Deer Hunting in the United States: An Analysis of Hunter Demographics and Behavior

Addendum to the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

Report 2001-6

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Introduction

Deer hunting is unquestionably the most popular form of hunting in the U.S. According to the *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (*FHWAR*), there were 10.3 million deer hunters in 2001, which is more than four times greater than the second most hunted species: turkey. For individuals over 16 years of age, nearly 1 in every 20 Americans and 8 in 10 hunters hunted deer in 2001, and their hunting-related expenditures while seeking deer totaled nearly $10.7 billion.[1]

This report seeks to provide information about deer hunter demographic characteristics, spending pattern, use of primitive weapons, land ownership and leasing behavior, and license purchasing pattern. It is intended to be used as an informational tool by resource managers, academics, product manufacturers, and other interested parties. To help clarify and make the information contained herein useful, this report often employs a contrasting style that compares deer hunters to non-deer hunters.[2]

Report Organization
The report is organized into four parts:

Part One: The "Participation and Demographics" section examines the size and geographic dispersion of the deer hunting population. Additionally, for widely used demographic features such as income, age, gender, education, and geographic location, the distribution of the U.S. population is compared to that of both deer and non-deer hunters.

Part Two: The "Contrasting Hunting Activities of Deer and Non-Deer Hunters" section contrasts additional characteristics of deer and non-deer hunters. These additional characteristics are applicable only to hunters and include hunter expenditures, hunting land ownership and leasing pattern, and the wildlife-watching pattern of hunters.

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Part Three: The "Deer Hunter Behavior Patterns" section provides a detailed analysis of several aspects of deer hunter behavior. The use of primitive weapons, land ownership and leasing pattern, and license purchasing behavior are all examined.

Part Four: Lastly, in the "Nonlicensed Deer Hunter Model" section, a logit regression model is used to identify the impact that numerous deer hunter characteristic variables have on the probability that a hunter will hunt without a hunting license.

All reported data contained herein are from the *2001 FHWAR*.[3] Consequently, all participation, dollar expenditures, and hunting behavior statistics are representative of 2001. Additionally, all data represents persons age 16 years and older.

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[1] "Economic Importance of Hunting in America," International Association of Fish and Wildlife Agencies, 2002 .

[2] Deer hunters can hunt species other than deer, but they must hunt deer to be categorized as such.

[3] FHWAR documents are available on the U.S. Fish and Wildlife Service webpage: http://federalaid.fws.gov/surveys/surveys.html.

Part One–Participation and Demographics

Deer Hunting Participation

Deer is clearly the species of choice for the majority of hunters in the U.S. Table 1 indicates that 79% or 10.3 million of the 13.0 million hunters in the U.S. hunted for deer. Turkey is the second most hunted species at 2.5 million. Behind turkey hunting, squirrel and rabbit follow at around 2 million each and then several bird species at 1 to 1.5 million.

The third and the fourth columns of Table 1 are included to provide additional information on other hunting activities of deer hunters. The third column entitled "Hunters Who Also Hunt Deer" indicates the number of hunters seeking each of the different species that also hunt deer. For example, this chart indicates that there were 910 thousand elk hunters in the U.S., and 656 thousand of these elk hunters also hunt deer. The fourth column entitled "Percent Deer Hunters" indicates the percent of hunters seeking each particular species who also hunt deer. In other words, it measures the proportion of other species hunters that hunt deer. Following this example, the 656 thousand elk hunters that also hunt deer represent 72% of all elk hunters.

Table 1. All Hunters and Deer Hunters by Species Type: 2001
(Population 16 years of age and older. Numbers in thousands.)

	All Hunters	Percent of All Hunters	Hunters Who Also Hunt Deer	Percent Deer Hunters
Total, All Hunters	13,034	100%		
Big Game				
Deer	10,272	79%	10,272	100%
Elk	910	7%	656	72%
Bear	360	3%	309	86%
Turkey	2,504	19%	2,203	88%
Moose	65	(Z)	*27	*41%
Other Big Game	498	4%	410	82%
Small Game				
Rabbit	2,099	16%	1,654	79%
Quail	992	8%	562	57%
Grouse	1,011	8%	755	75%
Squirrel	2,119	16%	1,772	84%
Pheasant	1,723	13%	1,065	62%
Other Small Game	526	4%	358	68%
Migratory Bird				
Geese	1,000	8%	669	67%
Duck	1,589	12%	979	62%
Dove	1,450	11%	964	67%
Other Migratory Bird	225	2%	116	51%
Other Animals				
Groundhog	276	2%	239	87%
Raccoon	263	2%	172	65%
Fox	140	1%	121	86%
Coyote	530	4%	435	82%
Other Animals	130	1%	82	63%

*Estimate based on a small sample size.
(Z) Less than 0.5 percent.
Note: Detail does not add to total because of multiple responses.

The "Percent Deer Hunters" column reveals that other species hunters are also avid deer hunters. With the exception of Moose at 41%, over 50% of hunters for other species are also deer hunters. As seen in Table 1, for the remainder of the Big Game species (Elk, Bear, Turkey, and Other Big Game), more than 80% of the hunters also hunt deer. Turkey hunters are the most likely to also be deer hunters. With few exceptions, migratory bird hunters typically have the lowest crossover into deer hunting. About 51% to 67% of migratory bird hunters (Geese, Duck, Dove, and Other Migratory Bird) also hunt deer.

There is one additional question of interest with respect to the other species hunting activity of deer hunters. Given the ample crossover of other species hunters into deer hunting, one might be inclined to ask the question: how many hunters seek deer and nothing else? While it is not evident in Table 1, about 4.3 million or 42% of deer hunters hunt deer and nothing else.

Tables 2 and 3 contain state-by-state estimates of deer hunting participation. Table 2 contains the number of all-species hunters and deer hunters by state. Table 3 contains the total days of deer hunting that occurred within each state, along with the total of all hunting days, and percent of all hunting days spent hunting deer.

Table 2. All Hunters and Deer Hunters, by State Where Hunting Occurred: 2001
(Population 16 years of age and older. Numbers in thousands.)

	All Hunters	Deer Hunters Number	Deer Hunters Percent
U.S. Total	13,034	10,272	79%
AK	93	19	20%
AL	423	379	90%
AR	431	314	73%
AZ	148	63	43%
CA	274	*84	*31%
CO	281	99	35%
CT	45	*26	*59%
DE	16	11	67%
FL	226	*156	*69%
GA	417	332	80%
HI	17	*7	*44%
IA	243	133	55%
ID	197	125	63%
IL	311	238	77%
IN	290	215	74%
KS	291	140	48%
KY	323	231	72%
LA	333	207	62%
MA	66	56	84%
MD	145	126	87%
ME	165	145	88%
MI	754	667	89%
MN	597	475	80%
MO	489	373	76%
MS	357	289	81%
MT	229	155	68%
NC	295	207	70%
ND	139	74	53%
NE	173	78	45%
NH	78	67	86%
NJ	135	111	83%
NM	130	75	58%
NV	47	*24	*52%
NY	714	651	91%
OH	490	417	85%
OK	261	199	76%
OR	248	183	74%
PA	1,000	932	93%
RI	*8	*5	*63%
SC	265	207	78%
SD	209	68	33%
TN	359	228	64%
TX	1,201	860	72%
UT	198	139	70%
VA	355	313	88%
VT	100	92	92%
WA	227	157	69%
WI	660	597	90%
WV	284	259	91%
WY	133	66	50%

*Estimate based on a small sample size.

Among other things, Table 2 reveals that deer hunting is a prominent activity in nearly every state. At least 50% of hunters in all but a few states hunt deer, and there are 21 states in which deer hunting participation is greater than 75%. Pennsylvania has the highest proportion of deer hunters while Texas has the largest number. Conversely, Alaska has the lowest proportion of deer hunters while Rhode Island has the fewest number.

Table 3. Days All Hunting and Deer Hunting, by State Where Hunting Occurred: 2001
(Population 16 years of age and older. Numbers in thousands.)

|		Days of Deer Hunting	
	Days All Hunting	*Number*	*Percent*
U.S. Total	228,368	133,457	58%
AK	1,146	183	16%
AL	7,616	6,309	83%
AR	8,411	4,792	57%
AZ	1,694	556	33%
CA	3,426	*904	*26%
CO	2,610	625	24%
CT	766	*479	*63%
DE	226	155	69%
FL	4,693	*2,930	*62%
GA	7,973	5,769	72%
HI	*316	*83	*26%
IA	3,989	1,346	34%
ID	2,100	837	40%
IL	4,522	3,146	70%
IN	5,000	2,593	52%
KS	3,647	1,295	36%
KY	4,664	2,281	49%
LA	6,442	4,250	66%
MA	1,158	610	53%
MD	1,799	1,298	72%
ME	2,469	1,918	78%
MI	8,994	6,266	70%
MN	8,437	4,587	54%
MO	6,606	3,783	57%
MS	8,481	6,690	79%
MT	2,442	1,075	44%
NC	7,526	4,747	63%
ND	1,635	554	34%
NE	2,204	662	30%
NH	1,459	1,001	69%
NJ	3,120	2,742	88%
NM	1,667	399	24%
NV	490	*154	31%
NY	13,187	9,133	69%
OH	10,233	4,062	40%
OK	5,642	2,979	53%
OR	2,947	1,528	52%
PA	13,955	7,413	53%
RI	*104	*56	*54%
SC	4,744	3,507	74%
SD	2,425	474	20%
TN	6,651	3,665	55%
TX	14,081	8,298	59%
UT	2,455	789	32%
VA	5,818	4,059	70%
VT	1,510	1,118	74%
WA	2,951	1,122	38%
WI	9,653	7,052	73%
WV	5,166	2,707	52%
WY	1,304	476	37%

Estimate based on a small sample size.

A comparison of the estimates in Tables 2 and 3 reveals several interesting points. The percent of hunters that hunt deer from Table 2 (79%) and the percent of hunting days spent deer hunting from Table 3 (58%) indicate that deer hunting is substantially less prominent as a proportion of all hunting days in the U.S. When days are considered, deer hunting makes up the majority of hunting activity in 31 states and represents more than 75% of all hunting activity in only 3 states.

General Demographic Characteristics

Tables 4 to 6 address the distribution of the U.S., deer hunter, and non-deer hunter populations among widely used demographic characteristics such as income, age, gender, education, and geographic location. All tables follow a similar format. The first two columns present the distribution of the U.S. population among the demographic variables of interest. The first column "Number" indicates the distribution in quantity, and the second column "Percent" presents the proportion of total individuals that appear in each respective category of the demographic variable. Thus, in Table 4, the second column indicates that 4% of the U.S. population 16 years or older is either 16 or 17. The "Number" and "Percent" columns within the Deer Hunter and Non-Deer hunter categories are handled similarly. The "Percent of U.S. Population" under Deer Hunters and Non-Deer hunters indicates the proportion of the U.S. population that participates in each activity category. For example, row two of Table 4 reveals that 6% of the U.S. population age 16 and 17 hunt deer, and 1% hunt species other than deer.

Figure 1: Percent of Hunters Who Sought Deer

Legend:
- ☐ Small sample
- ☐ ≤ 60 percent
- ☐ 60–75 percent
- ☐ ≥ 75 percent
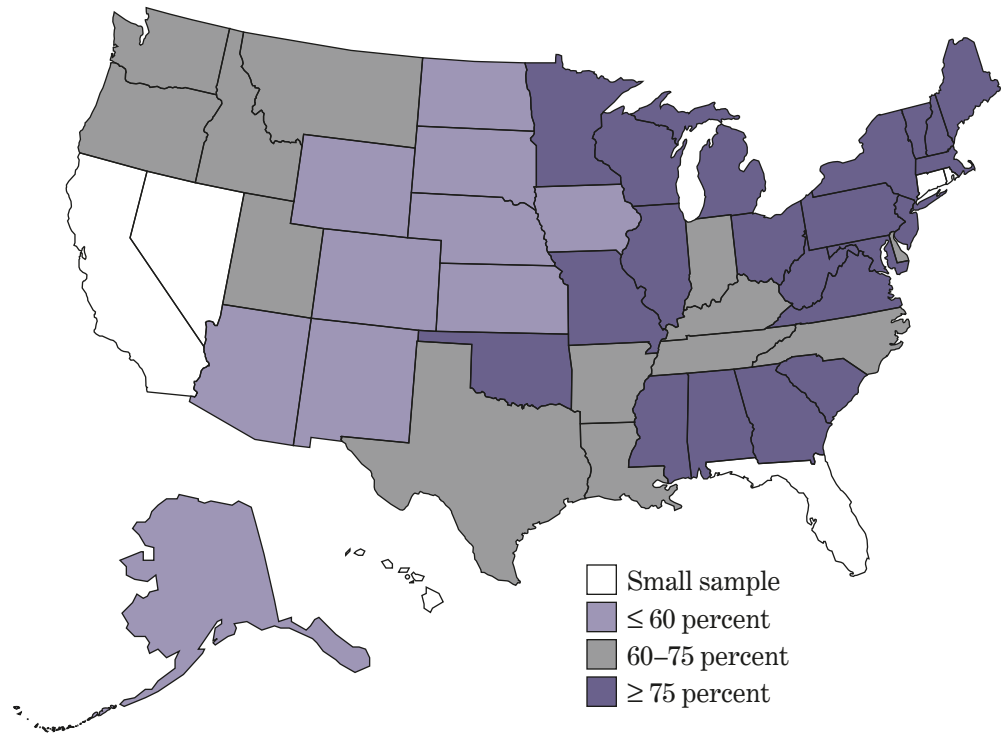
Age
There are several important similarities in the age distribution of deer hunters and non-deer hunters in Table 4. The age category with the greatest number of participants and the proportional level of participation is the same for both deer and non-deer hunters: 35-44 years. Likewise the age category with the least number of participants and the percent of participation is also the same: 16-17 years.

Table 4. Age Distribution of U.S. Population, Deer Hunters, and Non-Deer Hunters: 2001
(Population 16 years of age and older. Numbers in thousands.)

Age	U.S. Population Number	U.S. Population Percent	Deer Hunters Number	Deer Hunters Percent	Deer Hunters Percent of U.S. Population	Non-Deer Hunters Number	Non-Deer Hunters Percent	Non-Deer Hunters Percent of U.S. Population
U.S. Total	212,298	100%	10,272	100%	5%	2,762	100%	1%
16-17	7,709	4%	475	5%	6%	110	4%	1%
18-24	22,234	11%	994	10%	5%	256	9%	1%
25-34	35,333	17%	1,879	18%	5%	534	19%	2%
35-44	44,057	21%	2,848	28%	7%	702	25%	2%
45-54	40,541	19%	2,212	22%	6%	609	22%	2%
55-64	25,601	12%	1,151	11%	5%	298	11%	1%
65+	36,823	17%	713	7%	2%	253	9%	1%

There is one important difference in the age distribution of deer and non-deer hunters. The proportion of hunters over the age of 65 is noticeably lower for deer hunters. While 9% of all non-deer hunters are over 65, only 7% of deer hunters are in this segment. As baby boomers increasingly surpass 65, this alone indicates an impending change in deer hunting participation. However, the "Percent of the U.S. Population" column is even more telling. The percent of the U.S. population 55-64 years old that deer hunts is 5%, but it falls to 2% for those over 65. This represents a 58% decline in the participation rate. The obvious implication, provided that this pattern persists, is that deer hunting will likely experience more dramatic declines in participation than hunting for other species.

