

# Exploring Recent Increases in Hunting and Fishing Participation



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**Produced by the American Sportfishing Association,  
Responsive Management,  
the Oregon Department of Fish and Wildlife, and Southwick  
Associates**

**Conducted Under a Grant from the U.S. Fish and Wildlife Service  
and Administered by the Association of Fish and Wildlife Agencies**

**Multi-State Conservation Grant F12AP00142  
2013**



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## FINAL REPORT



PRODUCED UNDER MULTI-STATE CONSERVATION GRANT F12AP00142

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## **Acknowledgments**

The American Sportfishing Association, Responsive Management, Southwick Associates, and the Oregon Department of Fish and Wildlife would like to thank all the agency personnel and hunters and anglers who took the time to contribute to this project through personal interviews and by completing surveys.

The views contained in this report do not necessarily represent the views of the U.S. Fish and Wildlife Service or the Association of Fish and Wildlife Agencies.

Although numerous people assisted with this project, any errors, omissions, or typographical mistakes in the report are the sole responsibility of Responsive Management.

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## **CHAPTER 1. INTRODUCTION AND BACKGROUND**

Recreational hunting and fishing license sales produce valuable funding each year for fish and wildlife conservation and habitat restoration, while hunter and angler expenditures generate billions of dollars annually for the national economy and support millions of jobs. These facts suggest that the continued growth of hunting and fishing participation is critical to the nation.

The trend across the previous two decades had been a steady decline in hunting and fishing participation, yet recent statistics from the *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (National Survey)* indicate a recent increase in participation in hunting and fishing. From 2006 to 2011, hunting participation nationally increased 9%, while fishing participation increased 11% nationally over this time span.

The purpose of this project is to better understand the factors correlated with recent increases in hunting and fishing participation and license sales and determine the factors that may have contributed to these increases. Promoting participation and license sales is in the best interest of each state. Thus, an understanding of those factors associated with increased participation is a vital tool for state fish and wildlife agencies. The resulting conclusions will provide useful information in the continued development of marketing and outreach.

While much research has been published on factors contributing to the declining trend in participation among hunters and anglers, less is known about those factors that have contributed to this latest increase. There is recognition of the need to understand those factors driving recent license sales increases, but there is a limited number of analyses from which to build a body of knowledge.

The research project approaches the subject in many ways: a review of past research, interviews with agency personnel, and surveys of both hunters and anglers, as well as various types of analyses such as the chapter that uses a multi-regression analyses. The first section of this literature review examines the historical data regarding hunting and fishing participation in the United States. The chapter then explores factors that may have contributed to the decline in hunting and fishing participation, as well as factors leading to attrition in the activities, which also may have led to an overall decline from the mid-1980s until just recently. Finally, the report discusses factors that may tend to increase hunting and fishing participation.

### **HISTORIC HUNTING AND FISHING PARTICIPATION AND LICENSE SALES DATA**

Trends in hunting and fishing participation and license sales are closely tracked by government agencies and industry groups. In particular, there are two important data sources, with records covering many decades:

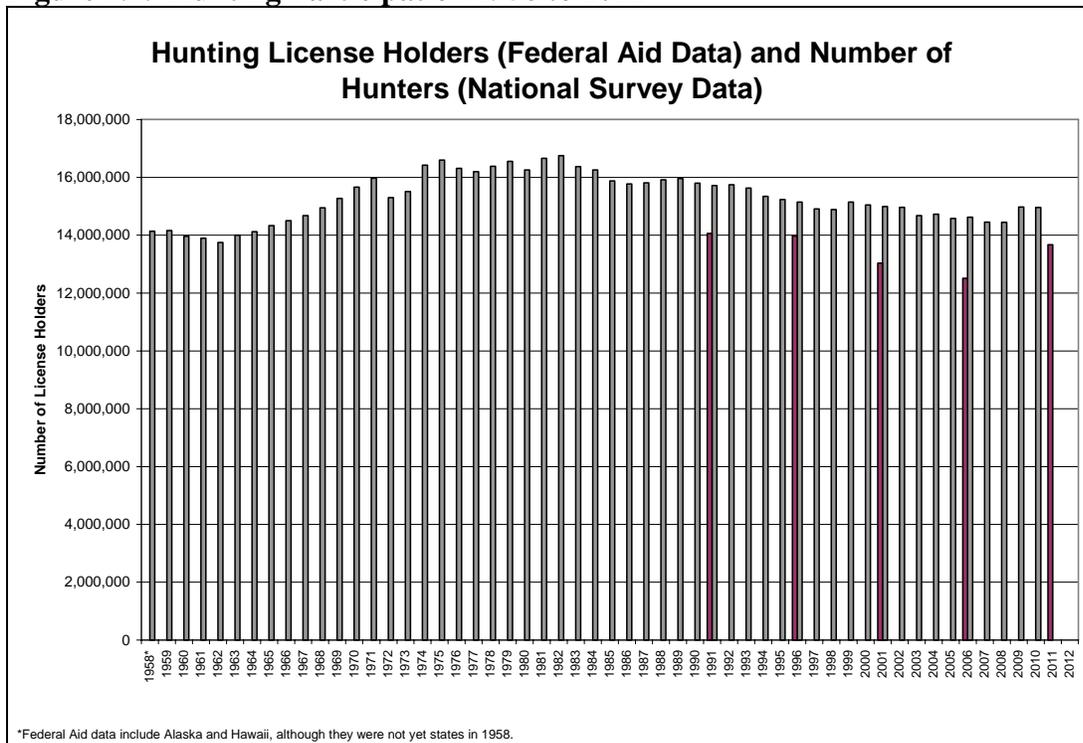
- License sales data collected by the individual states and compiled by the U.S. Fish and Wildlife Service, which are known as Federal Aid data because the data are used to allocate funding under the Federal Aid in Sport Fish and Wildlife Restoration Programs. Complete data are available starting in 1958 for hunting and 1961 for fishing.

