interpreted skeptically.

One of the reasons for projected declines in the hunter population is the aging of hunters, especially the large cohorts of the Baby Boom generation. Yet age is only part of the story. Participation rates have declined steadily since 2000, controlling for changes in age.

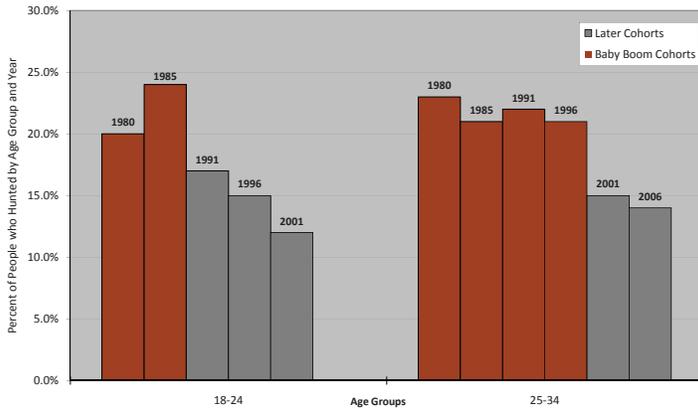
Hunter Population Controlling for Age Effects, 2000-2009



Hunter Recruitment and Retention

Male hunters in Wisconsin generally start hunting between age 10 and 14 (recruitment). After age 14, the number of hunters depends on the extent to which the already initiated continue to hunt (retention). People's experiences, their likelihood to be recruited into hunting and to continue to hunt over time vary by generation. We examine such generational influences by analyzing hunters by the year they reached hunting age and following each group (cohort) over time. Are people who came of age in some years more likely to hunt than people who reached hunting ages at other times? Generational (or cohort) effects stem from influences of the past that have affected certain cohorts differently than others. For instance, the social, economic, and environmental conditions of the post- World War II period in the United States influenced the developmental years of the Baby Boom generation, which in turn might influence the likelihood of that generation to hunt.

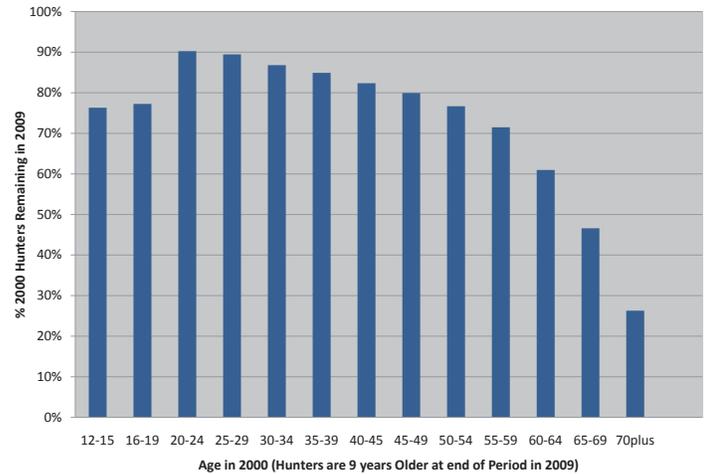
Recruitment of New Hunters: 1980-2006



Data are from National Survey of Fishing, Hunting, and Wildlife-related Recreation conducted by US Census Bureau for US Fish and Wildlife Service; State of Wisconsin; 1980, 1985, 1991, 1996, 2001, and 2006.

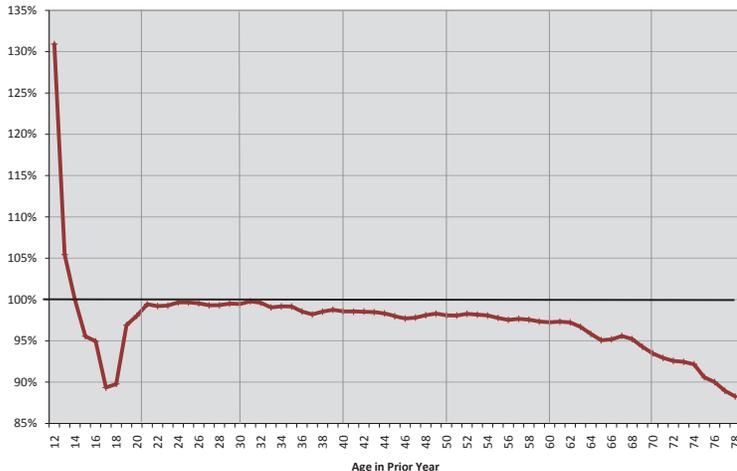
In addition to recruitment, we must examine the retention of hunters as they age forward in time. Do they continue to hunt or drop out? Do new people start hunting? One way to understand hunter retention is to compare the number of people in a hunting cohort who purchased licenses in 2000 to the number who purchased licenses nine years later in 2009. The chart at right shows the proportion of hunters who continue to hunt. For the younger cohorts, only 76% of those who hunted in 2000 continued to hunt in 2009. Once in their 20s, closer to 90% continued. Participation dropped off more for the cohorts in their 30s, 40s, and 50s, and most dramatically for cohorts entering their 60s, 70s and 80s.