Gender
The gender distribution for deer and non-deer hunters is very similar. Figure 2 reveals that about 90% of both deer and non-deer hunters are males. Only about 10% of both are female. Nevertheless, there are a sizable number of female deer hunters, close to one million.

Education
Deer hunting is a popular activity for all educational backgrounds, as shown in Figure 3. At 45%, nearly half of all deer hunters have at least some college. Another 41% have a high school education, and 14% have less than a high school education.

Despite the widespread appeal of deer hunting, non-deer hunters are likely to have more years of education. The proportion of deer hunters with 4 years of college or more is 20%. Meanwhile, 32% of non-deer hunters have 4 years of college or more. While non-deer hunters are likely to have more years of education, both deer and non-deer hunters have a higher proportion with 12 or more years of education than the entire U.S. population.

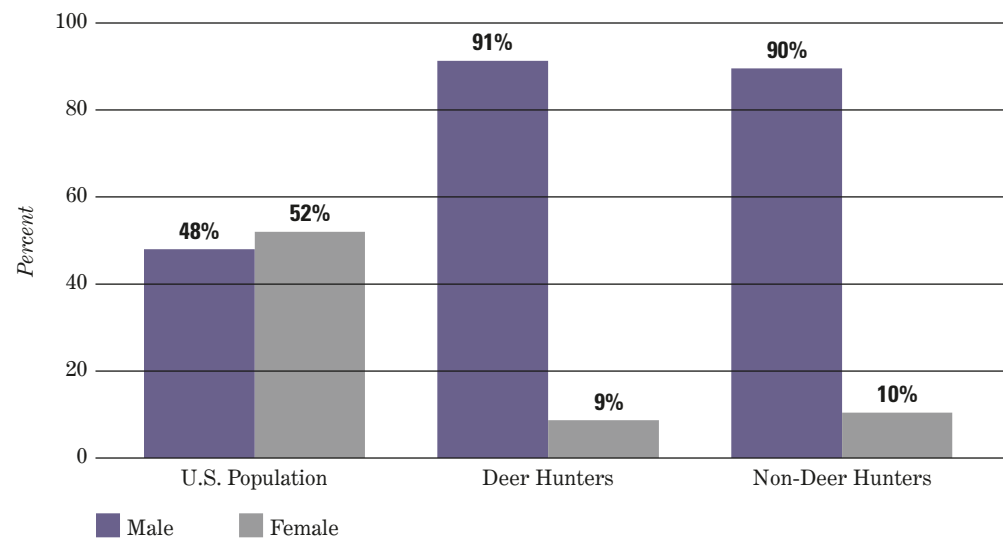**Figure 2. Gender Distribution of U.S. Population, Deer Hunters, and Non-Deer Hunters 16 Years of Age and Older: 2001**

Figure 3. Education Distribution of U.S. Population, Deer Hunters, and Non-Deer Hunters 16 Years of Age and Older: 2001
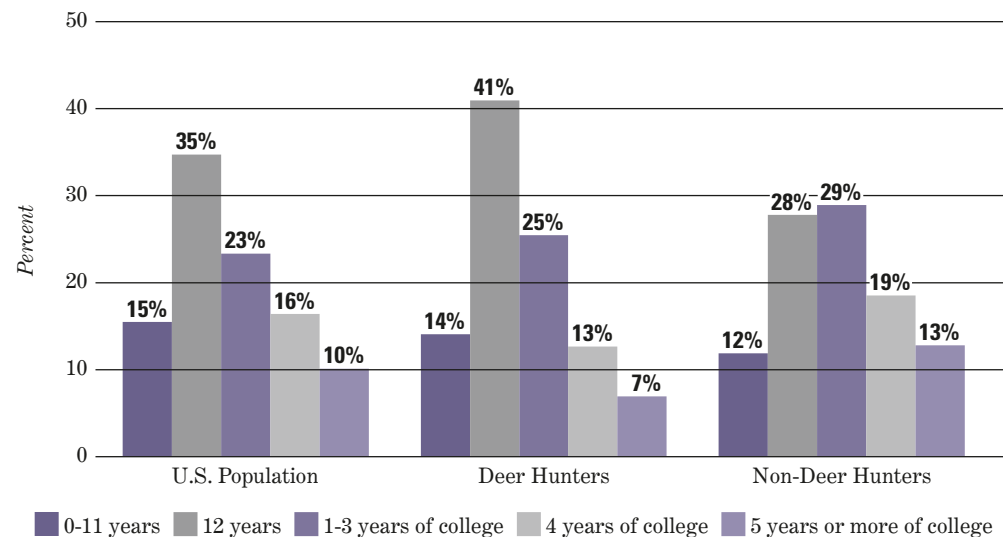
Table 5. Income Distribution of U.S. Population, Deer Hunters, and Non-Deer Hunters: 2001

(Population 16 years of age and older. Numbers in thousands.)

Region	U.S. Population		Deer Hunters			Non-Deer Hunters		
	Number	Percent	Number	Percent	Percent of U.S. Population	Number	Percent	Percent of U.S. Population
U.S. Total	212,298	100%	10,272	100%	5%	2,762	100%	1%
Not Reported	57,606	27%	1,965	19%	3%	528	19%	1%
Under $10,000	10,594	5%	320	3%	3%	82	3%	1%
$10-$19,999	15,272	7%	594	6%	4%	159	6%	1%
$20-$24,999	10,902	5%	504	5%	5%	125	5%	1%
$25-$29,999	11,217	5%	593	6%	5%	132	5%	1%
$30-$34,999	11,648	6%	714	7%	6%	143	5%	1%
$35-$39,999	9,816	5%	561	6%	6%	158	6%	2%
$40-$49,999	16,896	8%	1,154	11%	7%	215	8%	1%
$50-$74,999	31,383	15%	1,989	19%	6%	506	18%	2%
$75-$99,999	17,762	8%	1,034	10%	6%	335	12%	2%
$100,000 or More	19,202	9%	845	8%	4%	381	14%	2%

Income

In general, the percent of the U.S. population that hunts deer increases as income increases (Table 5). For the high end of the income spectrum, $75,000 or more, the participation rate dips back down. Despite this dip, deer hunting participation is positively correlated with income. At 7%, the participation rate for deer hunting is highest for individuals with household incomes from $40,000-49,999.

The income distribution for non-deer hunters is similar to that of deer hunters, but there are a few differences. Like deer hunting, non-deer hunting is positively correlated with income. However, the proportion of the U.S. population that participates in non-deer hunting does not dip back down as it does for deer hunting. The participation rate continues to rise even at the high end of the income range. Consequently, it is not surprising that the proportion of hunters with incomes of $75,000 or more is higher for non-deer hunters than for deer hunters: 26% and 18% respectively.

Geographic Regions

Table 6 displays the distribution of deer and non-deer hunters by the U.S. Census Bureau's geographic regions. At 9%, the participation rate for deer hunting, shown in the "Percent of U.S. Population" column, is highest in the West North Central region. For non-deer hunting the participation rate reaches a high of 3% in both the West North Central and Mountain regions. Incidentally, the West North Central is also the region with the highest participation rate for fishing.

Table 6 reveals some differences in the geographic dispersion of deer hunters and non-deer hunters. A substantially higher proportion of deer hunters than non-deer hunters are located in the Middle Atlantic and East North Central regions. Combined, these regions account for 35% of deer hunters. However, only 17% of non-deer hunters are located in these regions. Non-deer hunters are more heavily concentrated in the Mountain and Pacific regions. They account for 28% of non-deer hunters compared to 11% of deer hunters.

Figure 4. Percent of Population that Hunts Deer in the Bureau of Census Regions

West

Pacific 1%
Mountain 5%

Midwest

West North Central 9%
East North Central 6%

Northeast

Middle Atlantic 5%
New England 3%

West South Central 7%
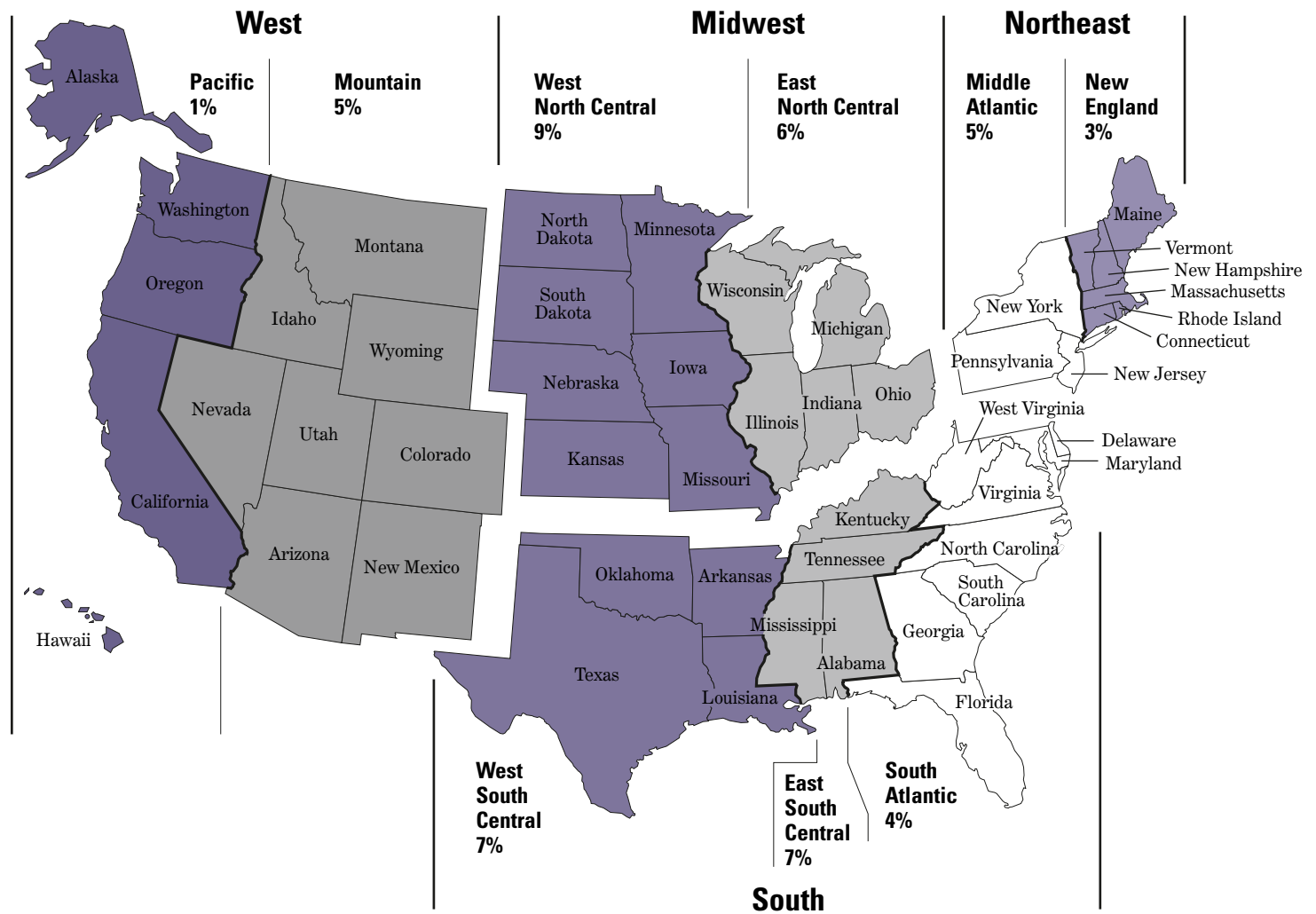East South Central 7%
South Atlantic 4%

South

Table 6. Geographic Distribution of U.S. Population, Deer Hunters, and Non-Deer Hunters: 2001
(Population 16 years of age and older. Numbers in thousands.)

	U.S. Population		Deer Hunters			Non-Deer Hunters		
Region	Number	Percent	Number	Percent	Percent of U.S. Population	Number	Percent	Percent of U.S. Population
U.S. Total	212,298	100%	10,272	100%	5%	2,762	100%	1%
New England	10,575	5%	342	3%	3%	44	2%	(Z)
Middle Atlantic	29,806	14%	1,515	15%	5%	119	4%	(Z)
East North Central	34,082	16%	2,062	20%	6%	359	13%	1%
West North Central	14,430	7%	1,251	12%	9%	459	17%	3%
South Atlantic	39,286	19%	1,557	15%	4%	319	12%	1%
East South Central	12,976	6%	915	9%	7%	248	9%	2%
West South Central	23,337	11%	1,536	15%	7%	452	16%	2%
Mountain	13,308	6%	631	6%	5%	389	14%	3%
Pacific	34,498	16%	464	5%	1%	374	14%	1%

(Z) Less than 0.5 percent.

Part Two–Contrasting Hunting Activities of Deer and Non-Deer Hunters

While the previous section compares deer and non-deer hunters to the U.S. population, this section focuses exclusively on deer and non-deer hunter populations. Comparisons are made between the population of deer hunters and non-deer hunters. It is important to remember that deer hunters may also engage in other types of hunting, and most will. As discussed in the participation section above, only 42% of deer hunters hunt deer and nothing else.

Expenditures

A basic summary of hunting days, trips, and hunting expenditures is shown in Table 7. Trip expenditures are directly related to hunting trips. They include but are not limited to food, drink, lodging, and transportation fees. Equipment expenditures include both hunting equipment such as rifles, ammunition, and hunting dogs, and auxiliary equipment that was used primarily for hunting rather than fishing such as camping equipment, clothing, and taxidermy costs. Special equipment includes purchases such as boats, campers, trucks, and cabins that were used primarily for hunting. Other expenditures include those associated with books, membership dues, licenses, land leasing, and land ownership.

Some highlights of Table 7 include the following. The average number of hunting days for all hunters is 18. Deer hunters average a slightly higher 20 days, while non-deer hunters are lower at 10 days. Mean number of trips has a very similar pattern: deer hunters are higher than the average for all hunters, and substantially higher than that for non-deer hunters. It must be reiterated that the days and trips of deer hunters can be spent hunting species other than deer. A considerable portion of the average 20 days of hunting by deer hunters is spent hunting other species.

Table 7. Deer and Non-Deer Hunter Days, Trips, and Expenditures: 2001
(Population 16 years of age and older. In thousands except for means and per person expenditures.)