- The *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*, conducted every 5 years\* since 1955 by the U.S. Fish and Wildlife Service and the U.S. Bureau of the Census. Data are comparable from one *National Survey* to the next starting in 1991; methodological differences in how the data were collected prior to 1991 do not allow previous *National Surveys* to be compared to those starting in 1991. (\*There was a one-time 6-year interval from 1985 to 1991 so that the survey dates now fall on years ending in 1 and 6 rather than 5 and 0. The last *National Survey* was for 2011; the next one is scheduled for 2016. Note that the data for the given year are always collected in the following year; for instance, the data for the 2011 *National Survey* were collected in 2012.)

In addition to two primary data sources, there are two aspects of the data to examine: the numbers of hunters and anglers (in absolute numbers), and the participation rate as a percentage of the population. The report first looks at the absolute numbers of hunters and anglers.

As shown in Figure 1.1, with slight fluctuations from year to year, Federal Aid data (grey bars) shows that the number of licensed hunters generally increased from 1958 to 1975, hit a plateau from 1975 to 1982, then went into a general decline from 1982 to 2008. The last two years for which data are available (2009 and 2010) show an increase in the number of licensed hunters over the 2008 level. Also shown on the graph are the estimated number of hunters from the *National Survey* data at 5-year intervals (red bars). The *National Survey* data show a decline after 1996 for the next two survey years (2001 and 2006), but then a rise in 2011. In short, both datasets show a recent slight increase in the number of hunters, albeit not to the peak levels in the 1980s.

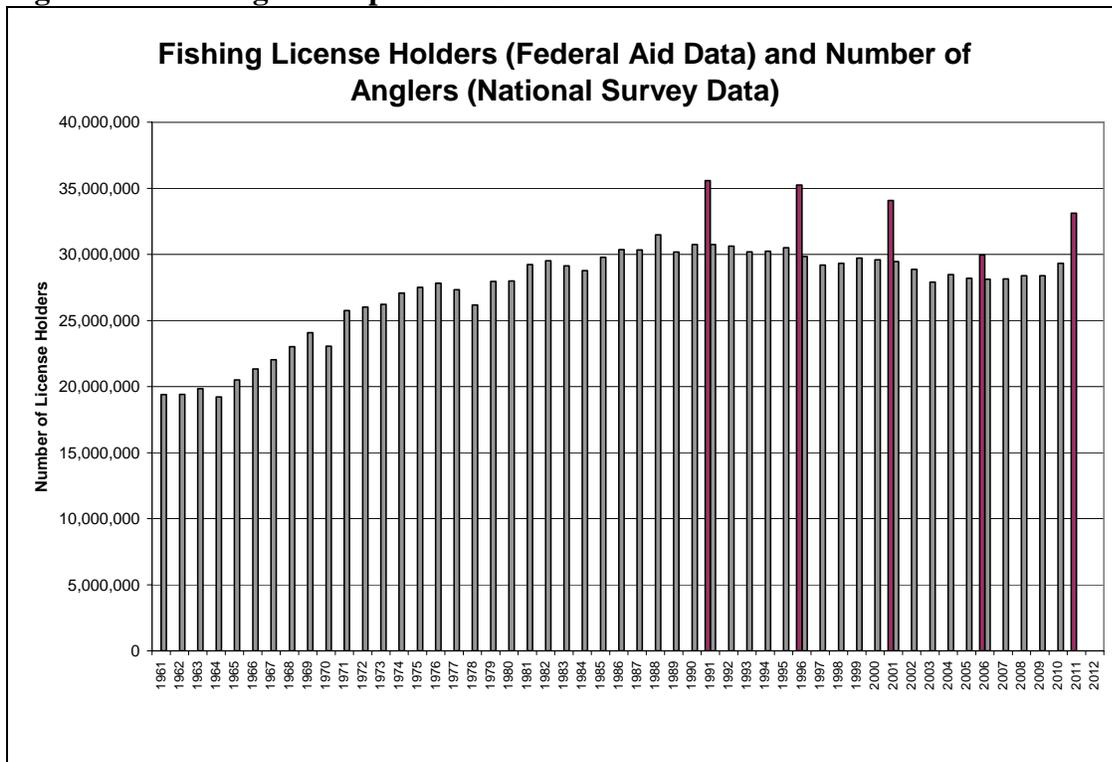
**Figure 1.1. Hunting Participation 1958 to 2012**



Source: U.S. Fish and Wildlife Service, *Historic License Data*; U.S. Fish and Wildlife Service/U.S. Census Bureau, *National Survey of Hunting, Fishing, and Wildlife-Associated Recreation*.