Hunter Retention by Cohort (2000-2009)



Another way to analyze hunter retention by cohort is to examine what demographers refer to as "survival ratios." These ratios compare the number of hunters at a certain age in one year to the number of hunters one year older the next year. If that ratio comparison is greater than 100%, then that cohort added new hunters over the year. If the ratio is less than 100%,

Average Annual Hunter Retention by Age, 2004-2009



then that cohort lost hunters in the course of the year. We average annual ratios experienced between 2004 and 2009 for each set of ages in order to examine the average "survival" of hunters from one year to the next between specific ages. This logic fuels the cohort survival projection model shown later in this report.

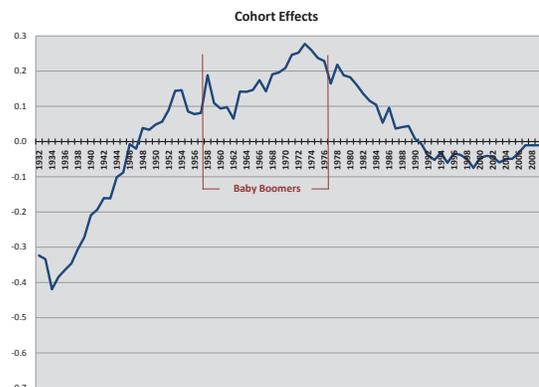
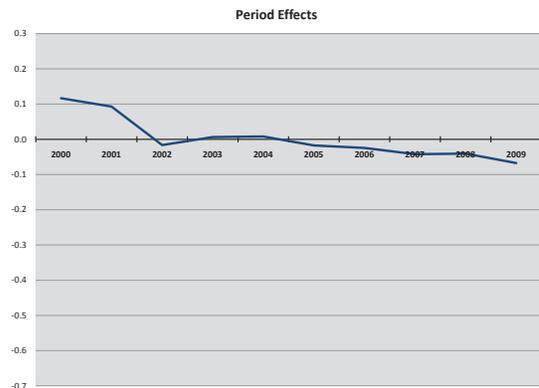
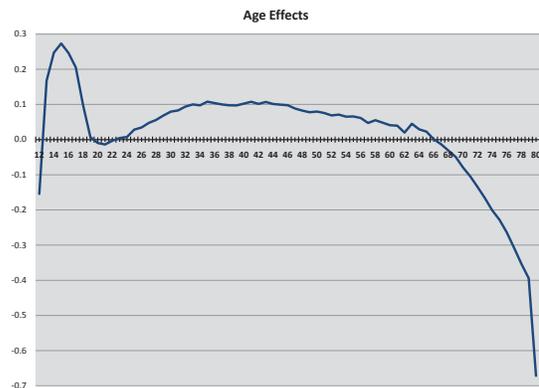
Between age 15 and 23, a significant number of the boys who tried hunting decide it is not for them. Between age 25 and 35 about 99.5% continue each year. However, after age 35 hunter retention gradually declines. About 2% drop out each year age 35-63. After age 63, 5-10% or more drop out each year. Still, its important to consider that these survival ratios may vary across cohorts. In particular, evidence suggests that Baby Boomers will be more likely to continue to hunt as they grow older than the older cohorts shown here because they already hunt more, are healthier, and are wealthier than any cohort that has come before.



Age, Period, Cohort Analysis

Examining patterns of hunter participation by time period, age, and cohort reveals several factors pointing to the fact that the hunter population is declining. These declines are somewhat related to the changing age structure of the Wisconsin population, yet participation rates for male gun hunters have declined at almost every age, suggesting that the time period is a more important factor in hunter decline. In addition, cohort groups of hunters tend to lose participation over time, as a proportion of hunters drop out each year. Evidence suggests that generational differences are an important explanation for changing numbers of hunters as well. In sum, hunter numbers have been declining due to a combination of time period, age, and cohort effects that work in conjunction with one another.

Age effects are relatively straightforward and related to life course events that tend to occur at particular ages (like going away to college, having children, or retiring) and physiological changes that occur as our bodies mature. Time period effects could represent specific events that occur at a certain moment in time, like the discovery of CWD in the Wisconsin herd, or more gradually occurring biological, social, economic, political, and cultural changes that have transpired over the last few years (i.e., programs promoting youth hunting, habitat change, or economic recession). Cohort effects refer to experiences of different generations and reflect social and cultural transformations that occurred in the past or that have occurred very gradually over a long period of time and have impacted different age groups in different ways (such as urbanization and improved medical care that extends healthy life). Thinking about changes in the deer hunter population in these ways offers a first look into how and why the population is changing and how it might continue to change over the next several years.