	All Hunters	Deer	Non-Deer
Hunters	13,034	10,272	2,762
Days of Hunting	228,368	*200,216	28,152
Mean Days of Hunting	18	20	10
Trips	200,125	176,140	23,985
Mean Hunting Trips	16	17	9
Total Hunting Expenditures	20,611,025	17,780,591	2,830,434
Trip	5,252,391	4,297,479	954,913
Per Person Trip	403	418	346
Equipment	5,764,554	4,723,654	1,040,900
Per Person Equipment	442	460	377
Special Equipment	4,596,942	4,348,665	248,277
Per Person Special Equipment	353	423	90
Other	4,997,137	4,410,793	586,344
Per Person Other	383	429	212

*Includes days spent hunting species other than deer.
Note: Trip includes expenditures directly related to hunting trips, which includes but is not limited to food, drink, lodging, and transportation fees. Equipment includes both hunting equipment such as rifles, ammunition, and hunting dogs, and auxiliary equipment that was used primarily for hunting such as camping equipment, clothing, and taxidermy costs. Special Equipment includes purchases such as boats, campers, trucks, and cabins that were used primarily for hunting. Other includes those associated with books, membership dues, licenses, land leasing, and land ownership. Per person spending is defined as the total spending divided by the total number of deer hunters or non-deer hunters.

Total expenditures of deer and non-deer hunters are $20.6 billion. Deer hunters are responsible for $17.8 billion, or 86% of the total. This amount differs considerably from the $10.7 billion spent on deer hunting pointed out above. The difference occurs because a portion of the $17.8 billion spent by deer hunters is spent while seeking species other than deer. Non-deer hunters account for $2.8 billion. Per person spending of deer hunters is greater than that of non-deer hunters for all expenditure categories: Trip, Equipment, Special Equipment, and Other. Per person spending of deer hunters in a particular category is defined as the total spending of deer hunters therein divided by the total number of deer hunters.

While per person expenditures of deer hunters are greater in all categories, they are dramatically higher for "Special Equipment" and "Other." Per person, deer hunters spend $423 on "Special Equipment," while non-deer hunters spend only $90 per person. Similarly, deer hunters spend $429 per person on "Other" equipment, and non-deer hunters spend $212.

Further inspection into the differences in "Special Equipment" expenditures reveals that deer hunters spend more for nearly every type of special equipment. They spend more on boats, campers, trucks, motorbikes or 4-wheelers, and cabins.

Table 8 provides additional detail on "Other" expenditures, which include those associated with books, membership dues, licenses, land leasing, and land ownership. It indicates that the principal differences between deer and non-deer hunters arise due to disparities in land leasing and land ownership spending. Per person, deer hunters spend more than twice the amount of non-deer hunters on land ownership and more than three times the amount on land leasing. Deer hunters are substantially more likely to both own and lease land for hunting than non-deer hunters, and this greater propensity to lease and own is evident in their higher expenditures.

Hunting Land Ownership and Leasing

As mentioned above, deer hunters have a higher propensity to both lease and buy land used primarily for hunting. Table 9 indicates the proportion of deer hunters and non-deer hunters that both own and lease hunting land. While 10% of deer hunters own land used primarily for hunting, only 3% of non-deer hunters do the same. Similarly, 9% of deer hunters and 3% of non-deer hunters lease land.

Table 8. Deer and Non-Deer Hunter Other Expenditures: 2001
(Population 16 years of age and older. In thousands except for per-person.)

Expenditure Categories	Deer	Non-Deer
	10,272	2,762
Magazines, books	66,879	17,652
Per Person	*7*	*6*
Membership Dues	199,310	44,368
Per Person	*19*	*16*
Land Ownership	2,994,916	356,473
Per Person	*292*	*129*
Land Leasing	575,475	49,027
Per Person	*56*	*18*
Licenses	574,213	118,825
Per Person	*56*	*43*

Note: Per person spending is defined as the total spending divided by the total number of deer hunters or non-deer hunters.

Table 9. Hunting Land Ownership and Leasing by Deer and Non-Deer Hunters: 2001
(Population 16 years of age and older. Numbers in thousands.)

	Deer Hunters	Percent Deer Hunters	Non-Deer Hunters	Percent Non-Deer Hunters
Total Hunters	10,272	100.0%	2,762	100.0%
Own Land for Hunting				
Does Own	976	10%	85	3%
Does Not Own	9,219	90%	2,625	95%
Lease Land for Hunting				
Does Lease	893	9%	90	3%
Does Not Lease	9,302	91%	2,620	95%

Note: Detail does not add to total because of nonresponse.

Public and Private Land Hunting Days

Given the higher propensity of deer hunters to both own and lease land for hunting, one might suspect that they would hunt a higher proportion of hunting days on private land than non-deer hunters. This is the case and is displayed in Table 10. Deer hunters spend 77% of their hunting days on private land, while non-deer hunters spend 72%. Interestingly, both deer and non-deer hunters spend more than 70% of days on private land even though only a relatively small percentage either own or lease land for the primary purpose of hunting. The results in Table 10 also reveal the importance of public lands on overall hunting activity. About one quarter of all days spent hunting occurs on public lands.

Wildlife-Watching Pattern

The wildlife-watching patterns of both deer and non-deer hunters are displayed in Table 11. Wildlife watching around the home denotes that hunters closely observed, fed, or photographed wildlife within a one-mile radius of their homes or maintained natural areas around their home for which benefit to wildlife was an important concern. Wildlife watching away from home refers to hunters who took trips at least one mile from their homes for the primary purpose of observing, photographing or feeding wildlife.

The wildlife-watching patterns of both deer and non-deer hunters are quite similar. About 55% of both participated in around-the-home wildlife watching, and about 30% of both took wildlife-watching trips away from home.

Table 10. Private Land and Public Land Hunting Days for Deer and Non-Deer Hunters: 2001
(Population 16 years of age and older. Numbers in thousands.)

	Deer		Non-Deer	
Total Hunting Days	140,467	100%	112,573	100%
Private Land	107,794	77%	80,655	72%
Public Land Days	32,673	23%	31,919	28%

Note: Days of hunting by deer hunters include days for hunting species other than deer.

Table 11. Wildlife-Watching Patterns of Deer Hunters, and Non-Deer Hunters: 2001
(Population 16 years of age and older. Numbers in thousands.)

	Deer Hunters	Percent Deer Hunters	Non-Deer Hunters	Percent Non-Deer Hunters
Total	10,272	100%	2,762	100%
Around-the-Home Watching				
Participates	5,842	57%	1,444	52%
Does Not Participate	4,412	43%	1,311	47%
Wildlife-Watching Trips				
Participates	3,202	31%	803	29%
Does Not Participate	7,056	69%	1,957	71%

Note: Detail does not add to total because of nonresponse.

Note: Wildlife Watching includes observing, feeding, or photographing wildlife around the home or on trips away from home.

Part Three–Deer Hunter Behavior Patterns

This section provides additional analysis of deer hunter behavior. A variety of behaviors will be analyzed including primitive weapons usage, land ownership and leasing pattern, and license purchasing pattern.

Primitive Weapons Use

The *2001 FHWAR Survey* can be used to gain a better understanding of hunters' usage of primitive weapons. For the purpose of this report, primitive weapon refers to muzzleloader "primitive" rifle and archery (bow and arrow). Non-primitive refers to conventional, non-muzzleloader rifles or pistols. Resource managers could potentially use primitive weapons restrictions to improve overall satisfaction of hunters, increase or decrease hunting participation, or improve hunting safety. Consequently, it is important to understand hunting behavior with respect to primitive weapons usage.

There is an important aspect about the data available from the *2001 FHWAR Survey* that affects the type of comparisons that can be made between users of different types of weapons. The questions of whether or not a primitive weapon was used are phrased in such a way that they do not exclude a hunter from participating in non-primitive forms of hunting. For example, in the archery question, hunters are asked the question of whether or not they hunted with a bow and arrow from January 1, 2001 to December 31, 2001. Consequently, the comparisons made here are between rifle hunters only and hunters who use both rifle and archery, or just archery.

Tables 12 and 13 refer to archery, muzzleloader, and archery/muzzleloader hunters. Given the manner in which the questions are asked, archery refers to hunters that used archery equipment and possibly used conventional, non-primitive rifles or pistols. Likewise, muzzleloader refers to hunters that used muzzleloader rifles and possibly used non-primitive rifles or pistols. Archery/muzzleloader refers to hunters that have used both archery and muzzleloader equipment and possibly used non-primitive rifles or pistols. Rifle/pistol refers to those hunters that only participate in non-primitive rifle or pistol hunting.

Table 12 indicates that over 19% of deer hunters use archery equipment and about 10% use muzzleloader rifles. Another 9.4% use both archery equipment

and muzzleloader rifles. All totaled, nearly 40% hunt with at least one of the primitive weapons. With nearly 4 hunters in 10 using a primitive weapon, it is clear that these hunting methods are critical components of overall hunting behavior.

When hunting expenditures, days, and trips are considered, the importance of primitive weapons methods is even more evident. Table 13 summarizes deer hunter behavior for each. These are expenditures, days, and trips of deer hunters who may or may not seek species other than deer. Consequently, the measures of hunting activity include that for other species. Archery hunters and muzzleloader hunters average more than twice the days as rifle/pistol hunters, while archery/muzzleloader hunters average nearly three times the

number of days. Mean number of hunting trips bears a similar pattern. It is not surprising that hunters who use primitive weapons participate a greater number of days and trips than conventional rifle hunters. Often hunters that use archery or muzzleloader weapons will participate in both primitive and non-primitive, conventional rifle hunting. Many states have primitive weapons seasons that precede the conventional weapons season, and hunters will participate in both. As well, allowable hunting seasons for primitive weapons are often greater in length than the conventional rifle-only season, which results in greater potential days to hunt.

Given the higher average number of trips and days of both archery and muzzleloader hunters, it is not surprising that their trip expenditures per person are higher than conventional rifle hunters. Per person, archery hunters spend nearly twice as much as conventional rifle hunters on trips. However, at $752, archery/muzzleloader hunters spend the most on trips per year.

Expenditures for equipment follow a similar pattern. Hunters that participate in archery hunting spend more than twice that of rifle/pistol only on average. It is important to recall that archery hunters in the context used here refers to those hunters that participate in archery hunting and possibly participate in conventional rifle hunting. If it is common that archery hunters participate in both, it is not surprising that they spend more per person on equipment. A similar logic follows for archery/muzzleloader hunters. Provided that they often participate in conventional rifle hunting, it is not surprising that they spend the most per person because they are buying equipment related to all three types of hunting.

Closer inspection of the "Other" expenditures category reveals where the key differences lie. Archery and archery/muzzleloader hunters have substantially higher other expenditures due to greater spending on land ownership and land leasing. Per person, archery hunters spend the most with $557 for ownership and $91 for leasing, which compares to $146 and $47 for conventional rifle hunters.

Table 12. Hunting Methods of Deer Hunters: 2001
(Population 16 years of age and older. Numbers in thousands.)

Weapon	Hunters	Percent
Total	10,272	100.0%
Archery	1,999	19.5%
Muzzleloader	1,020	9.9%
Archery/Muzzleloader	966	9.4%
Rifle/Pistol Only	6,288	61.2%

Table 13. Deer Hunter Days, Trips, and Expenditures by Weapon Type: 2001
(Population 16 years of age and older. In thousands except for means and per-person expenditures.)

	Archery	Muzzleloader	Archery/ Muzzleloader	Rifle/ Pistol Only
Hunters	1,999	1,020	966	6,288
Days of Hunting	52,995	27,680	37,113	82,427
Mean Days of Hunting	27	27	39	13
Trips	47,470	22,933	35,375	70,362
Mean Hunting Trips	24	23	37	11
Total Hunting Expenditures	4,695,406	2,057,708	2,616,765	8,410,713
Trip	1,156,602	370,695	726,414	2,043,768
Per Person Trip	579	363	752	325
Equipment	1,399,870	511,510	771,351	2,040,923
Per Person Equipment	700	501	799	325
Special Equipment	603,270	674,554	*348,563	2,722,278
Per Person Special Equipment	302	661	*360	433
Other	1,535,664	500,949	770,436	1,603,744
Per Person Other	768	491	798	255

*Based on a Small Sample Size

Note: Per person spending is defined as the total spending divided by the total number of deer hunters or non-deer hunters.

Hunting Land Ownership and Leasing

Knowledge of the practice of owning or leasing land for the primary purpose of hunting is valuable for a number of reasons. Greater ownership of land intended for the primary purpose of hunting could imply increased wildlife habitat or improvements in existing habitat. Alternatively, an increase in the number of hunters who own or lease land for the primary purpose of hunting could imply easier access to prime deer habitat, which possibly entails greater hunting pressure on a given deer population.

Table 14 summarizes the deer hunter ownership and land leasing pattern for numerous demographic characteristics. Land owned or leased for the primary purpose of hunting in Table 14 is not necessarily used for hunting deer; it may be used for seeking other species; however, it must be owned or leased by someone who hunts deer. Each row indicates the number of hunters that participated in the activity named by both the row and the column. Beneath the number of participants is the percent of each row that participated in the activity named by the column. For example, the first row and first column in Table 14 indicates that there were 294 thousand hunters who participated in archery hunting and owned land. This 294 thousand represents 14.7% of all hunters that participated in archery hunting. Summing the number of hunters across the columns yields more than 1.999 million hunters. This is because some hunters both owned land and leased land for hunting. Likewise, summing the percentages across the columns yields greater than 100%. It is also possible that the sum of percentages across the columns will be less than 100% if nonresponse to the own and land lease question is high enough. Nevertheless, the row percentages are useful to make comparisons of ownership or lease pattern across different row categories. For instance, the row for rifle/pistol only indicates that 436 thousand, or 6.9%, of hunters who used rifle/pistol weapons owned land. Comparing the two proportions together indicates that hunters who use archery equipment are about twice as likely to own hunting land as those who hunt by rifle/pistol methods. Close inspection of the data in Table 14 reveals much about the characteristics of hunters who own or lease land.

Table 14. Hunting Land Ownership and Leasing and Selected Characteristics of Deer Hunters: 2001
(Population 16 years of age and older. Numbers in thousands.)