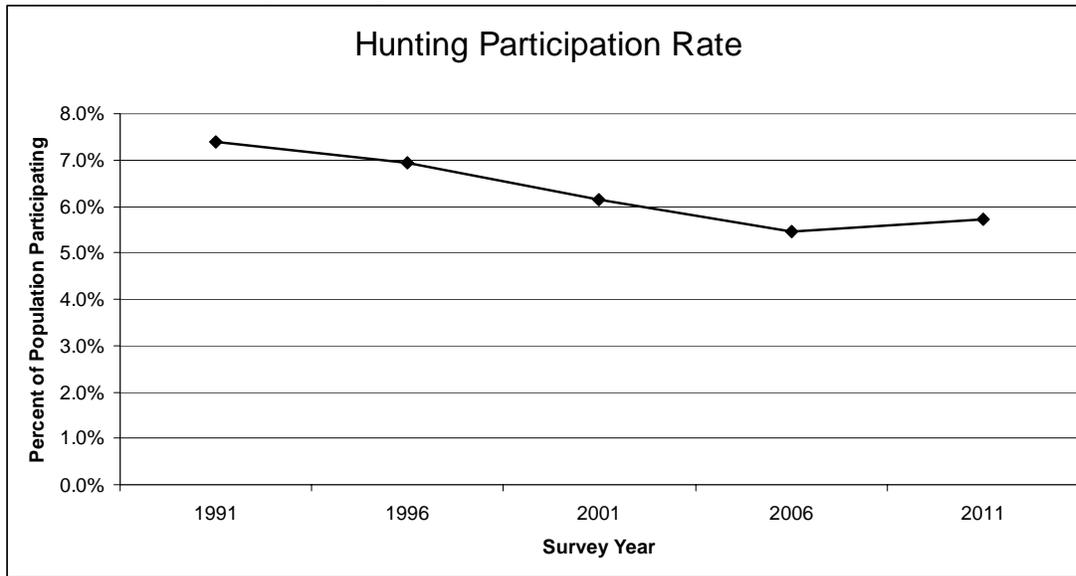
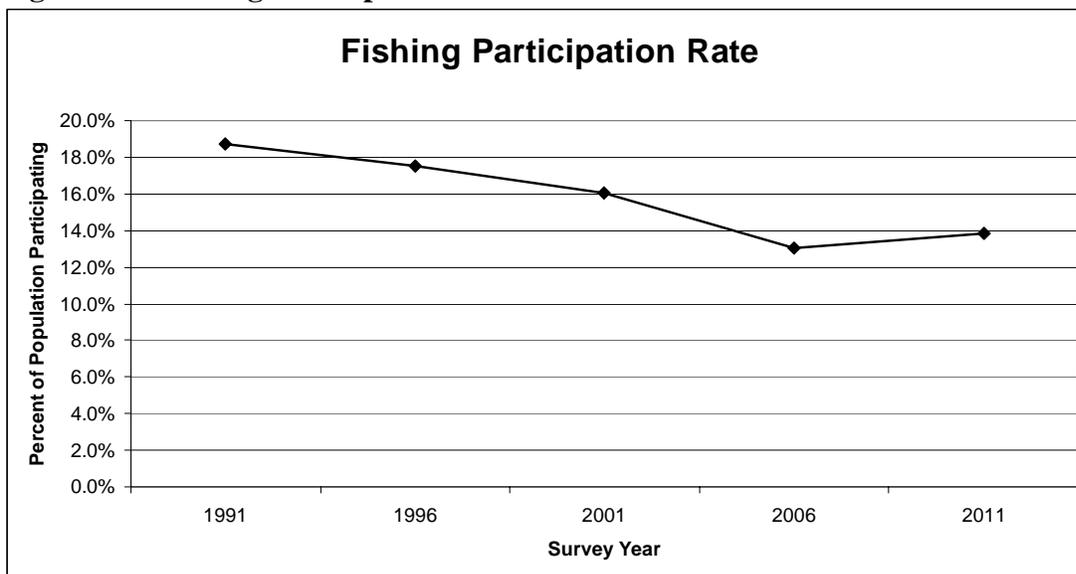
A similar graph shows fishing participation (Figure 1.2). Federal Aid data (grey bars) show that the number of fishing license holders generally rose, again with slight year-to-year fluctuations, from 1961 to a peak in 1988, then generally declined from 1988 to 2003. Since that time, the number has been fairly level to 2009, with a slight increase in 2010 over any of the years since 2002. Meanwhile, the *National Survey* data (red bars) show a sharp dip in 2006, followed by a rise in 2011. As with the hunting data, the fishing data show a recent slight increase in the number of anglers.

**Figure 1.2. Fishing Participation 1961 to 2012**



Source: U.S. Fish and Wildlife Service, *Historic License Data*; U.S. Fish and Wildlife Service/U.S. Census Bureau, *National Survey of Hunting, Fishing, and Wildlife-Associated Recreation*.

As mentioned previously, another aspect of hunting and fishing participation is the *rate* of participation—the percent of the population that engages in the activities. The *National Survey* calculates this rate, so comparable data are available at 5-year intervals from 1991 through 2011. By this measure, the participation rates in both fishing and hunting declined from 1991 to 2006, followed by a slight upswing in 2011 in both activities (Figures 1.3 and 1.4).

**Figure 1.3. Hunting Participation Rate 1991 to 2011****Figure 1.4. Fishing Participation Rate 1991 to 2011**

In addition to the national data shown above, there are state-level data from the two most recent *National Surveys* that show which states had increases in the number of resident hunters and anglers from 2006 to 2011. Table 1.1 shows the absolute numbers of resident hunters in the states in 2006 and in 2011, as well as the percentage increase or decrease over the 2006 numbers. The table is ranked by the percentage change in the *National Survey* numbers, with the states having the greatest increases at the top and the states having the worst decreases at the bottom. More than half the states had hunting participation increases showing up in their *National Survey* data. (Green indicates increases, yellow indicates no marked changes—less than 4%, and red indicates decreases.)

**Table 1.1. Hunting Participation in 2006 and 2011 and the Percentage Change**

State	Number of Resident Hunters in 2006 (in thousands) (National Survey data)	Number of Resident Hunters in 2011 (in thousands) (National Survey data)	Percent Change from the 2006 Number
Alaska	53	104	96%
Mississippi	238	436	83%
Arizona	126	225	79%
Illinois	258	459	78%
Indiana	237	377	59%
Alabama	310	492	59%
Wyoming	50	76	52%
New York	491	739	51%
South Dakota	89	127	43%
California	274	377	38%
Idaho	122	162	33%
Kentucky	241	316	31%
New Jersey	72	93	29%
Connecticut	36	46	28%
Hawaii	18	23	28%
Rhode Island	12	15	25%
Vermont	56	66	18%
Wisconsin	649	763	18%
Colorado	126	144	14%
South Carolina	159	180	13%
Washington	179	200	12%
Ohio	467	516	10%
Texas	979	1080	10%
Utah	144	158	10%
Nebraska	102	110	8%
Arkansas	301	316	5%
Louisiana	241	253	5%
Tennessee	265	276	4%
Florida	214	215	0%
Delaware	19	19	0%
Oklahoma	224	219	-2%
New Mexico	66	64	-3%
Maine	146	141	-3%
Iowa	208	200	-4%
West Virginia	194	184	-5%
North Carolina	277	259	-6%
Kansas	183	170	-7%
Virginia	353	326	-8%
Massachusetts	57	52	-9%
Minnesota	509	457	-10%
Missouri	540	477	-12%
Georgia	344	293	-15%
Oregon	218	181	-17%
New Hampshire	51	42	-18%
Pennsylvania	933	699	-25%
Nevada	54	39	-28%
Montana	145	104	-28%
Michigan	721	501	-31%
North Dakota	86	50	-42%
Maryland	133	69	-48%

Similar to the above data, Table 1.2 shows state-by-state data for fishing in the 2006 and 2011 *National Surveys*, as well as the percent change between those years. Again, the majority of states show an increase in resident fishing participants between the two years.