The complicated thing about an age-period-cohort analysis is that these factors work simultaneously making it difficult to separate effects caused by each individual component. In other words, it is difficult to tell whether it is a group's age at the moment, something about the time period, and/or a cohort issue that is affecting participation rates. The previous charts and discussion have attempted to distinguish these effects; yet, the three continue to confound one another. In order to isolate the effects of age, period, and cohort and to individually examine each, we implement an Age-Period-Cohort (APC) statistical analysis aimed at understanding how each of these factors works independently of the others to impact the Wisconsin deer hunting population. Using data from 2000 to 2009 on the number of licenses sold by single year of age (12 to 80+), we estimate the independent effects of age, period, and cohort on changes in the Wisconsin male gun deer hunter population.

The charts at left show the results of this analysis by likelihood to purchase a hunting license. Values below the zero axis represent decreased likelihood of hunting at that age, cohort, or time period. Values above the zero axis represent increased likelihood to hunt. The vertical scale for each chart is the same to facilitate comparing age, period, and cohort effects to one another. These results by age, period, and cohort inform the APC projection model shown later in this report.

Period effects demonstrate a consistent decline in the likelihood to hunt across all age and cohort groups over time. Age and cohort effects are stronger than period effects (farther from zero). Focusing on age, males are most likely to hunt as teens. After age 65, the likelihood of men to hunt decreases steadily. Cohorts who started to hunt 1952 to 1986 are most likely to hunt, and particularly those who came of age 1970-1977 (the later cohorts of the Baby Boom generation who were born 1958-1965). Generations following the Baby Boomers have been less likely to hunt. In particular, recruitment of cohorts coming of age since 1990 has been weak. These are the Millennial generation.

Note, however, that the effect of cohort on generations born prior to 1940 is difficult to interpret because we do not have observations of these cohorts before they were age 60 and already at older ages. They may have already been less likely to hunt due to old age, rather than cohort.



Future Deer Hunter Projections: Data and Methods

The two sources of data used in generating projections are (1) counts of Wisconsin resident gun deer hunting license purchases by single year of age and sex provided by the Wisconsin Department of Natural Resources Wildlife Management for the years 2000 to 2009, and (2) estimates and forecasts of the total population of the State of Wisconsin by single year of age and sex provided by Emeritus Professor Paul Voss at the Applied Population Laboratory. These forecasts were created using a cohort-component method of forecasting in May 2007.

We include three different projection models (scenarios) to project the number of future Wisconsin resident male gun deer hunters. Two of these models (Constant Rate and APC) follow a share projection methodology, whereby a subset of the population (in this case, deer hunters) is expressed as a proportion of the total population (here, the State of Wisconsin). Hunting rates are calculated by dividing the number of male hunters of a certain age by the Wisconsin male population of the same age. For instance, 28% of all 48 year old males in Wisconsin in 2009 were gun deer hunters. This approach offers insight into how changes in Wisconsin's population composition may affect future numbers of hunters in the coming years. The **Constant Rate** model assumes that age-specific participation rates from 2009 will remain constant each year into the future. These 2009 rates are then applied to a forecast of the total Wisconsin male population by age to generate a projection of the future number of male gun deer hunters. This model assumes that any change in the number of future hunters will be attributable to changes in the age structure of the base population (the total male Wisconsin population). The approach is well-suited for situations in which it is believed that participation rates by age will remain stable over time, but would produce an unrealistic projection of future hunters if participation rates change over time. In this case, the current structure of the hunter population with small cohorts of younger hunters and our age, period, and cohort analysis all suggest that participation rates will continue to decline. For these reasons, the share model is not likely a realistic projection of future hunters. Instead, this model might best be used as a gauge against which to compare other projection models.

The **Age-Period-Cohort** (APC) model also follows a share approach, but rather than assuming 2009 rates will remain constant, it applies statistical estimates of the likelihood of hunting by age, period, and cohort (as shown in the charts on page 5) to construct future participation rates. Like the Constant Rate share model, it then multiplies these rates times the projected future Wisconsin male population by single year of age, cohort group, and time period. First, the effect of every age (12 to 80+), period (2000 to 2009), and cohort (1932 to 2009) is estimated using Yang et al.'s (2008)ⁱ "intrinsic estimator" statistical approach in Stata software. We then transform the likelihood estimates and combine them to generate expected future participation rates by age, period, and cohort. The age effect is assumed to remain stable into the future, the period effect is assumed to continue to decline at the same average pace that it has over the last five years, and the effect of cohorts entering hunting starting in 2008 is assumed to be the average of the 1992 to 1997 cohorts. The APC model assumes that future participation rates will be affected by age, period, and cohort effects *and* it considers the changing age structure of the total Wisconsin male population. Note: this is a new method that has not been well tested, but theoretically it should provide a realistic projection of future hunters.