	Own Land	Lease Land	Neither Own nor Lease	Total
Archery	294 14.7%	205 10.3%	1,526 76.3%	1,999
Muzzleloader	113 11.1%	90 8.9%	832 81.5%	1,020
Archery/Muzzleloader	133 13.8%	146 15.1%	707 73.2%	966
Rifle/Pistol Only	436 6.9%	452 7.2%	5,371 85.4%	6,288
Age				
16-17	** **	** **	450 94.9%	475
18-24	*31 3.1%	*48 4.8%	915 92.0%	994
25-34	148 7.9%	154 8.2%	1,579 84.0%	1,879
35-44	256 9.0%	227 8.0%	2,366 83.1%	2,848
45-54	267 12.1%	263 11.9%	1,688 76.3%	2,212
55-64	151 13.1%	122 10.6%	898 78.0%	1,151
65+	107 15.0%	72 10.0%	540 75.8%	713
Education				
0-11 years	88 6.1%	154 10.7%	1,195 82.8%	1,442
12 years	388 9.2%	325 7.7%	3,520 83.7%	4,205
1-3 years of college	259 9.9%	178 6.8%	2,175 83.3%	2,612
4 years of college	181 13.9%	143 11.0%	994 76.3%	1,302
5 years or more of college	61 8.5%	92 12.9%	553 77.7%	712
Geography				
New England	29 8.4%	** **	310 90.6%	342
Middle Atlantic	*179 *11.8%	*79 *5.2%	1,285 84.9%	1,515
East North Central	271 13.1%	*66 *3.2%	1,723 83.5%	2,062
West North Central	107 8.6%	*28 *2.2%	1,107 88.5%	1,251
South Atlantic	128 8.2%	189 12.1%	1,235 79.4%	1,557
East South Central	98 10.7%	134 14.7%	692 75.6%	915
West South Central	140 9.1%	377 24.6%	1,034 67.3%	1,536
Mountain	*17 *2.7%	** **	603 95.6%	631
Pacific	** **	** **	446 96.3%	463

Table 14. Hunting Land Ownership and Leasing and Selected Characteristics of Deer Hunters: 2001 – continued

(Population 16 years of age and older. Numbers in thousands.)

	Own Land	Lease Land	Neither Own nor Lease	Total
Income				
Under $10,000	*31 9.8%	** **	284 88.6%	320
$10-$19,999	*42 *7.1%	*61 *10.3%	491 82.6%	594
$20-$24,999	*40 *8%	*30 *6.1%	434 86.3%	503
$25-$29,999	*45 *7.6%	*26 *4.4%	526 88.8%	593
$30-$34,999	*55 *7.7%	*46 *6.4%	616 86.3%	714
$35-$39,999	*47 *8.3%	*41 *7.3%	473 84.3%	561
$40-$49,999	71 6.2%	108 9.3%	992 86.0%	1,154
$50-$74,999	194 9.7%	212 10.7%	1,610 81.0%	1,989
$75-$99,999	142 13.8%	148 14.3%	763 73.8%	1,034
$100,000 or More	131 15.5%	131 15.5%	598 70.7%	845
Total Hunting Days				
≤5	112 4.2%	*86 *3.2%	2,474 92.6%	2,672
6 to 12	300 11.3%	165 6.2%	2,196 82.8%	2,654
13 to 25	215 8.7%	233 9.4%	2,061 82.9%	2,485
>25	346 14.7%	408 17.4%	1,669 71.1%	2,346
Metropolitan Statistical Area				
Outside MSA	429 9.9%	286 6.6%	3,645 84.0%	4,339
50,000 to 249,999	111 8.8%	84 6.7%	1,057 84.2%	1,256
250,000 to 999,999	164 8.7%	238 12.6%	1,498 79.2%	1,890
1,000,000 or more	273 9.8%	285 10.2%	2,235 80.2%	2,786

*Estimate based a on small sample size.

**Sample size too small to report data reliably.

Note: Detail does not add to total because of multiple response and nonresponse.

Weapon

As previously mentioned, archery hunters are substantially more likely to own land. At 13.8%, archery/muzzleloader hunters are nearly as likely to own land as archery hunters. Muzzleloader hunters are in the middle with 11.1%.

Archery/muzzleloader hunters are the most likely to lease at 15.1%. As with owning land, rifle/pistol only hunters are also the least likely to lease land at 7.2%. Archery and muzzleloader hunters fall in the middle with leasing percentages of 10.3% and 8.9% respectively.

Age

Ownership of hunting land is positively correlated with age. As age goes up, deer hunters are more likely to own land for hunting. A little over three percent of deer hunters aged 18-24 own hunting land, and 15% of deer hunters over 65 own hunting land. Moreover, the percent of hunters that own hunting land goes up for every age category. Relatively large increases in ownership rates are seen in the 25-34 age bracket and the 45-54 age bracket.

Leasing appears positively correlated with age from 18 to 54. Beyond 54 years, the proportion that lease goes down. Combined with the increase in the proportion of ownership for these age groups discussed above, these results are suggestive of a "graduation" of sorts, where hunters move from land leasing to land ownership as they age.

Education

Land ownership is generally positively correlated with education. The proportion of hunters who own land increases as years of education increases. This is true for all but the 5 years or more of college category. Hunters with 12 years of education own land at a 9.2% rate. The rate of ownership climbs substantially for hunters with 4 years of college up to 13.9%. However, for hunters with 5 years or more of college the percent that own land falls substantially to 8.5%.

Leasing is most likely for the two extremes of the education distribution. Hunters in the 0-11 years category lease at a 10.7% rate. The proportion of hunters that lease then goes down as education goes up, until the 4 years of college category is reached, where it climbs from 6.8% to 11.0%. The proportion that leases climbs once again for the 5 years or more of college category, up to 12.9%.

Geography

There are wide variations in ownership and lease pattern based on the geographic region where the hunter resides. It is likely that the availability of public hunting land within a region will have an impact on the degree of ownership and leasing activity. Hunters probably participate in owning land or leasing land to gain hunting rights to prime deer habitat, and areas with a greater level of public lands in which hunting is permissible probably provide hunters with greater access opportunities to deer habitat. Consequently, a greater quantity of huntable public lands likely reduces the need to purchase or lease for access. As well, other factors such as the use pattern of the land for purposes other than hunting, the terrain, and regional differences in the level of deer hunting participation could have an impact.

Comparisons of the proportion of public lands, as shown in Table 15, with the ownership and leasing pattern in Table 14 are generally supportive of a relationship between the two. Given the high proportion of public lands in both the Mountain and Pacific regions, it is not surprising to find that both have a small percentage of hunters who own or lease land for hunting. This can be ascertained by considering the relatively high percentage of hunters in the Mountain and Pacific regions that neither own nor lease. In both regions more than 95% of hunters neither own nor lease. Alternatively, the West South Central has a low proportion of public lands and a high percentage of hunters who either own or lease land. The South Atlantic and East South Central also both have a relatively low proportion of lands that are publicly owned and a relatively high proportion of deer hunters who either own or lease. One glaring exception to the relationship is in New England, which has the lowest proportion of public lands and also has relatively few deer hunters who own or lease land primarily for hunting. This discrepancy is likely due to other factors, particularly the finding in Table 8 that it has the lowest participation rate for both all hunting and deer hunting. Such a low participation rate of hunters in New England indicates reduced hunting pressure in available access areas.

Table 15. Proportion of U.S. Census Regions that are Publicly Owned (Federal and State)

New England	6%
Middle Atlantic	26%
East North	13%
West North Central	10%
South Atlantic	16%
East South Central	11%
West South Central	7%
Mountain	58%
Pacific	80%

Source: National Wilderness Institute 1995

Another interesting feature of Table 14 is the proportion of hunters that lease land in the West South Central. Almost 1 out of 4 deer hunters in the Region lease land primarily for hunting.

Income

Ownership of land primarily used for hunting is prominent at all income levels. The average ownership rate for all income levels is 9.5%, and most of the income strata are close to this average. Only those with incomes of $40,000-$49,999 and $75,000 or more are substantially different from the average. It is understandable that the higher income hunters would be more likely to own hunting land, but why those in the $40,000-$49,999 segment are less likely is unknown.

Leasing is generally positively correlated with income. As income increases, generally, the proportion of hunters who lease hunting land increases.

Total Hunting Days

Total hunting days in Table 14 refers to days of hunting for all species, not just deer. Additionally, the intervals for hunting days are chosen to roughly distribute the days in quartiles. Roughly one quarter of the data lies in each interval. Leasing is positively correlated with hunting days: an increase in one is accompanied by an increase in the other. This is perhaps not surprising, but the magnitudes of the proportions are instructive. Those who hunt more than 25 days are nearly three times as likely to lease land, 17.4%, than those who hunt between 6 to 12 days, 6.2%, and more than five times likely to lease land than those that hunt 5 or fewer days, 3.2%.

There is some apparent relationship between likelihood of owning hunting land and hunting days. The percentage of hunters that own hunting land goes up as hunting days go up, at least over some range. Those who are the least likely to own hunting land hunt the fewest days, while those who are the most likely to own hunting land hunt the most days. However, in the intervening number of days, the relationship is less clear. Those that hunt from 6 to 12 days are more likely to own hunting land than those that hunt 13 to 25 days.

Metropolitan Statistical Area (MSA)

"The general concept of a metropolitan or micropolitan statistical area is that of a core area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core . . . Each metropolitan statistical area must have at least one urbanized area of 50,000 or more inhabitants."[4] Consequently, classification by MSA type provides information on the population of hunters' residences. The categories of MSA that are listed in Table 14 indicate whether the hunter lived in a MSA of various sizes or lived outside of a MSA, which indicates a more rural residency.

Ownership of land for the primary purpose of hunting does not appear related to population of hunter residences. Deer hunters from MSAs of all sizes and those that do not reside in a MSA are all approximately equally likely to own hunting land.

Leasing of hunting land, however, does appear related to the population of hunter residences. Hunters that reside outside MSAs lease land the least, 6.6%. Hunters residing in MSAs with 50,000-249,999 people lease at a rate of 6.7%, and those residing in MSAs with 250,000-999,999 people lease at a rate of 12.6%. For those residing in MSAs of 1 million or more, the percent leasing does fall back down to 10.2%, but it is still greater than the rate for the smaller MSAs and outside MSAs. Consequently, there is a loosely positive correlation between MSA and rate of leasing.

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[4] U.S. Census Bureau, Population Division, Population Distribution Branch

License Purchasing Behavior

Revenue from the sale of hunting licenses is an important source of funding for the resource management activities of state fish and game agencies. However, over the last several years, there has been a decline in overall license sales. Consequently, it is perhaps more important now than in previous years to minimize nonlicensed hunting behavior. Knowledge of the characteristics and behavior of hunters that hunt without licenses could be useful in this regard. Fortunately this behavior can be analyzed with survey data from the *2001 FHWAR*.

The *2001 FHWAR* queries hunters about whether they purchased a hunting license and whether they were exempt from the requirement to purchase a hunting license through the following two questions:

> *"Did you buy a license to hunt in 2001? This could be a license that you bought or was bought for you."*

> *"Some hunters were exempt from buying a license in 2001 because of their age, because they had a lifetime or free license, or some other reason. Were you exempt from buying a hunting license in any state in which you hunted in 2001?"*

Using both of these questions it is possible to identify those hunters that did not purchase any license and were not exempt from the requirement to do so. To the extent that deer hunters responded truthfully and accurately to these two questions, those that are nonlicensed and nonexempt can be considered noncompliant. All states have a general hunting license requirement for deer hunters. Most states do have some exemptions, but unless an exemption is applicable, a license is required. Consequently, if a deer hunter answered that he or she did not buy a license and was not exempt, then that hunter can be considered *likely* noncompliant. For the purposes of this analysis, those hunters that answered "no" to both questions are considered *likely* noncompliant. However, it is important to remember that these nonlicensed and nonexempt hunters are only noncompliant if they understood and answered both questions correctly. While the remainder of this report refers to these individuals as noncompliant, this is not necessarily the case.

There is one notable aspect of the exemption question above that may have caused some errant responses. The question does not specifically identify landowner or tenant exemption as a potential reason why a hunter was not required to purchase a license. Many states have some form of landowner or tenant exemption from the requirement to purchase hunting licenses. The forms of these regulations vary. Some apply to small game only, whereas some also apply to deer hunting. The acreage operated by a landowner or tenant to qualify for an exemption differs substantially. In one state a free deer permit can be obtained by landowners of 5 or more acres, while in another an exemption is granted for owners or operators of 160 acres of agricultural land. Technically, landowners or tenants who were exempt from the requirement of purchasing a hunting license should have answered yes to the exemption question. If all landowners or tenants who had an exemption because of their landowner status answered correctly, then none of them would have been identified as nonlicensed and nonexempt. However, some may have answered incorrectly because landowner or tenant exemption is not specifically identified. Due to this potential for an errant response, one of the characteristics analyzed in Table 16 is whether hunting occurred in a state where a landowner or tenant exemption was available.

Table 16 summarizes the license purchasing pattern for numerous deer hunter characteristics. It follows the same format as that of Table 14 discussed above. A queried hunter must have answered both the question regarding license purchase and the question regarding exemption to be included in this table; and to be considered "Did Not Buy and Not Exempt" the hunter must have answered "no" to each. It is possible that hunters were exempt from the necessity to purchase some licenses and not others. Consequently, the hunters can answer that they were exempt from buying a license and they also purchased a license. These responses appear in "Bought and Exempt." This analysis will focus on the fourth column: "Did Not Buy and Not Exempt," as they are seen as the *likely* noncompliant hunters.[5]

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[5] The questions about license purchases and exemption are not species specific. As a result, it is possible that a hunter could have purchased a license for some species, but not all species for which there was a requirement. Consequently, there is the possibility that some deer hunters may have been compliant in purchasing a license for another species, and not for deer.

Overall, the data suggest that there were about 824,000 noncompliant deer hunters in 2001. This represents about 8% of all deer hunters. Furthermore, the data suggest that the rate of noncompliance varies widely among different groupings of deer hunters. The following analyzes the relationship between noncompliance and numerous deer hunter characteristics.

There is an apparent relationship between the type of weapons that hunters use and the rate of noncompliance. Rifle/pistol only hunters are 1.5 and 2.3 times more likely to be noncompliant than muzzleloader and archery/muzzleloader hunters respectively. Muzzleloader and archery/muzzleloader hunters are the least likely to be non-compliant, at less than 5% for each, while archery lies in the middle with 6.1%.

There is an apparent negative correlation between age and noncompliance. As age goes up, the proportion that is noncompliant goes down. The proportion of noncompliant hunters drops substantially after 24 years of age. Hunters 16 to 24 years old have a noncompliance rate around 11%, and thereafter, with the exception of the 55 to 64 category, the rate falls to around 7%.

Noncompliance is common across all educational levels. The only sharp deviation from the 8% mean level of noncompliance is for those who fall in the 5 years or more of college category. At 4.2%, their rate of noncompliance is about one half the overall average. Those with the highest level of noncompliance have 1-3 years of college, but those with four years of college are very close.

To gain a better understanding of how geographic region affects the likelihood of hunting without a license, Table 16 indicates the geographic region where hunting occurred, not hunter residence. The change to hunter destination was deemed necessary for the purposes of the regression modeling discussed below. One notable difference between hunter residence and hunting occurrence is that more than one region is permitted for the latter. In other words, while all hunters report a residency in only one region, some participate in hunting in multiple regions.