**Table 1.2. Fishing Participation in 2006 and 2011 and the Percentage Change**

State	Number of Resident Anglers in 2006 (in thousands) (National Survey data)	Number of Resident Anglers in 2011 (in thousands) (National Survey data)	Percent Change from the 2006 Number
South Dakota	89	156	75%
New York	932	1585	70%
Arizona	330	533	62%
Alaska	137	211	54%
Vermont	64	95	48%
New Hampshire	108	153	42%
North Carolina	868	1196	38%
Washington	641	835	30%
New Mexico	164	213	30%
Michigan	1077	1397	30%
Oklahoma	525	680	30%
Mississippi	465	600	29%
Colorado	490	593	21%
Illinois	795	955	20%
Utah	288	343	19%
Louisiana	590	700	19%
Minnesota	1108	1303	18%
Kansas	319	372	17%
Idaho	206	238	16%
Wyoming	96	110	15%
Hawaii	92	104	13%
New Jersey	458	509	11%
Connecticut	251	277	10%
Ohio	1145	1257	10%
Indiana	663	720	9%
Tennessee	658	709	8%
Montana	172	185	8%
Pennsylvania	830	891	7%
Arkansas	430	458	7%
South Carolina	527	561	6%
Iowa	397	416	5%
Nebraska	169	177	5%
Rhode Island	76	79	4%
Virginia	640	649	1%
Florida	1881	1895	1%
Nevada	114	114	0%
California	1578	1576	0%
Missouri	870	827	-5%
Massachusetts	398	377	-5%
Texas	2308	2133	-8%
Wisconsin	1014	910	-10%
Delaware	66	59	-11%
Maine	220	193	-12%
Maryland	403	347	-14%
Oregon	455	373	-18%
Alabama	600	473	-21%
Georgia	971	764	-21%
Kentucky	580	451	-22%
West Virginia	291	222	-24%
North Dakota	88	65	-26%

In summary, both the absolute numbers of hunters and anglers nationally as well as the national participation rates in these activities appear to be on a recent upswing. Whether these increases continue into the future or are simply functions of year-to-year fluctuations remains to be seen. Nonetheless, the data show promise for hunting and fishing stakeholders. This chapter next

looks at some of the factors that may have led to the decreases in these activities from the mid-1980s until just recently.

## **DEMOGRAPHIC FACTORS RELATED TO THE DECLINES IN HUNTING AND FISHING PARTICIPATION FROM THEIR PEAKS IN THE 1980s**

In both hunting and fishing, the declines in participation from the peak in the 1980s is partly attributed to a broad demographic change in the United States—urbanization. Participation in hunting and fishing is greatest among rural residents, yet the United States has been becoming more urban throughout the 20th century, including the decades of hunting and fishing decline (Applegate, Lyons, and Plage 1984; Responsive Management 2004, 2005a, 2006; Leonard 2007). According to U.S. Census data, 36% of the United States population lived in a rural area in 1950. This percentage steadily declined to 30% in 1960, then to 25% in 1990, and to 22% in 2000.

Concomitant factors related to urbanization—the loss of lands for hunting and fishing and the loss of access to lands for hunting and fishing—also contributed to declines in the activities. Additionally, as an area becomes more urban, there is a dilution of the hunting and fishing traditions and the loss of social groups that participate in the activities; in other words, as an area urbanizes, hunters and anglers will likely have fewer neighbors who participate in these activities.

A follow-up study to the 1975 *National Survey*, conducted by Charbonneau and Lyons (1980), is one of the first cautious predictors of the future decline in hunting (as well as fishing) participation, and it identified urbanization as an important factor. In the study, the researchers suggested that the declining rate of hunting participation was linked to a growing metropolitan population and concomitant declining proximity of recreational land for hunting. The conclusions of that study were borne out by others that linked a decline in hunting participation with an increasingly urbanized society, including Responsive Management's 2008 study conducted with the National Shooting Sports Foundation that showed that access, negatively affected by urbanization, remains one of the top reasons for declining hunter participation. Specifically, the top items among hunters taking away from their enjoyment or causing them to hunt less were not enough places to hunt (26% of active hunters gave this response) and not enough access to hunting lands (23%) (RM/National Shooting Sports Foundation 2008).

Another demographic change in the United States that may have contributed to the decline in hunting and fishing participation rates is the aging of the population, as documented by the U.S. Census Bureau—the median age has increased from 28.0 years in 1970 to 36.4 years in 2006. Leonard (2007) examined avidity in hunting among age groups and found that, in general, avidity declines after people reach 25 years of age. Additionally, when ex-hunters and ex-anglers were asked in a survey to give reasons for their dropping out of the activities, age/health is one of the top reasons given (Duda, Jones, and Criscione, 2010). Therefore, it is reasonable to expect that the rates of hunting and fishing participation would decline as the population ages. Note that this demographic change may help explain the drop in the participation *rate* that was seen from 1991 to 2006, but it does not fully explain the drop in absolute numbers of participants that was seen for the simple reason that all age groups,

including the younger age groups, increased during that time in the United States, even though the *proportion* of the population in the younger age groups declined.

A third demographic change in the United States that may have affected participation rates in hunting and fishing is the decline in the proportion of the population made up of whites. The *National Surveys* have suggested that participation rates in hunting and fishing, particularly hunting, is greater among whites than among non-whites. Therefore, as the proportion of the overall population that is white has declined, the proportion of the population that hunts and/or fishes would also decline. Again, though, in absolute numbers, the white population increased over this time period, so this demographic change does not fully explain the drop in absolute numbers of participants that was seen until recently.

### **FACTORS RELATED TO ATTRITION IN HUNTING AND FISHING PARTICIPATION**

In this study, which is focused on *increased* participation in hunting and fishing, the following examination of non-demographic factors leading to *declines* in participation can provide important clues: at the most simplistic level, it is logical to posit that the inverse of factors causing declines in participation would contribute to increases in participation.