In addition to the share models, we also provide a **Cohort Survival** projection model. This model follows a different logic. Rather than using the total Wisconsin male population as a base, this approach uses that current (2009) hunting population as a base. We start with 2009 hunters and age them forward over time. Each year, we assume that a certain proportion of hunters will "survive" to hunt again the next year, following the average survival ratios by age that were observed 2004-2009. Survival ratios depict changes in the hunter population, year to year and age to age. They measure the effects of people recruited into and dropping out of hunting. The ratios are calculated for several pairs of years and then an average of retention ratios between 2004 and 2009 is calculated for each age. For example, the average ratio for 13 to 14 year old male gun hunters is 1.054. This means that the number of 14 year old hunters is on average 5.4% larger each year than the number of 13 year old hunters the previous year. These ratios are shown in the Average Annual Retention by Age chart on page 4. Only the survival ratios for the youngest ages (12 to 13 and 13 to 14) show increases; all other ratios show decreases in the number of hunters as cohorts age over time. The survival ratio model captures the effects of age, recent period changes, and to a lesser extent "generational" (or cohort) trends because it follows cohorts of hunters over time. This model assumes that the average rates of transfer into and out-of hunting by cohorts at particular ages in recent years will continue into the future. The most significant point of error following this approach is in projecting the number of new 12-year old hunters who will be recruited into hunting each year. To make this projection, we assume that the percent of all 12-year olds who hunt in 2010 will be the average of this proportion 2004-2009 and that this proportion will steadily decline over time at a similar to pace to what it has over the last several years. This method should provide a realistic projection of future hunters.

ⁱ Yang, Y., W. J. Fu, S. Schulhofer-Wohl, and K.C. Land. 2008. The intrinsic estimator for age-period-cohort analysis: What it is and how to use it. *American Journal of Sociology* 113 (6): 1697-1736.

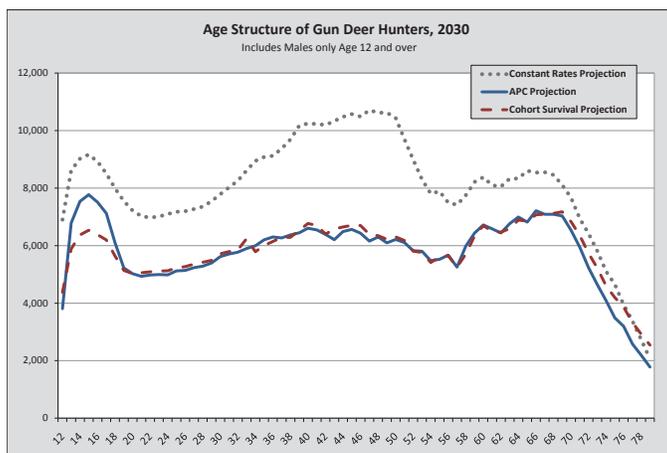
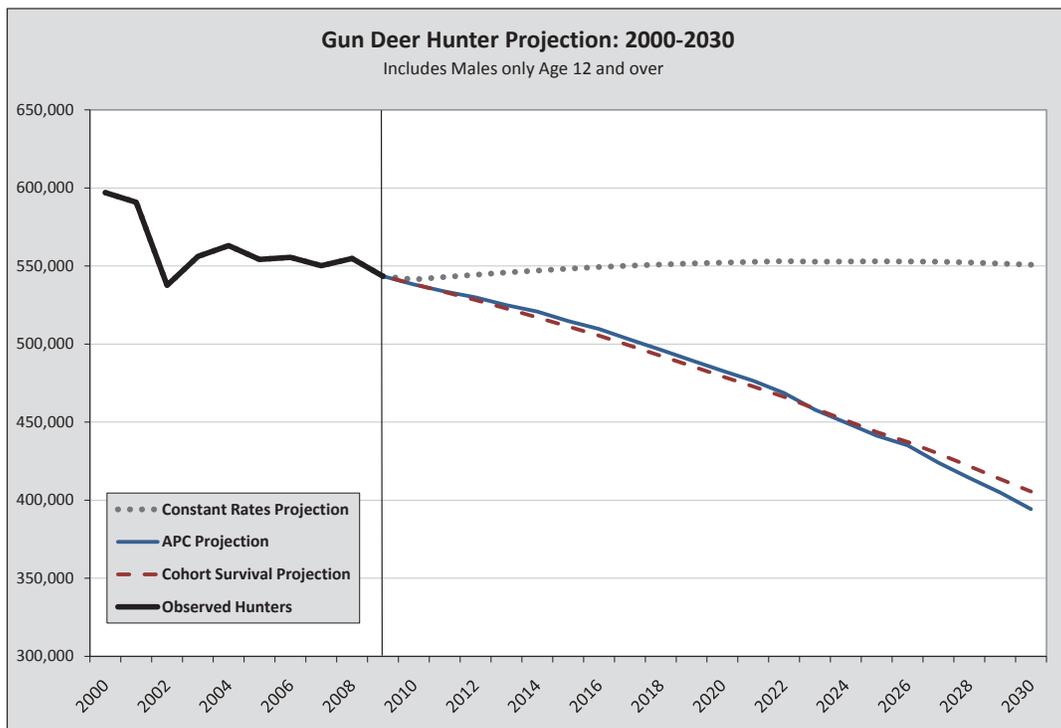