Table 16. License Purchasing and Selected Characteristics of Deer Hunters: 2001

(Population 16 years of age and older. Numbers in thousands.)

	Did Not Buy and Exempt	Bought and Not Exempt	Bought and Exempt	Did Not Buy and Not Exempt	Total
Archery	103 / 5.2%	1,623 / 81.2%	126 / 6.3%	123 / 6.1%	1,999
Muzzleloader	80 / 7.8%	805 / 78.9%	84 / 8.2%	*48 / 4.7%	1,020
Archery/Muzzleloader	97 / 10.0%	727 / 75.3%	94 / 9.7%	*41 / *4.3%	966
Rifle/Pistol Only	295 / 4.7%	4,879 / 77.6%	435 / 6.9%	611 / 9.7%	6,288
Age					
16-17	** / **	345 / 72.8%	70 / 14.8%	54 / 11.3%	475
18-24	** / **	790 / 79.4%	66 / 6.7%	109 / 11.0%	994
25-34	65 / 3.5%	1,566 / 83.4%	93 / 5.0%	141 / 7.5%	1,879
35-44	119 / 4.2%	2,274 / 79.8%	202 / 7.1%	220 / 7.7%	2,848
45-54	90 / 4.1%	1,805 / 81.6%	150 / 6.8%	141 / 6.4%	2,212
55-64	*63 / *5.5%	876 / 76.1%	91 / 7.9%	111 / 9.7%	1,151
65+	213 / 29.9%	377 / 52.9%	*66 / *9.2%	*48 / *6.8%	713
Education					
0-11 years	86 / 6.0%	1,123 / 77.9%	114 / 7.9%	109 / 7.5%	1,442
12 years	255 / 6.1%	3,311 / 78.7%	285 / 6.8%	326 / 7.8%	4,205
1-3 years of college	113 / 4.3%	2,026 / 77.6%	191 / 7.3%	243 / 9.3%	2,612
4 years of college	60 / 4.6%	1,034 / 79.4%	84 / 6.5%	117 / 9.0%	1,302
5 years or more of college	60 / 8.5%	539 / 75.7%	*66 / *9.2%	*30 / *4.2%	712
Geography					
New England	25 / 6.0%	353 / 83.7%	29 / 6.9%	*40 / *3.3%	422
Middle Atlantic	*55 / 3.4%	1,369 / 84.4%	143 / 8.8%	*56 / *3.4%	1,623
East North Central	*508 / *6.3%	6,205 / 76.8%	644 / 8.0%	*728 / *9.0%	8,085
West North Central	*53 / *4.3%	1,006 / 81.6%	91 / 7.4%	83 / 6.7%	1,232
South Atlantic	142 / 9.6%	975 / 65.5%	155 / 10.4%	217 / 14.6%	1,489
East South Central	66 / 6.3%	749 / 70.9%	92 / 8.7%	149 / 14.1%	1,055
West South Central	125 / 8.1%	1,101 / 71.5%	146 / 9.5%	168 / 10.9%	1,540
Mountain	*14 / *2.0%	636 / 88.3%	*31 / *4.3%	39 / 5.4%	720
Pacific	*41 / *9.2%	349 / 78.2%	** / **	*45 / *10.0%	446

continues

Table 16. License Purchasing and Selected Characteristics of Deer Hunters: 2001 – continued

(Population 16 years of age and older. Numbers in thousands.)

	Did Not Buy and Exempt	Bought and Not Exempt	Bought and Exempt	Did Not Buy and Not Exempt	Total
Income					
Under $10,000	** **	246 76.6%	** **	42 13.2%	320
$10-$19,999	68 11.5%	438 73.8%	*21 *3.5%	*62 *10.4%	594
$20-$24,999	*34 *6.7%	408 81.0%	** **	*57 *11.2%	504
$25-$29,999	*44 *7.4%	452 76.2%	*51 *8.6%	*46 *7.8%	593
$30-$34,999	*48 *6.7%	534 74.9%	*76 *10.6%	*56 *7.8%	714
$35-$39,999	*51 *9.1%	*454 80.8%	*43 *7.7%	*12 *2.2%	561
$40-$49,999	*41 *3.6%	931 80.7%	98 8.5%	82 7.1%	1,154
$50-$74,999	78 3.9%	1,674 84.2%	130 6.5%	107 5.4%	1,989
$75-$99,999	*53 *5.1%	790 76.4%	102 9.8%	*90 *8.7%	1,034
$100,000 or More	*38 *4.4%	677 80.1%	*60 *7.1%	*66 *7.8%	845
Gender					
Male	542 5.8%	7,341 78.3%	714 7.6%	687 7.3%	9,371
Female	33 3.6%	692 76.8%	*25 *2.8%	137 15.2%	901
Total Hunting Days					
≤5	172 6.5%	1,941 73.0%	155 5.8%	392 14.8%	2,661
6 to 12	140 5.3%	2,163 81.6%	172 6.5%	177 6.7%	2,651
13 to 25	127 5.1%	2,009 81.1%	181 7.3%	161 6.5%	2,478
>25	*135 *5.8%	1,893 80.9%	*228 *9.8%	84 3.6%	2,340
Land Lease/Own					
Own Land	74 8.5%	652 75.2%	91 10.5%	*50 *5.8%	867
Lease Land	60 7.7%	639 81.5%	*78 *10.0%	** **	784
Own and Lease	** **	78 72.1%	** **	** **	109
Neither Own nor Lease	432 5.1%	6,661 79.0%	547 6.5%	767 9.1%	8,435
Public/Private Land					
Public and Private Land	81 3.8%	1,733 81.9%	175 8.3%	107 5.0%	2,115
Private Only	402 6.4%	4,879 77.4%	436 6.9%	535 8.5%	6,309
Public Only	72 4.7%	1,231 80.5%	117 7.6%	100 6.5%	1,529

continues

Noncompliance varies dramatically by geographic region. In New England, noncompliance is the lowest at 3.3%. Middle Atlantic is a close second at 3.4%. Mountain and West North Central round out those that have noncompliance of less than the national average, while East North Central is close to the average. In the South Atlantic, noncompliance climbs to 14.6%, and East South Central is close at 14.1%. West South Central and Pacific also have noncompliance greater than the national average, at 10.9% and 10% respectively.

Income appears to have a negative correlation with noncompliance over a portion of its range. At 13.2% those with incomes under $10,000 are the most likely to be noncompliant. Between $10,000-24,999 the proportion declines to around 10.4%. Beyond $25,000, with few exceptions, the rate of noncompliance is not substantially different than the mean of 8%. This substantial drop in the noncompliance rate after $24,999 and the relatively flat rate thereafter suggests that the effect of increasing incomes on noncompliance is reduced after a certain threshold of income is attained.

Somewhat surprisingly, the rate of noncompliance appears to differ substantially by gender. Female hunters have twice the rate of noncompliance as male hunters. For females the rate of noncompliance is 15.2%, while 7.3% of males are noncompliant.

Not surprisingly, the noncompliance rate is negatively correlated with hunting days. At 14.8%, those who hunt fewer than 6 days are more than 4 times as likely to be noncompliant than those who hunt over 25 days, 3.6%. For 6-25 days, the rate of noncompliance is around 6.5%.

**Table 16. License Purchasing and Selected Characteristics of
Deer Hunters: 2001 – continued**
(Population 16 years of age and older. Numbers in thousands.)

	Did Not Buy and Exempt	Bought and Not Exempt	Bought and Exempt	Did Not Buy and Not Exempt	Total
Metropolitan Statistical Area					
Outside MSA	248 5.7%	3,413 78.7%	349 8.0%	299 6.9%	4,339
50,000 to 249,999	63 5.0%	998 79.4%	*69 *5.5%	114 9.0%	1,256
250,000 to 999,999	116 6.1%	1,435 75.9%	154 8.2%	161 8.5%	1,890
1,000,000 or more	149 5.3%	2,187 78.5%	167 6.0%	251 9.0%	2,786
Landowner Exemption State					
Potential Exemption Available	214 3.7%	4,666 81.7%	416 7.3%	413 7.2%	5,709
Exemption Not Available	361 8.1%	3,367 75.5%	323 7.2%	410 9.2%	4,461

*Estimate based a on small sample size.
**Sample size too small to report data reliably.
Note: Detail does not add to total because of multiple response and nonresponse.

There is an apparent relationship between the hunting land leasing/ ownership pattern and the rate of noncompliance. At 9.1%, those who have the highest rate of noncompliance are hunters that neither own nor lease hunting land. Those who own hunting land have a 5.8% noncompliance rate.

Noncompliance varies slightly between public or private land hunting. If only private land is used by the hunter, then the rate of noncompliance is the highest at 8.5%. If public and private land are used by the hunter then noncompliance drops to 5%. For public land only hunters, the rate of noncompliance is in the middle at 6.5%.

There is perhaps some relationship between the rate of noncompliance and MSA residency. Whether or not a hunter resides in or outside of a MSA appears relevant. Hunters who live outside MSAs have a notably lower rate of noncompliance than those who do reside in MSAs. Within different size MSAs, however, there is little variation in the rate of noncompliance.

The rate of noncompliance does not appear to differ appreciably between hunters that hunt in a state where a landowner exemption was available and those that did not. To be considered "Potential Exemption Available" the hunter must reside and hunt in a state where a landowner or tenant exemption was available. The exemption must also have applied to deer hunting and must have applied to all fees for licenses, permits, or tags. In other words, if there was the potential that a deer hunter could have hunted deer for no fee whatsoever because of their landowner or tenant status, their hunting activity is considered "Potential Exemption Available."

Part Four–Nonlicensed Deer Hunter Model

The descriptive statistics contained in Table 16 and the adjoining discussion address variations in the rate of license noncompliance and numerous deer hunter characteristics. As noted, numerous variables appear to have some relationship with noncompliance. Sometimes these relationships are expected based on basic economic principles. For example, it is not surprising to find that the number of hunting days has a decidedly negative correlation with rate of noncompliance. The more days hunted, the more likely a hunter is to encounter compliance enforcement personnel, such as a game warden. This increased chance of "being caught" translates into a higher expected cost of hunting without a license. In other cases, the relationships do not have a readily apparent economic logic, such as the finding that hunters with 4 years of college have a higher rate of noncompliance than those with 12 years of school.

However, the use of descriptive statistics alone is not the appropriate method to test the validity of a relationship between the various deer hunter characteristics with noncompliance. There are interrelationships among the characteristic variables themselves that can act to conceal the effect of each on noncompliance. For example, as noted above, deer hunters that participate in primitive weapons hunting have a lower rate of noncompliance than those that use conventional rifles and pistols only, and those who hunt a greater number of days have a higher rate of noncompliance than those who hunt fewer days. Additionally, it was also noted above that deer hunters who participate in primitive weapons hunting also tend to hunt a greater number of days than those that do not. Consequently, it is difficult to determine the effect that type of weapons used and hunting days has on the noncompliance independently. Logit regression is appropriate to separate the effects of

hunting days, ownership pattern, income and other variables on the probability of hunting license compliance. The logit model helps eliminate the confounding effects of the correlation between hunting days and type of weapons used. Consequently, the effect of each on the probability of noncompliance can be isolated more effectively. Moreover, the logit regression method is appropriate for situations where the dependent variable is a dichotomous choice, such as compliance or noncompliance.

More specifically, the logit regression used here models the logarithm of the odds ratio that an individual was noncompliant (hunted without a license) as a function of a set of explanatory variables or hunter characteristics. The logit regression is described by the following two equations.

$$(1) \quad P_i = \frac{e^{\beta_i X_i}}{1 + e^{\beta_i X_i}}$$

$$(2) \quad \ln\left(\frac{P_i}{1 - P_i}\right) = \sum_{i=1} \beta_i X_i$$

where:

P_i = Probability that the ith individual hunted without a license (i.e., "yes")

X_i = Vector of explanatory variables

β = Vector of coefficients to be estimated

All individuals that reported an exemption from the requirement to purchase a hunting license were excluded in the modeling analysis. Consequently, the modeling procedure addresses the probability that a nonexempt hunter will hunt without a license. When considering only the nonexempt hunters, those that hunt without licenses are considered noncompliant. However, the qualifying remarks made above concerning *likely* noncompliance are still applicable.

Variables

The explanatory variables that are used in the logit regression model are contained in Table 17. The variables used in the regression were selected from a large set of potential explanatory variables through a combination of Stepwise Model Fitting and use of the likelihood ratio test[6]. These variable selection methods aid discovery of unexpected relationships. Some of the variables entered into the regression appear in the same form as seen in Table 16: PUB_PRIV, WEAPON, GENDER, and the geographic regions where hunting occurs. Other variables address the same socioeconomic or hunting characteristic, but they are in different form. The form of the variables is changed to facilitate more effective model fitting or to simplify the results. These altered variables are as follows. LEASE indicates whether a hunter leased land for the purpose of hunting. EDUC indicates whether the hunter had 5 or more years of college. AGECLASS indicates whether a hunter was 55 years or older. INCOME indicates whether a hunter had an income of between $29,999 and $75,000. BIN_HUNTDAYS puts total hunting days in interval form. Several other species variables were not included in Table 16, but were found to have a significant relationship with noncompliance.

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[6] Consult author for additional information on other model specifications, list of variables that were not included in the final regression, and information on Stepwise Model Fitting.

Most of the variables contained in Table 17 are nominal variables. Each nominal variable used in the logit model has a base or reference case. The reference case is given a value of 0 in the estimated equation. Consequently, the calculated coefficient for the reference case is embodied in the coefficient for the intercept term. The reference case for each nominal variable is given by the first level for each in Table 17. Thus, the reference case is as follows:

- Hunting Days ≤ 5
- Under 55 Years of Age
- Middle Income (Greater than $29,999 and Less than $75,000)
- Private Land Only
- Male
- Do Not Lease Hunting Land
- Rifle/Pistol Only
- Less Than 5 Years of College Education
- Hunting occurred in New England, East North Central, West North Central, or Mountain States
- No Duck Hunting
- No Coyote Hunting
- No Other Big Game Hunting
- No Bear Hunting
- No Squirrel Hunting

Every variable value other than the reference case has a coefficient. Each of these coefficients indicate the change in the log odds ratio from equation 2 that occurs when the value of the respective nominal variable is different than the reference case. For example, since "Rifle/Pistol Only" is the reference case for WEAPON, each of the other levels of WEAPON (Archery, Muzzleloader, and Archery/Muzzleloader) will have a coefficient. The coefficient for "Archery" will indicate the change in the log odds due to the hunter using archery equipment instead of using rifle/pistol only equipment. The same will also be the case for the "Muzzleloader" and "Archery/Muzzleloader" coefficients.