In 2008, research by Responsive Management (RM/National Shooting Sports Foundation, 2008) showed the top three factors causing attrition in hunting were a limited amount of free time, family obligations, and work obligations (Figure 1.5). While the link between the aforementioned decline in hunting participation and these factors is not fully understood, it may be that societal changes may have exacerbated these factors—certainly, the proportion of households in which there is a full-time caretaker appears to have declined in the last few decades (i.e., there are more households in which both parents work and more households headed by single parents), which would lead to adults having less free time, more family obligations, and more work obligations.

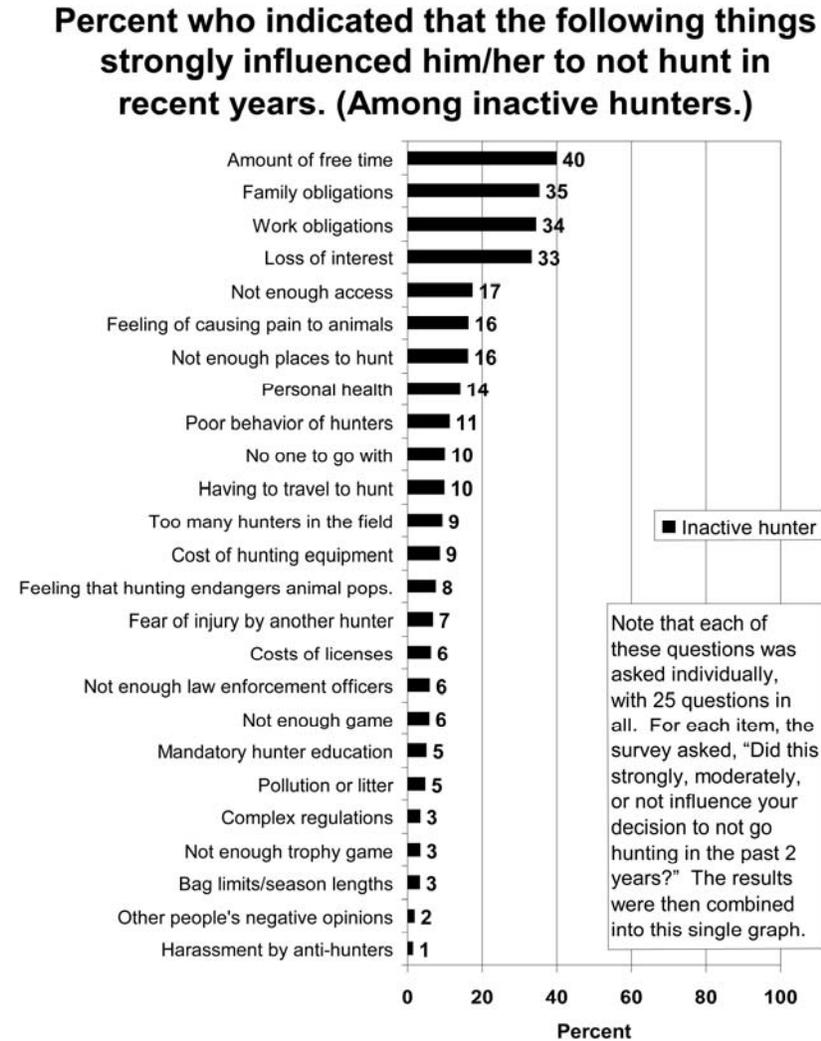
As with hunting participation, research also shows that people are not fishing as much because of time constraints: surveys of anglers find that lack of time is frequently mentioned as limiting fishing participation, typically because of family or work obligations (RM, 1995, 1999, 2004, 2011; Fedler and Ditton, 2001).

Another societal factor that may possibly have contributed to a decline in hunter participation is a change in how people relate to and value wildlife. According to Manfredo and Zinn, Americans are moving away from the traditional utilitarian value orientation towards wildlife towards a protection-oriented approach (1996). This change in value orientation would obviously affect consumptive use of wildlife—particularly hunting (fishing can be nonconsumptive if the angler catches-and-releases).

There is also a small, but vocal, anti-hunting and anti-fishing lobby that has grown over the last few decades; while the majority of Americans approve of hunting, a study on animal welfare issues by Responsive Management found that 18% of Americans believe that “animals have rights like humans and should not be used in any way” (Duda, Jones, and Criscione, 2010) Further studies have shown the public holds gradations of support for hunting based on the

purpose of the hunt itself (RM 2005b, 2005c). Hunting participation may be adversely affected by these negative perceptions of hunters and the sport of hunting (Peterson, 2004).

**Figure 1.5. Constraints to Participation Among Inactive Hunters**



**FACTORS RELATED TO INCREASES IN PARTICIPATION IN HUNTING AND FISHING**

With more than 35 years of declining participation among hunters and anglers, researchers have had plenty of time and data to research those factors that may have contributed to the decline in hunting and fishing participation. However, there is much less research analyzing factors influencing increases in hunting and fishing participation and license sales—though the need for such research is pressing and timely.

Hypotheses regarding the recent upsurge of hunting participation and license sales have been routinely posited in newspaper articles and industry websites without any rigorous substantiation. One study, however, analyzed possible reasons for increases in hunting participation and license sales. In 2008, Responsive Management (2008) published a study using Federal Aid data from 3 years—1992, 1999, and 2004—in which hunting license sales increased against 13 other years of license sale declines between 1990 and 2005. Using qualitative and quantitative analysis, the study considered the potential for both internal and external factors to influence hunting license sales. Its most salient findings were that economic considerations, with one exception, did not appear to figure prominently into most peoples' decision to buy a hunting license. The exception was that the study found a negative correlation to increases in housing starts. When this study finding is paired with another finding from a study (RM/National Shooting Sports Foundation, 2008), which found that the top occupational category for employed hunters was the category that encompassed construction, carpentry, plumbing, electrical, and craftsman, it can be posited that, in times of increased housing starts, a substantial number of hunters will have less free time to go hunting because of work obligations. It may be that the inverse is true: in times of economic recession and fewer housing starts, it may be that hunters would have more free time to go hunting.

The second phase of the aforementioned Responsive Management study (2008) was a qualitative analysis of a survey that asked state wildlife professionals to suggest and assess factors that might have affected license sales in their state. The study found that an important factor that may have increased license sales is changing types of licenses (e.g., creation of new licenses, re-packaging or renaming licenses). Of state fish and wildlife agencies that were polled in the survey, from 28% to 37%, depending on which year was considered, named license type changes as a factor affecting their license sales increase.