The Future of Deer Hunters in Wisconsin: Projections

Projections suggest that the number of male gun deer hunters will decline considerably over the next several years. Although they follow very different methodological approaches, both the Cohort Survival and APC models offer remarkably similar results. Both suggest that hunter numbers should be expected to decline so that in 2020, the number of male gun hunters would drop to about 480,000 (compared to 549,505 in 2010). By 2030, these models predict that the number could drop to 400,000 or fewer. If hunters continue to drop out of hunting and new young hunters enter hunting at rates similar to what they have in the recent past, then the Cohort Survival model should reasonably predict the number of future male gun hunters. The APC model assumes that participation rates of the Baby Boom generation will remain relatively high as this group ages until at least age 70, but that declining period effects and lower participation rates of younger cohorts will lead to declining participation rates across all ages over time.

Year	Observed	Constant	Survival	APC
2000	597,025			
2005	554,223			
2009	543,479			
2010		541,360	538,457	538,190
2015		548,291	511,241	514,784
2020		552,208	479,254	482,886
2025		552,965	443,594	441,347
2030		550,829	405,605	394,334

The Constant Rate model assumes that participation rates will *not* continue to decline as they have since 1980, but rather that participation rates will remain stable in the future at the same rates experienced in 2009. This model should be considered as a point of comparison with the other models, rather than a realistic scenario of future hunter population, unless there is a dramatic recruitment of young and middle age hunters within the next five years.



The chart at left shows the projected number of hunters in 2030 by age for each of the different models. The Cohort Survival and APC models produce very similar results, while the Constant Rate model produces a much younger hunter age structure.

The chart reveals that the most realistic projections will generate a scenario in which the hunter population is considerably older than it is today. By 2030, the APC and Cohort Survival models project that 28-30% of male gun deer hunters will be age 60 and over. This is important because it suggests the need for more accessible hunting opportunities for an aging population.

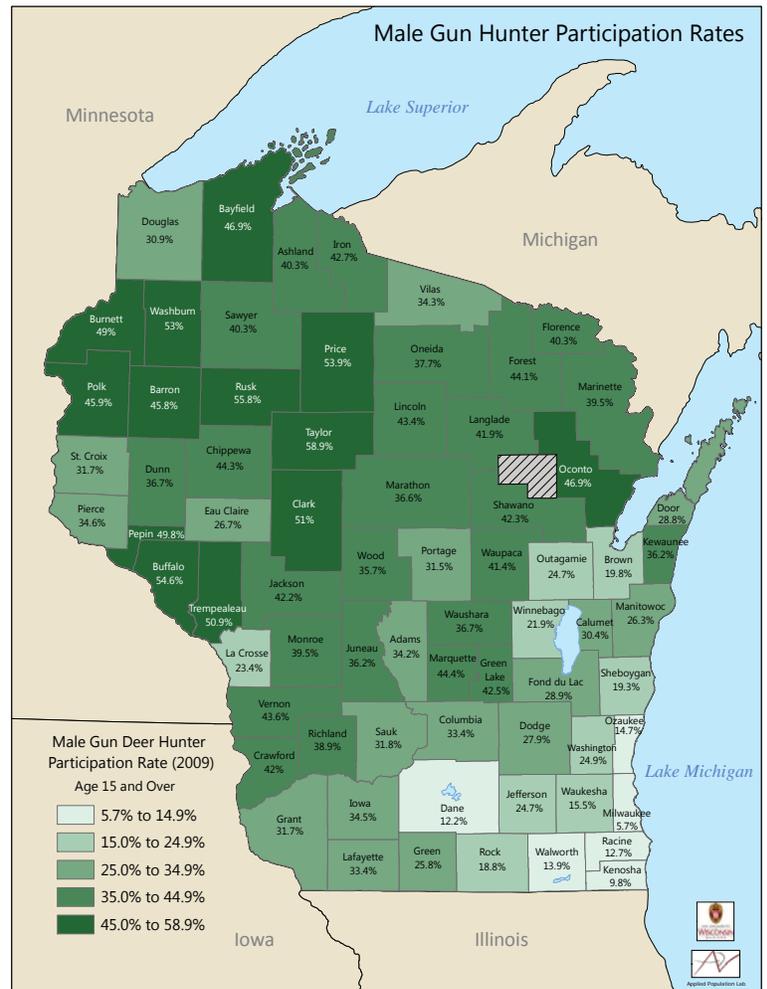
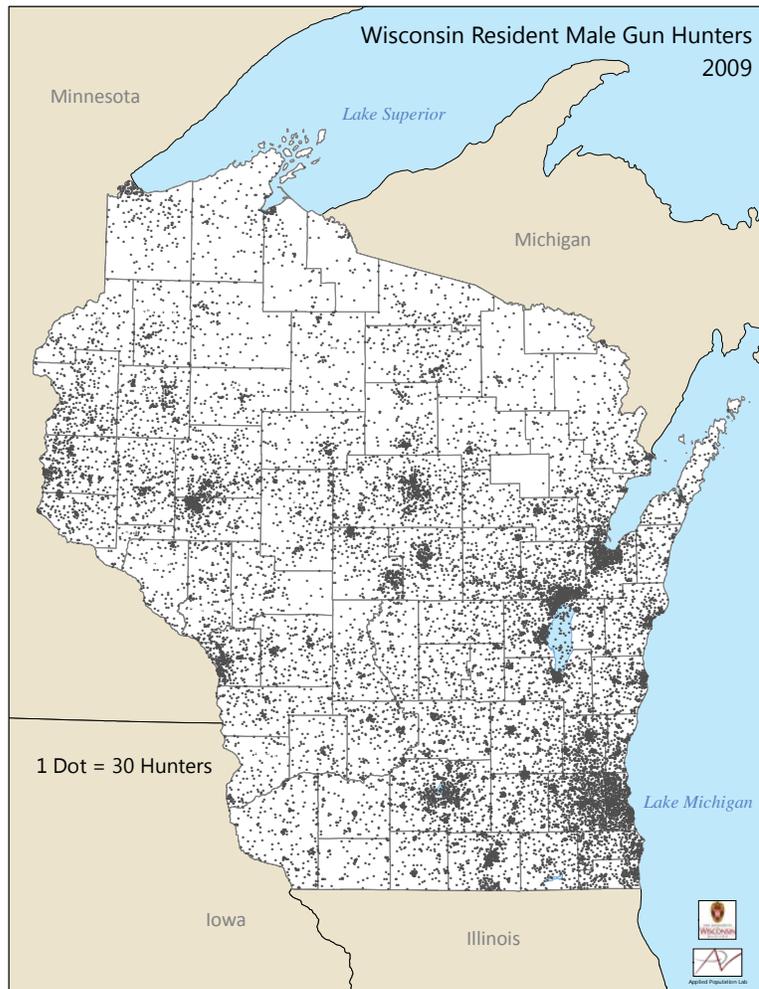
Where do Deer Hunters Live? A Geographical Analysis