Table 17. Logit Regression Explanatory Variables

BIN_HUNTDAYS	Nominal Variable with 3 Levels 1 to 5 6 to 25 >25
AGECLASS	Indicator variable with 2 values Under 55 55 Years Old or More
INCOME	Indicator variable with 2 values Middle Income (Greater than 29,999 and Less than 75,000) Not Middle Income (Less than 30,000 or More than 74,999)
PUB_PRIV	Nominal Variable with 3 Levels Private Only Public Only Public and Private
SEX	Indicator variable with 2 values Male Female
LEASE	Indicator Variable with Levels Do Not Lease Land Lease Land
WEAPON	Nominal Variable with 4 Levels Rifle/Pistol Only Archery/Muzzleloader Archery Muzzleloader
EDUC	Indicator variable with 2 values Under 5 Years of College 5 or More Years of College
S_ATLAN	Indicator variable with 2 values Did Not Hunt In South Atlantic Hunted
W_SOUTHCENT	Indicator variable with 2 values Did Not Hunt In West South Central Hunted
E_SOUTHCENT	Indicator variable with 2 values Did Not Hunt In East South Central Hunted in East South Central
PACIFIC	Indicator variable with 2 values Did Not Hunt In Pacific Hunted
SPECIES_DUCK	Indicator variable with 2 values Did Not Hunt Hunted
SPECIES_COYOTE	Indicator variable with 2 values Did Not Hunt Hunted
SPECIES_OtherBG	Indicator variable with 2 values Did Not Hunt Hunted
SPECIES_BEAR	Indicator variable with 2 values Did Not Hunt Hunted
SPECIES_SQUIRREL	Indicator variable with 2 values Did Not Hunt Hunted

Results

The results from the logistic regression procedure are presented in Table 18. A negative number in the estimation column indicates that the variable in question has a negative relationship with the likelihood that one will be noncompliant. Additionally, the Pr > ChiSq column indicates the probability that the relationship between each variable and the target variable (likelihood of noncompliance) occurs by chance. A Pr > ChiSq of less than 0.05 is considered strongly statistically significant, while a value of less than 0.1 is considered significant. An example will serve to explain the particulars of Table 21. The table indicates that the estimate for muzzleloader is -0.6452. Since the base case for WEAPON is "Rifle/Pistol Only," the negative result indicates that, all other things equal, hunters that use muzzleloader weapons are less likely to hunt without a license than hunters that use only traditional rifles/pistol weapons. Additionally, the Pr > ChiSq indicates a probability of 0.0278, which is significant. This significance indicates that there is greater than a 97.22% probability that the relationship between "Muzzleloader" and noncompliance did not occur by chance.

Geography

The base geographic regions are New England, East North Central, West North Central, or Mountain States. The effect of hunting in any of these regions on the likelihood of noncompliance is captured in the intercept variable. Consequently, coefficients on the other geographic region variables (S_ATLAN, W_SOUTHCENT, E_SOUTHCENT, and PACIFIC) indicate the change in likelihood of noncompliance that occurs when hunting occurs in one of these respective regions rather than New England, East North Central, West North Central, or Mountain States.

The geographic regions results indicate the following. As evidenced by the positive coefficients, hunters in the South Atlantic, West South Central, East South Central and Pacific are all more likely to hunt without a license than those in base regions. Moreover, the results are highly significant. The hunters in the East South Central States are the most likely to hunt without a license, all other things equal. At 1.53, its coefficient is larger than those for South Atlantic, West South Central, and Pacific.

Hunting Days

Hunting a greater number of days leads to a reduced rate of noncompliance. The reference case is hunting days ≤ 5. Consequently, the negative coefficients for both 6 to 25 and >25 indicate that hunters with more than 5 days of hunting are less likely to be noncompliant. Moreover, because the coefficient for >25 is larger in absolute value than that for 6 to 25, the negative impact of increased hunting days is greater the more days the hunter participates. All hunting days' coefficients are strongly significant, which indicates a high probability that the relationship between days and noncompliance did not occur by chance.

Public or Private Land Hunting

Hunters that use only private land are more likely to hunt without a license than those that use at least some public land. Private land only is the reference case, so the negative coefficients for both "Public Only" and "Public and Private" indicate that hunters in both of these categories are less likely to be noncompliant. Additionally, those that use both public and private land are the least likely to be noncompliant. It is uncertain why hunters that use only private land

Table 18. Analysis of Maximum Likelihood Estimates of Logit Regression

Variable	Value	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		-2.25	0.19	138.57	<.0001
BIN_HUNTDAYS	6 to 25	-0.77	0.16	21.35	<.0001
BIN_HUNTDAYS	>25	-1.50	0.28	26.80	<.0001
AGECLASS	55 Years Old or More	0.50	0.19	6.82	0.00
INCOME	Middle Income	-0.40	0.14	7.25	0.00
PUB_PRIV	Pub Only	-0.28	0.20	1.88	0.17
PUB_PRIV	Pub and Priv	-0.95	0.26	13.51	0.00
SEX	Female	0.89	0.19	20.11	<.0001
LEASE	Lease Land	-1.89	0.53	12.77	0.00
WEAPON	Archery/Muzzleloader	-1.12	0.48	5.45	0.01
WEAPON	Archery	-0.19	0.23	0.74	0.38
WEAPON	Muzzleloader	-0.64	0.29	4.83	0.02
EDUC	5 or More Years of College	-1.44	0.52	7.40	0.00
S_ATLAN	Hunted	1.41	0.20	49.21	<.0001
W_SOUTHCENT	Hunted	1.48	0.24	36.40	<.0001
E_SOUTHCENT	Hunted	1.53	0.20	54.70	<.0001
PACIFIC	Hunted	1.34	0.27	23.98	<.0001
SPECIES_DUCK	Hunted	-0.61	0.35	3.07	0.07
SPECIES_COYOTE	Hunted	0.69	0.41	2.76	0.09
SPECIES_OtherBG	Hunted	0.91	0.38	5.75	0.01
SPECIES_BEAR	Hunted	-1.85	1.03	3.19	0.07
SPECIES_SQUIRREL	Hunted	0.38	0.22	2.99	0.08

are the most likely to be noncompliant; however, it is probably due in part to the decreased chance of encountering compliance enforcement personnel when using private land.

Gender
All other things equal, women are substantially more likely to hunt without a license than male hunters. This result could indicate a problem with the survey instrument. Women are possibly more likely to go on a trip that they consider a hunting trip but does not involve them carrying a weapon. The *FHWAR Survey* question to discern hunting participation does specifically instruct respondents to "not include as hunting occasions when you only observed others hunt or when you only scouted." Nevertheless, there could be some errant responses. If females have a greater propensity to err in this regard, it could explain why they are more likely to be noncompliant. The results could also indicate that females are more likely to go on a hunting trip where they have limited access to a weapon. In other words, a female may go on a hunting trip with her husband who will be the one "officially" carrying the weapon, but she may have access to the weapon if a good opportunity for a shot arises. As a result, the couple may only carry one license, even though they are both actually hunting.

Lease Land
The results indicate that hunters who lease land are less likely to be noncompliant than those who do not lease. Those that do not lease land include those who own land primarily used for hunting and those who neither own nor lease land for hunting[7]. There are a variety of possible explanations for why those who lease land are less likely to be noncompliant. One potential explanation is peer pressure. Hunting leases are often made by a group of individuals with a landowner. The group of hunters is often friends or colleagues, so individual hunters within the group would probably not wish to be viewed as irresponsible by the remaining members. Another possible explanation involves

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[7] Other models considered but not presented here suggest additionally that those who lease land are significantly more likely to be noncompliant than those who own land for the primary purpose of hunting.

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landowner requirements. It is possible that by requiring evidence of hunting licenses for lessees, the landowner acts as surrogate enforcement representative of fish and wildlife agencies. Lastly, some states have required that lessors maintain a record book that documents the lessees hunting on their land. It is possible that the maintenance of such a book could encourage increased hunting license compliance because it is used as a reference tool by enforcement personnel. Whatever the reason, it is clear those hunters who lease hunting land are less likely to hunt without a license than those who do not.

Weapon
In general, people who hunt with primitive weapons are less likely to be noncompliant than those who do not. Those hunters that participated in both archery and muzzleloader hunting are the least likely to be noncompliant, followed by those that participate in muzzleloader hunting. Those that participated in archery hunting but not

muzzleloader hunting are also less likely to be noncompliant, but the coefficient is not significant, so there is a relatively high probability that the relationship could have occurred by chance.

There are several possible explanations for why hunters using primitive weapons are less likely to be noncompliant. Often primitive weapon hunts occur for safety reasons. In densely populated regions, where hunting with high powered rifles may endanger others, primitive weapons restrictions are often employed. Enforcement may be easier in these dense population regions than in more remote regions. Another potential reason is that primitive weapon hunts generally occur prior to or after the general rifle season when hunting participation is high. The lower participation in the primitive weapon seasons implies increased probability that a given hunter will be checked for appropriate licensing by law enforcement personnel. Consequently, there may be increased pressure to be appropriately licensed.

Income
Hunters with household incomes between $30,000 and $75,000 are less likely to be noncompliant than those at the higher or lower end of the income distribution. It is not surprising that those with incomes of over $29,999 have decreased likelihood of noncompliance than hunters with lower incomes. Those with higher incomes not only have an increased ability to afford hunting licenses, they also probably have a higher opportunity cost of being caught hunting without a license. However, it is somewhat more puzzling to find that those with incomes of over $75,000 are more likely to be noncompliant than hunters in the middle income range. A possible explanation is that hunters in the high end of the income distribution are more likely to hunt on private game ranches where hunting without licenses may be more common[8].

Age
When hunters are over 55 years old they are more likely to be noncompliant. Numerous other specifications for age were tried, but only an indicator form to capture the upper end of the age spectrum proved significant. Possibly the over 55 indicator variable indicates errant responses to the exemption question. Despite the fact that age is clearly identified as a reason for a possible exemption, some hunters may have answered no exemption when they should not have.

Other Species Variables
Interestingly, there are several other species variables that are relatively good indicators of a hunter's likelihood of hunting without a license. All other things equal, those that also hunt duck or bear are less likely to be noncompliant, while those that hunt coyote, squirrel, or other big game are more likely to be noncompliant. Other big game includes species such as antelope, caribou, bison, and more exotic African species that appear on game ranches. It does not include other big game species for which hunting activity is specifically queried such as elk, turkey, moose, and sheep.

Calculated Probabilities
The results in Table 18 can be used to directly calculate the probability that a nonexempt hunter will hunt without a license if appropriate values for the explanatory variables are known. To refrain from delving into a discussion about how to use the results, several tables are created that exhibit the results of the regression procedure. Tables 19 and 20 show the probability that a nonexempt male hunter will hunt without a license. Table 19 addresses the base geographic regions: New England, East North Central, West North Central, and Mountain. Table 20 displays the results for the Pacific region, which are very similar to those for the South Atlantic, East South Central, and West South Central[9].

Each cell in Tables 19-20 contains the probability that a nonexempt hunter who hunts in the manner suggested by the row and column of the table will hunt without a license. For example, the first row and first column of Table 19 indicates the following: an under 55 hunter in the base geographic regions, who has a middle income, hunts for 1 to 5 days, does not lease land, hunts only on private land, only uses rifle/pistol weapons, and only hunts deer has a 6.5% probability of hunting without a license. However, if the hunter is otherwise the same, but hunts coyote also, he has a 12.3% probability of noncompliance. This is displayed in the first row and second column from the left in Table 19. When displayed in this manner, the importance of the other species hunted variables on license buying behavior is evident.

In Table 20 the probabilities for the Pacific region are displayed. The probabilities in the Pacific region, as well as those for the South Atlantic, East South Central, and West South Central regions are substantially higher than the base case. The difference in the probabilities underscores the importance of hunting region on license buying behavior.

The probabilities that appear in Tables 19-20 are calculated directly from the modeling process. They are intended to convey an understanding of how different categorical variables affect the decision to hunt without a license. Consequently, there is no requirement that actual deer hunters fulfill every combination of categorical variables displayed. There may not be any hunters in the Pacific Region that use muzzleloader weapons and also hunt duck and squirrel. Even if there are no hunters that fulfill the specifications of a given cell, the probabilities are still shown to impart an understanding of the categorical variable impacts. The species combinations shown in the tables, however, were not chosen at random. These are some of the more common combinations of the significant species variables.

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[8] Other specifications of income were attempted. Contact author for further information on alternative specifications.

[9] Because of their similarity to Pacific, the South Atlantic, East South Central, and West South Central probability tables are not displayed, but they can be obtained upon request.

Table 19. Probability of Hunting without License: New England, East North Central, West North Central, and Mountain