Among those factors that must be mentioned as possibly affecting increases in hunting and fishing participation and license sales are recruitment and retention programs. As participation numbers and license sales declined steadily, recruitment and retention programs were founded and developed to address the trend. Such strategies and focus may have had an effect on hunting and fishing populations. In 2007, the U.S. Fish and Wildlife Service issued an addendum to the 2005 National Survey titled *Fishing and Hunting Recruitment and Retention in the U.S. from 1990 to 2005* (Leonard, 2007). Although the report specifically stated that the *National Survey* was not “designed to ascertain the impact” of recruitment and retention programs, it did posit that such programs had helped stop the rapid decline of participation recorded in the 1990s.

In 2011, Responsive Management evaluated 37 hunting, shooting, and fishing recruitment and retention programs among the 400 offered across the country (RM, 2011). The survey data make clear that recruitment and retention programs are generally more effective at retaining those already initiated into hunting, shooting, and fishing than they are at recruiting true newcomers to these activities. In general, however, participation in the programs had beneficial effects: participants reported increased approval of and interest in hunting, shooting, and fishing, and increased knowledge of and participation in hunting, shooting, and fishing. The report also advises that providing quality instructors, age-appropriate material, and other concurrent opportunities to participate in outdoor sports are all factors contributing to successful programs.

When retention programs slow attrition to a rate less than the rate of getting new members into the sports, the overall numbers of hunters and anglers would increase.

### **LOOKING AHEAD**

This study seeks to identify correlative factors to each state's increase or decrease in hunting and fishing license sales. It will also provide valuable qualitative and quantitative data that can be used to better understand factors related to hunting and fishing license sales. As a direct result of this study, future marketing strategies will be based on a foundation of scientific research as opposed to speculation, ensuring that fish and wildlife agencies receive a greater return on investment for their efforts.

## CHAPTER 2. AGENCY SURVEY AND PERSONAL INTERVIEW RESULTS

This chapter presents the results of surveys of state agencies that manage hunting and fishing participation and opportunities, as well as personal interviews conducted with state agency representatives. Agencies in all 50 states were contacted multiple times to request and encourage participation in the surveys and personal interviews. The surveys and the analysis explore several issues related to increases and decreases in hunting, freshwater fishing, and saltwater fishing between the 2006 *National Survey* and the 2011 *National Survey*, including factors related to changes in participation, the degree of impact of these factors, and budgets and staffing related to marketing and recruitment and retention efforts for each activity.

While examining the data that follow it is important to note two issues affecting the results. First, the overall n-values are low, particularly for those pertaining to saltwater fishing given that only a portion of the states have saltwater fishing opportunities. While percentages are often reported throughout the analysis, the total number of respondents is sometimes used rather than percentages when the n-values are below 10. Second, personal interviews with agency representatives and additional qualitative data provided by respondents completing the survey suggest that many respondents are uncomfortable with specifying which factors were responsible for or had a direct impact on any changes in participation and license sales. Indeed, qualitative responses indicate that very few agencies have formal measurements or tracking efforts, suggesting the opinions on contributing factors to changes in participation and license sales are based more on perceptions and assumptions. Also, respondents had difficulties providing accurate estimates regarding staffing, time, and budgets related to marketing and recruitment and retention efforts.

### ASSESSMENT OF FACTORS INFLUENCING PARTICIPATION AND LICENSE SALES

Each state agency was asked about specific factors that may or may not have influenced participation and license sales in the state in separate surveys each for hunting, freshwater fishing, and saltwater fishing. For each factor, an appropriate agency representative was asked to indicate if the factor had increased, had decreased, or had no impact on participation and/or license sales; note that the representative's response to whether participation and/or license sales had increased or decreased is based on the respondent's perception and may or may not reflect the change in overall participation reported by the *National Survey*. The surveys also asked whether each factor had a major or minor impact on the change in participation and/or license sales, as well as specifically which years it had an impact from 2006 to 2011.

Overall, marketing was a top named factor across all three activities – hunting, freshwater fishing, and saltwater fishing – for contributing to an *increase* in participation and/or license sales. Typically, agencies perceived it as having a minor impact on the increase. Factors cited as contributing to a *decrease* in participation among the activities often include, but are not limited to, factors beyond the control of the agencies, such as the economy, demographic factors, and weather.