This section examines where Wisconsin resident deer hunters live in order to better understand the changing male gun deer hunting population. The map on the left shows a dot for every thirty hunters, taken from WDNR license data that includes hunter addresses in 2009. Hunters are clustered in the major urban centers of the state. In fact, 56% of all male gun deer hunters lived in metropolitan counties in 2009, with 21% living in Dane (25,739 hunters), Waukesha (24,945), Milwaukee (21,278), Brown (20,617), and Marathon (20,394) counties alone.

At the same time, deer hunting is a more popular activity in the more rural parts of state and especially in the north. The map on the right shows hunting participation rates for males age 15 and over by county in 2009. The total number of male gun deer hunters residing in each county is divided by an estimate of the total male Wisconsin population at these ages living in each county. So, while a large number of people in the most urban areas hunt, it is still a small percentage of the total population-- only 5.7% of Milwaukee county males deer hunted in 2009. The reverse is true for more rural areas where 50% or more of males deer hunt. The culture of hunting is still alive in more rural areas of the state.

Participation rates are higher in western Wisconsin than in the eastern part of the state. We might expect participation to be stronger in the southwest than the southeast because it is considerably more rural. However, participation rates also tend to be higher in the northwest than the northeast, despite the fact that the northeast is at least as rural as the northwest.

Notes: Because these data are based on DNR license sales, American Indian hunters (especially prevalent in Menominee, Sawyer, Vilas, Forest, and Ashland counties) are not included in the numerators of these figures. Also, all of the maps showing county-level participation rates rely on US Census Estimates for county population by age and sex (vintage 2009) for the denominators. These data are the best currently available by age and sex; however, they may be somewhat imprecise, especially in counties experiencing recent changes in age-specific migration. Finally, the census estimates include the population living in prisons. This artificially reduces the 20-24 year old participation rates in Waushara, Jackson, Columbia, Sheboygan, Monroe, and Winnebago Counties and affects the change in recruitment rate in Waushara County. For these reasons, participation rates by county (particularly at ages 20-24) should be interpreted with some caution.



Retention and Recruitment Struggles are more Serious in Eastern Wisconsin

We've demonstrated that the number of deer hunters in Wisconsin is declining due to lower retention of middle aged hunters and also because of relatively low recruitment rates of young male hunters, particularly those in the Millennial generation. Here, we examine the geographic distribution of these factors mapping them by county. The map on the previous page shows that male gun deer hunter participation rates are generally lower in the eastern part of the state than the west. The analysis on this page shows that retention of middle aged hunters and recruitment of young males into hunting have also been lower in eastern Wisconsin over the last decade.