Hunting Days	Lease Land	Public or Private Land	Weapon	Under 55 Years Old								55 Years Old or More							
				Deer	Deer Coyote	Deer Duck	Deer Duck Squirrel	Deer Bear	Deer Other BG	Deer Squirrel	Deer Squirrel Coyote	Deer	Deer Coyote	Deer Duck	Deer Duck Squirrel	Deer Bear	Deer Other BG	Deer Squirrel	Deer Squirrel Coyote
Middle Income																			
1 to 5	Do Not Lease	Private Only	Rifle/Other Only	6.5%	12.3%	3.6%	5.2%	1.1%	5.2%	9.3%	17.0%	10.3%	18.8%	5.9%	8.4%	1.8%	8.4%	14.4%	25.3%
			Muzzleloader	3.5%	6.8%	1.9%	2.8%	0.6%	2.8%	5.1%	9.7%	5.7%	10.8%	3.2%	4.6%	0.9%	4.6%	8.1%	15.1%
		Public Only	Rifle/Other Only	5.0%	9.5%	2.8%	4.0%	0.8%	4.0%	7.1%	13.4%	7.9%	14.8%	4.5%	6.4%	1.3%	6.4%	11.2%	20.3%
			Muzzleloader	2.7%	5.2%	1.5%	2.1%	0.4%	2.1%	3.9%	7.5%	4.3%	8.3%	2.4%	3.5%	0.7%	3.5%	6.2%	11.8%
		Pub and Priv	Rifle/Other Only	2.6%	5.1%	1.4%	2.1%	0.4%	2.1%	3.8%	7.3%	4.2%	8.2%	2.3%	3.4%	0.7%	3.4%	6.1%	11.5%
			Muzzleloader	1.4%	2.7%	0.8%	1.1%	0.2%	1.1%	2.0%	4.0%	2.3%	4.4%	1.2%	1.8%	0.4%	1.8%	3.3%	6.4%
	Lease Land	Private Only	Rifle/Other Only	1.0%	2.1%	0.6%	0.8%	0.2%	0.8%	1.5%	3.0%	1.7%	3.3%	0.9%	1.3%	0.3%	1.3%	2.5%	4.8%
			Muzzleloader	0.5%	1.1%	0.3%	0.4%	0.1%	0.4%	0.8%	1.6%	0.9%	1.8%	0.5%	0.7%	0.1%	0.7%	1.3%	2.6%
		Pub and Priv	Rifle/Other Only	0.4%	0.8%	0.2%	0.3%	0.1%	0.3%	0.6%	1.2%	0.7%	1.3%	0.4%	0.5%	0.1%	0.5%	1.0%	1.9%
			Muzzleloader	0.2%	0.4%	0.1%	0.2%	0.0%	0.2%	0.3%	0.6%	0.3%	0.7%	0.2%	0.3%	0.1%	0.3%	0.5%	1.0%
6 to 25	Do Not Lease	Private Only	Rifle/Other Only	3.1%	6.1%	1.7%	2.5%	0.5%	2.5%	4.5%	8.6%	5.0%	9.6%	2.8%	4.0%	0.8%	4.0%	7.2%	13.5%
			Muzzleloader	1.7%	3.3%	0.9%	1.3%	0.3%	1.3%	2.4%	4.7%	2.7%	5.3%	1.5%	2.2%	0.4%	2.2%	3.9%	7.6%
		Public Only	Rifle/Other Only	2.4%	4.6%	1.3%	1.9%	0.4%	1.9%	3.4%	6.6%	3.8%	7.4%	2.1%	3.1%	0.6%	3.1%	5.5%	10.5%
			Muzzleloader	1.2%	2.5%	0.7%	1.0%	0.2%	1.0%	1.8%	3.6%	2.0%	4.0%	1.1%	1.6%	0.3%	1.6%	3.0%	5.8%
		Pub and Priv	Rifle/Other Only	1.2%	2.4%	0.7%	1.0%	0.2%	1.0%	1.8%	3.5%	2.0%	3.9%	1.1%	1.6%	0.3%	1.6%	2.9%	5.7%
			Muzzleloader	0.6%	1.3%	0.3%	0.5%	0.1%	0.5%	0.9%	1.9%	1.1%	2.1%	0.6%	0.8%	0.2%	0.8%	1.5%	3.1%
	Lease Land	Private Only	Rifle/Other Only	0.5%	1.0%	0.3%	0.4%	0.1%	0.4%	0.7%	1.4%	0.8%	1.6%	0.4%	0.6%	0.1%	0.6%	1.2%	2.3%
			Muzzleloader	0.3%	0.5%	0.1%	0.2%	0.0%	0.2%	0.4%	0.7%	0.4%	0.8%	0.2%	0.3%	0.1%	0.3%	0.6%	1.2%
		Pub and Priv	Rifle/Other Only	0.2%	0.4%	0.1%	0.1%	0.0%	0.1%	0.3%	0.5%	0.3%	0.6%	0.2%	0.2%	0.1%	0.2%	0.4%	0.9%
			Muzzleloader	0.1%	0.2%	0.1%	0.1%	0.0%	0.1%	0.1%	0.3%	0.2%	0.3%	0.1%	0.1%	0.0%	0.1%	0.2%	0.5%
>25	Do Not Lease	Private Only	Rifle/Other Only	1.5%	3.0%	0.8%	1.2%	0.2%	1.2%	2.2%	4.4%	2.5%	4.9%	1.4%	2.0%	0.4%	2.0%	3.6%	7.0%
			Muzzleloader	0.8%	1.6%	0.4%	0.6%	0.1%	0.6%	1.2%	2.3%	1.3%	2.6%	0.7%	1.1%	0.2%	1.1%	1.9%	3.8%
		Public Only	Rifle/Other Only	1.2%	2.3%	0.6%	0.9%	0.2%	0.9%	1.7%	3.3%	1.9%	3.7%	1.0%	1.5%	0.3%	1.5%	2.7%	5.4%
			Muzzleloader	0.6%	1.2%	0.3%	0.5%	0.1%	0.5%	0.9%	1.8%	1.0%	2.0%	0.5%	0.8%	0.2%	0.8%	1.5%	2.9%
		Pub and Priv	Rifle/Other Only	0.6%	1.2%	0.3%	0.5%	0.1%	0.5%	0.9%	1.7%	1.0%	1.9%	0.5%	0.8%	0.2%	0.8%	1.4%	2.8%
			Muzzleloader	0.3%	0.6%	0.2%	0.2%	0.1%	0.2%	0.5%	0.9%	0.5%	1.0%	0.3%	0.4%	0.1%	0.4%	0.8%	1.5%
	Lease Land	Private Only	Rifle/Other Only	0.2%	0.5%	0.1%	0.2%	0.0%	0.2%	0.3%	0.7%	0.4%	0.8%	0.2%	0.3%	0.1%	0.3%	0.6%	1.1%
			Muzzleloader	0.1%	0.2%	0.1%	0.1%	0.0%	0.1%	0.2%	0.4%	0.2%	0.4%	0.1%	0.2%	0.0%	0.2%	0.3%	0.6%
		Pub and Priv	Rifle/Other Only	0.1%	0.2%	0.1%	0.1%	0.0%	0.1%	0.1%	0.3%	0.1%	0.3%	0.1%	0.1%	0.0%	0.1%	0.2%	0.4%
			Muzzleloader	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.0%	0.1%	0.0%	0.1%	0.1%	0.2%

continues

Table 19. Probability of Hunting without License: New England, East North Central, West North Central, and Mountain – continued

Hunting Days	Lease Land	Public or Private Land	Weapon	Under 55 Years Old Deer	Deer Coyote	Deer Duck	Deer Duck Squirrel	Deer Bear	Deer Other BG	Deer Squirrel	Deer Squirrel Coyote	55 Years Old or More Deer	Deer Coyote	Deer Duck	Deer Duck Squirrel	Deer Bear	Deer Other BG	Deer Squirrel	Deer Squirrel Coyote
Not Middle Income																			
1 to 5	Do Not Lease	Private Only	Rifle/Other Only	9.5%	17.3%	5.3%	7.6%	1.6%	7.6%	13.3%	23.5%	14.7%	25.7%	8.5%	12.0%	2.6%	12.0%	20.2%	33.6%
			Muzzleloader	5.2%	9.9%	2.9%	4.2%	0.9%	4.2%	7.4%	13.9%	8.3%	15.4%	4.7%	6.7%	1.4%	6.7%	11.7%	21.0%
		Public Only	Rifle/Other Only	7.3%	13.6%	4.1%	5.8%	1.2%	5.8%	10.3%	18.7%	11.4%	20.6%	6.5%	9.3%	2.0%	9.3%	15.9%	27.6%
			Muzzleloader	3.9%	7.6%	2.2%	3.2%	0.6%	3.2%	5.7%	10.8%	6.3%	12.0%	3.5%	5.1%	1.1%	5.1%	9.0%	16.6%
		Pub and Priv	Rifle/Other Only	3.9%	7.5%	2.1%	3.1%	0.6%	3.1%	5.6%	10.6%	6.2%	11.7%	3.5%	5.0%	1.0%	5.0%	8.8%	16.3%
			Muzzleloader	2.1%	4.1%	1.1%	1.6%	0.3%	1.6%	3.0%	5.8%	3.4%	6.5%	1.8%	2.7%	0.5%	2.7%	4.8%	9.3%
	Lease Land	Private Only	Rifle/Other Only	1.5%	3.1%	0.8%	1.2%	0.2%	1.2%	2.2%	4.4%	2.5%	4.9%	1.4%	2.0%	0.4%	2.0%	3.6%	7.1%
			Muzzleloader	0.8%	1.6%	0.4%	0.6%	0.1%	0.6%	1.2%	2.4%	1.3%	2.6%	0.7%	1.1%	0.2%	1.1%	1.9%	3.8%
		Pub and Priv	Rifle/Other Only	0.6%	1.2%	0.3%	0.5%	0.1%	0.5%	0.9%	1.7%	1.0%	2.0%	0.5%	0.8%	0.2%	0.8%	1.4%	2.8%
			Muzzleloader	0.3%	0.6%	0.2%	0.3%	0.1%	0.3%	0.5%	0.9%	0.5%	1.0%	0.3%	0.4%	0.1%	0.4%	0.8%	1.5%
6 to 25	Do Not Lease	Private Only	Rifle/Other Only	4.6%	8.8%	2.5%	3.7%	0.7%	3.7%	6.6%	12.4%	7.4%	13.7%	4.1%	5.9%	1.2%	5.9%	10.4%	18.9%
			Muzzleloader	2.5%	4.8%	1.3%	2.0%	0.4%	2.0%	3.6%	6.9%	4.0%	7.7%	2.2%	3.2%	0.6%	3.2%	5.7%	10.9%
		Public Only	Rifle/Other Only	3.5%	6.8%	1.9%	2.8%	0.6%	2.8%	5.0%	9.6%	5.6%	10.7%	3.1%	4.5%	0.9%	4.5%	8.0%	14.9%
			Muzzleloader	1.9%	3.7%	1.0%	1.5%	0.3%	1.5%	2.7%	5.3%	3.0%	5.9%	1.7%	2.4%	0.5%	2.4%	4.4%	8.4%
		Pub and Priv	Rifle/Other Only	1.8%	3.6%	1.0%	1.4%	0.3%	1.4%	2.6%	5.2%	3.0%	5.8%	1.6%	2.4%	0.5%	2.4%	4.3%	8.2%
			Muzzleloader	1.0%	1.9%	0.5%	0.8%	0.2%	0.8%	1.4%	2.8%	1.6%	3.1%	0.9%	1.3%	0.3%	1.3%	2.3%	4.5%
	Lease Land	Private Only	Rifle/Other Only	0.7%	1.4%	0.4%	0.6%	0.1%	0.6%	1.1%	2.1%	1.2%	2.3%	0.6%	0.9%	0.2%	0.9%	1.7%	3.4%
			Muzzleloader	0.4%	0.8%	0.2%	0.3%	0.1%	0.3%	0.6%	1.1%	0.6%	1.2%	0.3%	0.5%	0.1%	0.5%	0.9%	1.8%
		Pub and Priv	Rifle/Other Only	0.3%	0.6%	0.2%	0.2%	0.0%	0.2%	0.4%	0.8%	0.5%	0.9%	0.2%	0.4%	0.1%	0.4%	0.7%	1.3%
			Muzzleloader	0.1%	0.3%	0.1%	0.1%	0.0%	0.1%	0.2%	0.4%	0.2%	0.5%	0.1%	0.2%	0.0%	0.2%	0.4%	0.7%
>25	Do Not Lease	Private Only	Rifle/Other Only	2.3%	4.5%	1.2%	1.8%	0.4%	1.8%	3.3%	6.4%	3.7%	7.2%	2.0%	3.0%	0.6%	3.0%	5.3%	10.2%
			Muzzleloader	1.2%	2.4%	0.7%	1.0%	0.2%	1.0%	1.8%	3.5%	2.0%	3.9%	1.1%	1.6%	0.3%	1.6%	2.9%	5.6%
		Public Only	Rifle/Other Only	1.7%	3.4%	0.9%	1.4%	0.3%	1.4%	2.5%	4.9%	2.8%	5.5%	1.5%	2.2%	0.5%	2.2%	4.1%	7.8%
			Muzzleloader	0.9%	1.8%	0.5%	0.7%	0.1%	0.7%	1.3%	2.6%	1.5%	2.9%	0.8%	1.2%	0.2%	1.2%	2.2%	4.3%
		Pub and Priv	Rifle/Other Only	0.9%	1.8%	0.5%	0.7%	0.1%	0.7%	1.3%	2.6%	1.5%	2.9%	0.8%	1.2%	0.2%	1.2%	2.1%	4.2%
			Muzzleloader	0.5%	0.9%	0.3%	0.4%	0.1%	0.4%	0.7%	1.4%	0.8%	1.5%	0.4%	0.6%	0.1%	0.6%	1.1%	2.2%
	Lease Land	Private Only	Rifle/Other Only	0.3%	0.7%	0.2%	0.3%	0.1%	0.3%	0.5%	1.0%	0.6%	1.1%	0.3%	0.5%	0.1%	0.5%	0.8%	1.7%
			Muzzleloader	0.2%	0.4%	0.1%	0.1%	0.0%	0.1%	0.3%	0.5%	0.3%	0.6%	0.2%	0.2%	0.1%	0.2%	0.4%	0.9%
		Pub and Priv	Rifle/Other Only	0.1%	0.3%	0.1%	0.1%	0.0%	0.1%	0.2%	0.4%	0.2%	0.4%	0.1%	0.2%	0.0%	0.2%	0.3%	0.6%
			Muzzleloader	0.1%	0.1%	0.0%	0.1%	0.0%	0.1%	0.1%	0.2%	0.1%	0.2%	0.1%	0.1%	0.0%	0.1%	0.2%	0.3%