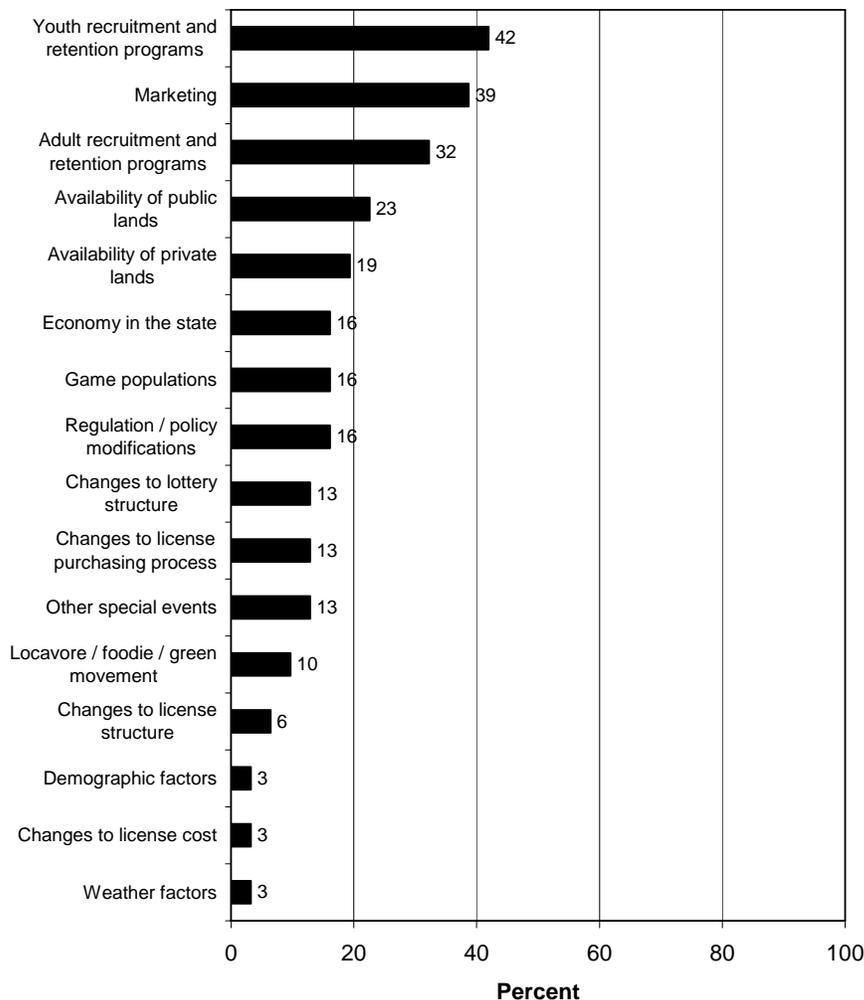
## Hunting

In general, marketing and recruitment and retention programs are the factors most commonly cited by agencies as having contributed to an *increase* in hunting participation and/or license sales from 2006 to 2011 among resident and nonresident hunters (Figures 2.1 and 2.2).

Specifically, the top three factors most commonly cited by agencies as having contributed to an increase in *resident* hunting participation and/or license sales are youth recruitment and retention programs (42% of responding state agencies cited this factor), marketing (39%), and adult recruitment and retention programs (32%). The top factor most commonly cited by agencies as having contributed to an increase in *nonresident* hunting participation and/or license sales is marketing (39%). The remaining factors for both resident and nonresident hunting are led by availability of public lands and availability of private lands.

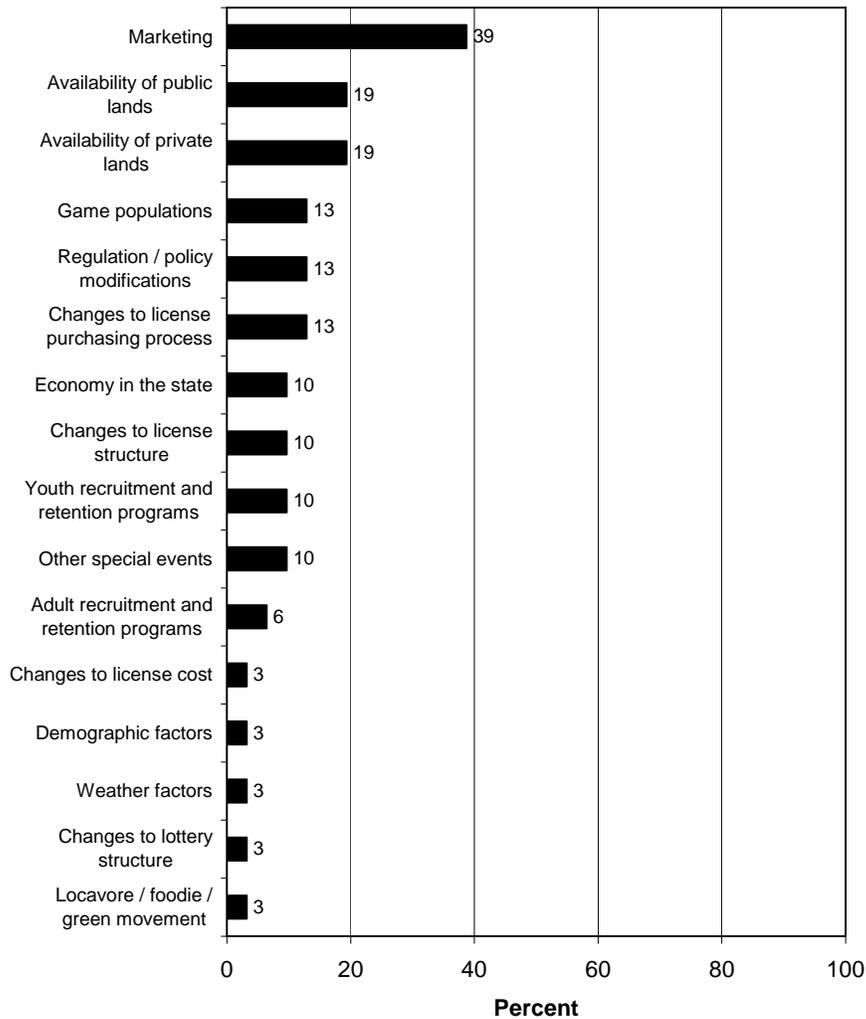
**Figure 2.1. Factors Contributing to Increases in Resident Hunting Participation**

**Factors that contributed to an increase in resident hunting participation and/or license sales in states from 2006 to 2011.**



**Figure 2.2. Factors Contributing to Increases in Nonresident Hunting Participation**

**Factors that contributed to an increase in nonresident hunting participation and/or license sales in states from 2006 to 2011.**