Retention of Middle Aged Hunters

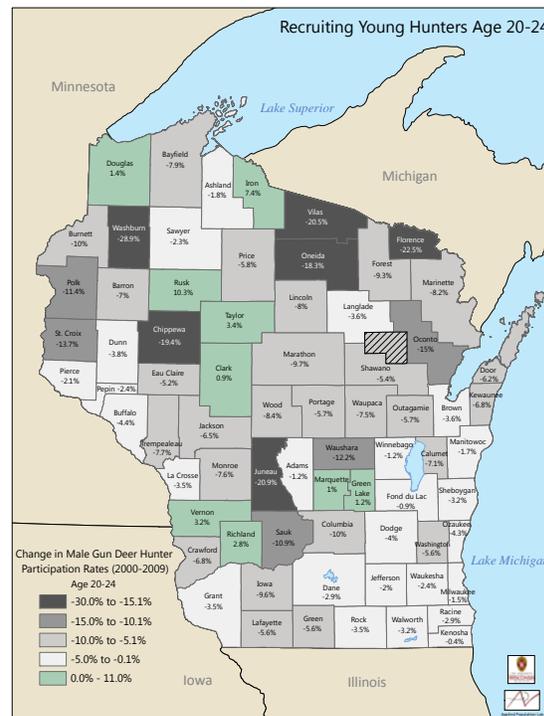
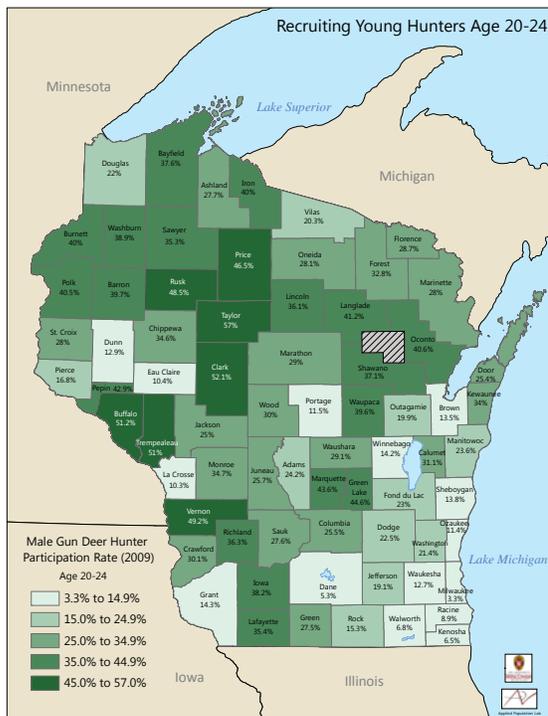
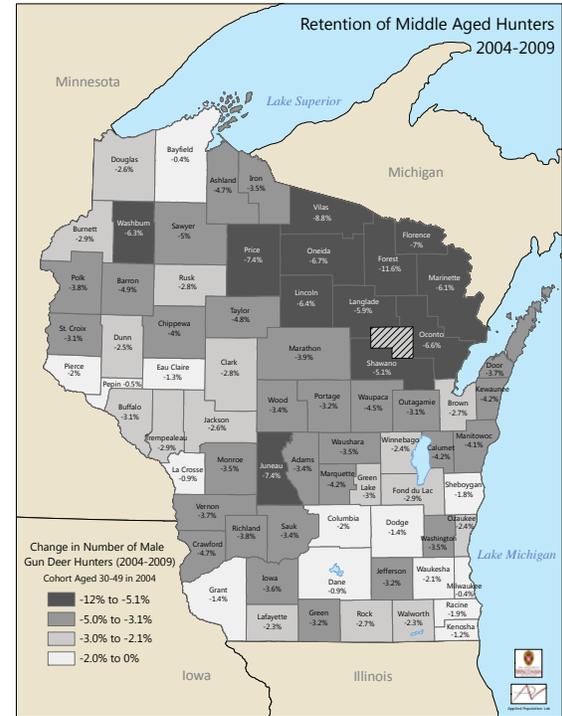
The map at right shows county-level declines in hunter participation rates among the cohort of male gun deer hunters who were age 30-49 in 2004 (and then age 35 to 54 in 2009). This group includes the latter half of the Baby Boom generation who have the highest deer hunting participation rates of any cohort of Wisconsin hunters. Darker grays depict more decline. For instance, in Forest County in 2004, 61.2% of this cohort of men hunted. Five years later in 2009, only 49.6% of the men in this cohort hunted (decline of 11.6%).

Participation declined most in northeastern Wisconsin, and in counties with significant retirement migration and lakefront development. Numerically, eastern counties generally lost more hunters, while western Wisconsin generally retained its hunting base.