Table 20. Probability Hunting without License: Pacific Region, Male Hunters

Hunting Days	Lease Land	Public or Private Land	Weapon	Under 55 Years Old								55 Years Old or More							
				Deer	Deer Coyote	Deer Duck	Deer Duck Squirrel	Deer Bear	Deer Other BG	Deer Squirrel	Deer Squirrel Coyote	Deer	Deer Coyote	Deer Duck	Deer Duck Squirrel	Deer Bear	Deer Other BG	Deer Squirrel	Deer Squirrel Coyote
Middle Income																			
1 to 5	Do Not Lease	Private Only	Rifle/Other Only	21.2%	35.1%	12.7%	17.6%	4.1%	17.6%	28.3%	44.2%	30.7%	47.1%	19.3%	26.0%	6.5%	26.0%	39.4%	56.6%
			Muzzleloader	12.4%	22.1%	7.1%	10.1%	2.2%	10.1%	17.1%	29.3%	18.9%	31.8%	11.2%	15.6%	3.5%	15.6%	25.4%	40.6%
		Public Only	Rifle/Other Only	16.8%	28.8%	9.8%	13.8%	3.1%	13.8%	22.8%	37.2%	25.0%	40.0%	15.2%	20.9%	5.0%	20.9%	32.8%	49.5%
			Muzzleloader	9.6%	17.5%	5.4%	7.7%	1.6%	7.7%	13.4%	23.7%	14.9%	25.9%	8.6%	12.1%	2.7%	12.1%	20.4%	33.9%
		Pub and Priv	Rifle/Other Only	9.4%	17.2%	5.3%	7.6%	1.6%	7.6%	13.1%	23.3%	14.5%	25.5%	8.4%	11.9%	2.6%	11.9%	20.0%	33.4%
			Muzzleloader	5.1%	9.8%	2.8%	4.1%	0.8%	4.1%	7.4%	13.7%	8.2%	15.2%	4.6%	6.6%	1.4%	6.6%	11.6%	20.8%
	Lease Land	Private Only	Rifle/Other Only	3.9%	7.5%	2.1%	3.1%	0.6%	3.1%	5.6%	10.6%	6.2%	11.8%	3.5%	5.0%	1.0%	5.0%	8.9%	16.4%
			Muzzleloader	2.1%	4.1%	1.1%	1.6%	0.3%	1.6%	3.0%	5.9%	3.4%	6.5%	1.8%	2.7%	0.5%	2.7%	4.9%	9.3%
		Pub and Priv	Rifle/Other Only	1.5%	3.0%	0.8%	1.2%	0.2%	1.2%	2.2%	4.4%	2.5%	4.9%	1.4%	2.0%	0.4%	2.0%	3.6%	7.0%
			Muzzleloader	0.8%	1.6%	0.4%	0.6%	0.1%	0.6%	1.2%	2.3%	1.3%	2.6%	0.7%	1.1%	0.2%	1.1%	1.9%	3.8%
6 to 25	Do Not Lease	Private Only	Rifle/Other Only	11.0%	19.9%	6.3%	8.9%	1.9%	8.9%	15.4%	26.7%	17.0%	29.1%	9.9%	13.9%	3.1%	13.9%	23.0%	37.5%
			Muzzleloader	6.1%	11.5%	3.4%	4.9%	1.0%	4.9%	8.7%	16.0%	9.7%	17.7%	5.5%	7.8%	1.7%	7.8%	13.6%	24.0%
		Public Only	Rifle/Other Only	8.5%	15.7%	4.8%	6.9%	1.4%	6.9%	12.0%	21.5%	13.3%	23.5%	7.6%	10.8%	2.3%	10.8%	18.3%	31.1%
			Muzzleloader	4.6%	8.9%	2.6%	3.7%	0.8%	3.7%	6.7%	12.5%	7.4%	13.9%	4.2%	6.0%	1.2%	6.0%	10.5%	19.1%
		Pub and Priv	Rifle/Other Only	4.5%	8.7%	2.5%	3.6%	0.7%	3.6%	6.5%	12.3%	7.3%	13.6%	4.1%	5.8%	1.2%	5.8%	10.3%	18.7%
			Muzzleloader	2.4%	4.8%	1.3%	1.9%	0.4%	1.9%	3.5%	6.8%	3.9%	7.6%	2.2%	3.2%	0.6%	3.2%	5.7%	10.8%
	Lease Land	Private Only	Rifle/Other Only	1.8%	3.6%	1.0%	1.4%	0.3%	1.4%	2.6%	5.2%	3.0%	5.8%	1.6%	2.4%	0.5%	2.4%	4.3%	8.3%
			Muzzleloader	1.0%	1.9%	0.5%	0.8%	0.2%	0.8%	1.4%	2.8%	1.6%	3.1%	0.9%	1.3%	0.3%	1.3%	2.3%	4.5%
		Pub and Priv	Rifle/Other Only	0.7%	1.4%	0.4%	0.6%	0.1%	0.6%	1.0%	2.1%	1.2%	2.3%	0.6%	0.9%	0.2%	0.9%	1.7%	3.3%
			Muzzleloader	0.4%	0.7%	0.2%	0.3%	0.1%	0.3%	0.5%	1.1%	0.6%	1.2%	0.3%	0.5%	0.1%	0.5%	0.9%	1.8%
>25	Do Not Lease	Private Only	Rifle/Other Only	5.7%	10.7%	3.1%	4.5%	0.9%	4.5%	8.1%	15.0%	9.0%	16.6%	5.1%	7.3%	1.5%	7.3%	12.7%	22.5%
			Muzzleloader	3.1%	5.9%	1.7%	2.4%	0.5%	2.4%	4.4%	8.5%	4.9%	9.4%	2.7%	3.9%	0.8%	3.9%	7.1%	13.2%
		Public Only	Rifle/Other Only	4.3%	8.3%	2.4%	3.4%	0.7%	3.4%	6.2%	11.7%	6.9%	13.0%	3.9%	5.6%	1.2%	5.6%	9.8%	17.9%
			Muzzleloader	2.3%	4.5%	1.3%	1.8%	0.4%	1.8%	3.3%	6.5%	3.7%	7.2%	2.1%	3.0%	0.6%	3.0%	5.4%	10.3%
		Pub and Priv	Rifle/Other Only	2.3%	4.4%	1.2%	1.8%	0.4%	1.8%	3.3%	6.3%	3.7%	7.1%	2.0%	2.9%	0.6%	2.9%	5.3%	10.1%
			Muzzleloader	1.2%	2.4%	0.6%	0.9%	0.2%	0.9%	1.7%	3.4%	2.0%	3.8%	1.1%	1.6%	0.3%	1.6%	2.8%	5.5%
	Lease Land	Private Only	Rifle/Other Only	0.9%	1.8%	0.5%	0.7%	0.1%	0.7%	1.3%	2.6%	1.5%	2.9%	0.8%	1.2%	0.2%	1.2%	2.1%	4.2%
			Muzzleloader	0.5%	0.9%	0.3%	0.4%	0.1%	0.4%	0.7%	1.4%	0.8%	1.5%	0.4%	0.6%	0.1%	0.6%	1.1%	2.2%
		Pub and Priv	Rifle/Other Only	0.3%	0.7%	0.2%	0.3%	0.1%	0.3%	0.5%	1.0%	0.6%	1.1%	0.3%	0.4%	0.1%	0.4%	0.8%	1.6%
			Muzzleloader	0.2%	0.4%	0.1%	0.1%	0.0%	0.1%	0.3%	0.5%	0.3%	0.6%	0.2%	0.2%	0.1%	0.2%	0.4%	0.9%

continues

Not Middle Income

				Under 55 Years Old								55 Years Old or More							
Hunting Days	Lease Land	Public or Private Land	Weapon	Deer	Deer Coyote	Deer Duck	Deer Duck Squirrel	Deer Bear	Deer Other BG	Deer Squirrel	Deer Squirrel Coyote	Deer	Deer Coyote	Deer Duck	Deer Duck Squirrel	Deer Bear	Deer Other BG	Deer Squirrel	Deer Squirrel Coyote
1 to 5	Do Not Lease	Private Only	Rifle/Other Only	28.7%	44.7%	17.9%	24.2%	5.9%	24.2%	37.1%	54.2%	39.9%	57.1%	26.4%	34.5%	9.4%	34.5%	49.3%	66.1%
			Muzzleloader	17.4%	29.8%	10.2%	14.3%	3.2%	14.3%	23.6%	38.3%	25.8%	41.1%	15.8%	21.6%	5.2%	21.6%	33.8%	50.6%
		Public Only	Rifle/Other Only	23.2%	37.7%	14.0%	19.3%	4.5%	19.3%	30.7%	47.0%	33.2%	50.0%	21.2%	28.3%	7.2%	28.3%	42.2%	59.4%
			Muzzleloader	13.7%	24.1%	7.9%	11.1%	2.4%	11.1%	18.8%	31.8%	20.7%	34.4%	12.4%	17.1%	3.9%	17.1%	27.7%	43.4%
		Pub and Priv	Rifle/Other Only	13.4%	23.7%	7.7%	10.9%	2.4%	10.9%	18.5%	31.3%	20.3%	33.8%	12.1%	16.8%	3.8%	16.8%	27.2%	42.8%
			Muzzleloader	7.5%	14.0%	4.2%	6.0%	1.3%	6.0%	10.6%	19.3%	11.8%	21.2%	6.7%	9.6%	2.1%	9.6%	16.4%	28.2%
	Lease Land	Private Only	Rifle/Other Only	5.7%	10.8%	3.2%	4.6%	0.9%	4.6%	8.1%	15.1%	9.0%	16.6%	5.1%	7.3%	1.5%	7.3%	12.7%	22.6%
			Muzzleloader	3.1%	6.0%	1.7%	2.4%	0.5%	2.4%	4.4%	8.5%	5.0%	9.5%	2.7%	4.0%	0.8%	4.0%	7.1%	13.3%
		Pub and Priv	Rifle/Other Only	2.3%	4.4%	1.2%	1.8%	0.4%	1.8%	3.3%	6.4%	3.7%	7.1%	2.0%	2.9%	0.6%	2.9%	5.3%	10.1%
			Muzzleloader	1.2%	2.4%	0.7%	1.0%	0.2%	1.0%	1.7%	3.4%	2.0%	3.9%	1.1%	1.6%	0.3%	1.6%	2.9%	5.6%
6 to 25	Do Not Lease	Private Only	Rifle/Other Only	15.6%	27.1%	9.1%	12.8%	2.8%	12.8%	21.4%	35.3%	23.4%	38.0%	14.2%	19.5%	4.6%	19.5%	30.9%	47.3%
			Muzzleloader	8.9%	16.3%	5.0%	7.2%	1.5%	7.2%	12.5%	22.2%	13.8%	24.3%	8.0%	11.3%	2.5%	11.3%	19.0%	32.1%
		Public Only	Rifle/Other Only	12.2%	21.8%	7.0%	9.9%	2.1%	9.9%	16.9%	29.0%	18.6%	31.5%	11.0%	15.4%	3.5%	15.4%	25.1%	40.3%
			Muzzleloader	6.8%	12.8%	3.8%	5.5%	1.1%	5.5%	9.7%	17.7%	10.7%	19.4%	6.1%	8.7%	1.9%	8.7%	15.0%	26.1%
		Pub and Priv	Rifle/Other Only	6.6%	12.5%	3.7%	5.3%	1.1%	5.3%	9.4%	17.3%	10.5%	19.1%	6.0%	8.5%	1.8%	8.5%	14.7%	25.7%
			Muzzleloader	3.6%	7.0%	2.0%	2.9%	0.6%	2.9%	5.2%	9.9%	5.8%	11.0%	3.2%	4.6%	1.0%	4.6%	8.3%	15.3%
	Lease Land	Private Only	Rifle/Other Only	2.7%	5.3%	1.5%	2.2%	0.4%	2.2%	3.9%	7.5%	4.4%	8.4%	2.4%	3.5%	0.7%	3.5%	6.3%	11.9%
			Muzzleloader	1.4%	2.8%	0.8%	1.1%	0.2%	1.1%	2.1%	4.1%	2.3%	4.6%	1.3%	1.9%	0.4%	1.9%	3.4%	6.6%
		Pub and Priv	Rifle/Other Only	1.1%	2.1%	0.6%	0.8%	0.2%	0.8%	1.5%	3.0%	1.7%	3.4%	0.9%	1.4%	0.3%	1.4%	2.5%	4.9%
			Muzzleloader	0.6%	1.1%	0.3%	0.4%	0.1%	0.4%	0.8%	1.6%	0.9%	1.8%	0.5%	0.7%	0.1%	0.7%	1.3%	2.6%
>25	Do Not Lease	Private Only	Rifle/Other Only	8.2%	15.3%	4.6%	6.6%	1.4%	6.6%	11.6%	20.9%	12.9%	22.9%	7.4%	10.5%	2.3%	10.5%	17.8%	30.3%
			Muzzleloader	4.5%	8.6%	2.5%	3.6%	0.7%	3.6%	6.5%	12.2%	7.2%	13.5%	4.0%	5.8%	1.2%	5.8%	10.2%	18.6%
		Public Only	Rifle/Other Only	6.3%	11.9%	3.5%	5.1%	1.0%	5.1%	9.0%	16.5%	10.0%	18.2%	5.7%	8.1%	1.7%	8.1%	14.0%	24.6%
			Muzzleloader	3.4%	6.6%	1.9%	2.7%	0.6%	2.7%	4.9%	9.4%	5.5%	10.5%	3.1%	4.4%	0.9%	4.4%	7.9%	14.6%
		Pub and Priv	Rifle/Other Only	3.3%	6.5%	1.8%	2.7%	0.5%	2.7%	4.8%	9.2%	5.4%	10.2%	3.0%	4.3%	0.9%	4.3%	7.7%	14.3%
			Muzzleloader	1.8%	3.5%	1.0%	1.4%	0.3%	1.4%	2.6%	5.1%	2.9%	5.6%	1.6%	2.3%	0.5%	2.3%	4.2%	8.1%
	Lease Land	Private Only	Rifle/Other Only	1.3%	2.6%	0.7%	1.1%	0.2%	1.1%	1.9%	3.8%	2.2%	4.3%	1.2%	1.7%	0.3%	1.7%	3.1%	6.1%
			Muzzleloader	0.7%	1.4%	0.4%	0.6%	0.1%	0.6%	1.0%	2.0%	1.2%	2.3%	0.6%	0.9%	0.2%	0.9%	1.7%	3.3%
		Pub and Priv	Rifle/Other Only	0.5%	1.0%	0.3%	0.4%	0.1%	0.4%	0.8%	1.5%	0.8%	1.7%	0.5%	0.7%	0.1%	0.7%	1.2%	2.4%
			Muzzleloader	0.3%	0.5%	0.1%	0.2%	0.0%	0.2%	0.4%	0.8%	0.4%	0.9%	0.2%	0.4%	0.1%	0.4%	0.7%	1.3%

Summary

This report has presented a wide array of information on deer hunter demographics and behavior patterns, from general participation levels to deer hunter license purchasing patterns. Much of the report uses comparisons with non-deer hunters to help better illuminate the behavior and activities of deer hunters.

The comparison and contrasts among deer and non-deer hunters reveals numerous differences between the two. Beyond 65 years of age, deer hunter participation rates are notably lower. Deer hunters tend to have fewer years of education. Deer hunters tend to spend more on hunting, particularly for special equipment, land leasing, and land ownership. Deer hunters are more likely to own land and hunt on privately owned land. Lastly, deer hunters have a lower proportion of hunters in the highest income brackets.

As well, there are several similarities between deer and non-deer hunters. The wildlife watching behavior and the gender distribution of both are roughly the same. Additionally, even among those variables where differences exist, the similarity of the two groups is often greater than their differences. Both deer and non-deer hunting participation tend to increase with income levels, and both are popular activities for individuals of all education levels.

After comparing deer hunters with non-deer hunters, the report analyzes weapons usage, land ownership, and license purchasing pattern of deer hunters. Nearly 40% of deer hunters hunt with at least one of the primitive weapons, and those that use primitive weapons, on average, participate more days and spend more money than those who do not. Both hunting land ownership and leasing have a positive correlation with age and the use of primitive weapons, and both have a negative relationship with the amount of public land available. However, income, hunting days, and metropolitan residency have a stronger relationship with land leasing than ownership. Several variables appear associated with reduced probability of hunting without a license: use of primitive weapons, increased income, more hunting days, land ownership or leasing, and residence outside metropolitan areas. Additionally, license purchasing noncompliance varies dramatically by geographic region.

In an effort to isolate the impact of numerous potential variables on license noncompliance, logit regression was used. The results of the logit regression reveal that numerous variables do have a statistically significant impact on the probability of noncompliance. Most of the conclusions from the logit regression modeling are generally in line with intuition and economic logic.

The results of the logit model are used to calculate the approximate probabilities of male deer hunters hunting without a license. The probabilities impart some understanding of how various hunter characteristics affect noncompliance. The probability of hunting without a license changes dramatically as hunting days change, as other species hunted change, whether muzzleloader weapons are used, if public land is used, and as geographic region of where hunting takes place changes. Whether a hunter is over 55 and whether he or she has a middle income have more subtle impacts on the probability of hunting without a license.

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