Hunter Recruitment

Turning to recruitment of young hunters. The map below left shows participation rates in 2009 at ages 20-24, representing current recruitment levels. We examine ages 20-24 because by this age, a hunter identity is usually established and hunters generally continue to hunt for years to come. This map shows that participation is highest in the more rural and western areas of the state. In several counties, about half of young men hunt.

The map below right shows *change* in participation rates for 20-24 year olds between 2000 and 2009. This effectively compares recruitment of the Millennial generation (age 20-24 in 2009) to prior recruitment of Generation X hunters (age 20-24 in 2000). Almost everywhere recruitment has declined, but a few counties (shown in green) have increased young adult participation.



Reading these maps together, we can see that in St. Croix County, for instance, the participation rate among 20-24 year olds in 2009 was 28%. This represents a decline of 14% from 2000, when participation was 42% (28%+14%= 42%).

Declines have been most stark in counties (like St. Croix) where a metropolitan population has been expanding into more rural territory and in areas that have been experiencing retirement migration and lakefront development. Both of these are cases of growing population pressure and land development. In addition, they may limit hunting access and change local culture.

Key Points

- The number of gun deer hunting licenses sold to Wisconsin residents declined from 644,991 in 2000 to 602,791 in 2010. This is a decline of 6.5% in ten years. Declines have been most stark among males age 25-44, who have (in the recent past) hunted at high rates and killed a large number of deer.
- Hunter participation rates vary by age. Men are most likely to deer hunt as teens, but between age 15 and 23 a significant number of those who try hunting decide that it is not for them and do not continue. After age 60-65, hunter participation rates dropping off considerably as hunters reach older ages.
- Examining the population of male gun deer hunters in 2009 by age shows a large bulge in the Baby Boom generation (age 43-63) and a relative dearth of young hunters following them. As Boomer hunters age into years when health may keep them from hunting, hunter numbers are likely to decline. Still, Baby Boomers will likely hunt at relatively high rates later into life than their predecessors as they are more likely to stay healthier longer, to hunt, and to be wealthy enough to afford access and gear. As of 2010, the aging of the Baby Boom generation is **not** responsible for current hunter decline, but this will increasingly become an important factor over the next ten to twenty years.
- Hunter participation rates at all age and cohort groups have steadily declined each year since 2000. If Wisconsin males had continued to hunt at the same rate as they did in 2000 (by age), there would have been 105,000 more hunters than the number of licenses actually sold in 2009.
- Projections suggest that the number of male gun deer hunters will decline considerably over the next several years. Between 2010 and 2020, projections suggest hunters will decline from 549,505 licenses sold to about 480,000. By 2030, the number of male gun deer hunters is projected to decline to 400,000 or fewer.
- The population of hunters is also projected to age considerably in coming years. By 2030, approximately 30% of male gun deer hunters will be over age 60. This suggests a need for more accessible hunting opportunities for an aging population.
- Most Wisconsin hunters (56%) live in metropolitan counties. However, the rate at which people hunt is significantly higher in more rural areas and particularly in northern Wisconsin. In several counties, 50% or more of men age 15 and over hunt. Interestingly, participation rates are somewhat higher in western Wisconsin than in the eastern part of the state.
- The recent decline in male gun deer hunter numbers can be attributed to relatively weak retention of hunters age 35-45 over the last decade and to relatively weak recruitment of young men into hunting who were born since 1980.
- The table at right shows annual hunter retention over the last decade by age group. Retention of male gun hunters drops off after age 35. While 99.5% of hunters age 20-35 continue hunting each year, after age 35 increasing numbers of hunters drop out. County-level analysis shows that retention of middle-aged hunters has been declining more rapidly in eastern Wisconsin than west with large declines in the southeast, the Fox Valley, and the northeast.
- Furthermore, relatively few males born since 1980 have been recruited into hunting at young ages, making the cohorts of hunters age 20-30 in 2010 small. This shift coincides with what is often referred to as the Millennial Generation (see Howe and Strauss 2000). Research suggests that Millennials are less likely to participate in all types of outdoor recreation than preceding generations and that they are less likely to agree that “it is important to be outside as much as possible” (Leisure Trends Group 2008, Howe 2009).
- Geographically, young hunter (age 20-24) participation rates are stronger (and declining less) in the west than in the east. Overall, the Millennial generation is being recruited into hunting at lower rates than the prior Generation X in almost every county. This has particularly been the case in areas where a metropolitan population has been expanding into more rural territory (like St. Croix and Polk Counties) and in areas that have been experiencing retirement migration and lakefront development (e.g. Vilas, Oneida, Washburn, and Juneau Counties). These are cases of growing population pressure and land development. In addition, they may limit hunting access and change local culture.

Average Male Gun Hunter Retention (Year to Year)

Age	Drop Out Rate
25-35	0.5%
35-45	1.5%
45-55	1.9%
55-65	2.7%
65-75	6.1%
75-79	10.6%

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