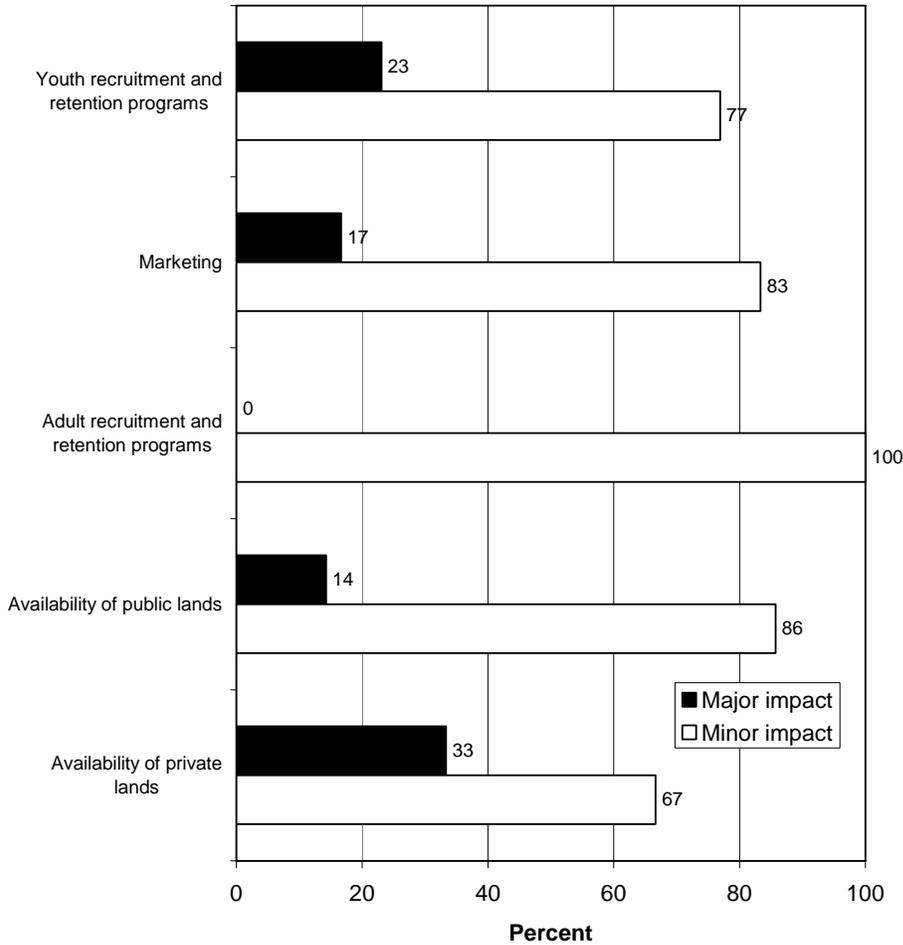


For each of the factors discussed above, agency respondents were more likely to indicate the factor had a minor impact on the increase in participation and/or license sales than to indicate it had a major impact (Figures 2.3 and 2.4).

**Figure 2.3. Breakdown of Factors Into Major or Minor Impacts on Increases in Resident Hunting Participation**

**To what degree did the following factors impact resident hunting participation and/or license sales in your state from 2006 to 2011?**

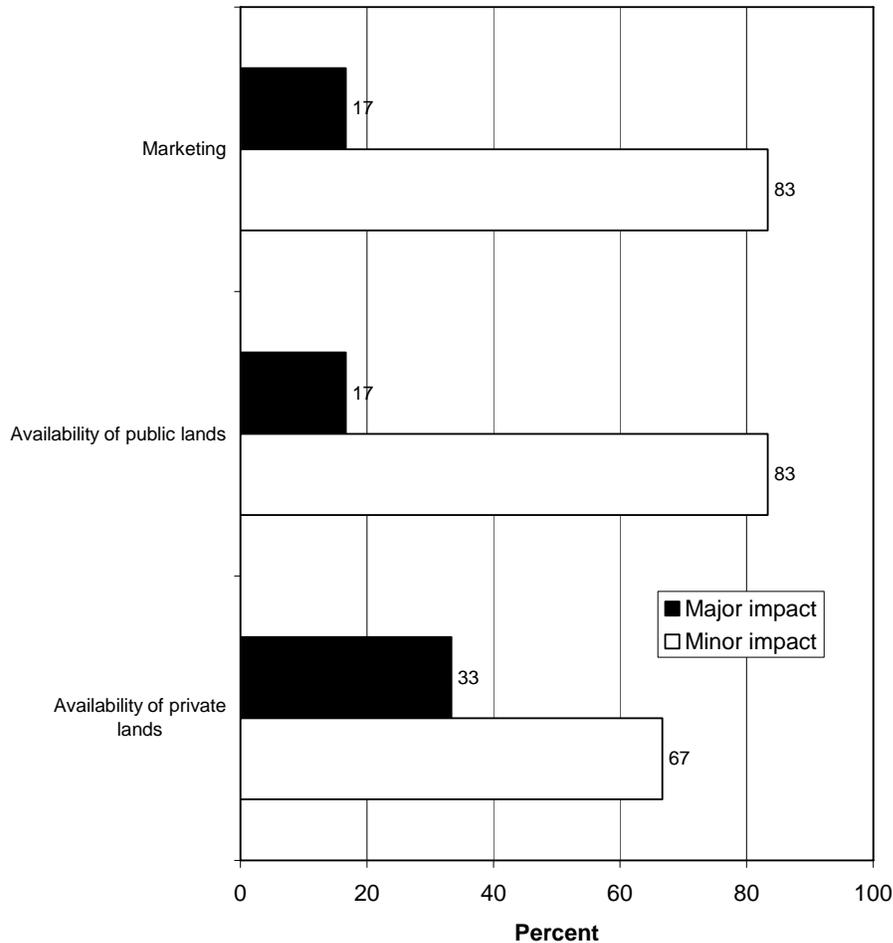
**(Shown for the top factors that contributed to an increase in resident hunting participation and/or license sales from 2006 to 2011.)**



**Figure 2.4. Breakdown of Factors Into Major or Minor Impacts on Increases in Nonresident Hunting Participation**

**To what degree did the following factors impact nonresident hunting participation and/or license sales in your state from 2006 to 2011?**

**(Shown for the top factors that contributed to an increase in nonresident hunting participation and/or license sales from 2006 to 2011.)**



The number of agencies indicating youth recruitment and retention programs, marketing, and adult recruitment and retention programs had an impact on increased *resident* hunting generally increased for each year from 2006 to 2009 and then remained relatively stable from 2009 to 2011 for each of these three top factors (Table 2.1). The number of agencies indicating marketing had an impact on increased nonresident hunting also generally increased for each year from 2006 to 2009 but then decreased from 2009 to 2011 (Table 2.2).

**Table 2.1. Agencies Indicating Factors Had an Impact on Increases in Resident License Participation**

Years the top contributing factors had an impact on an increase in resident hunting participation and/or license sales from 2006 to 2011.						
Factors	Year (Number of Agencies Indicating Factor Had an Impact)					
	2006	2007	2008	2009	2010	2011
Youth recruitment and retention programs	7	8	10	14	14	14
Marketing	5	6	7	9	9	10
Adult recruitment and retention programs	6	6	6	7	7	7
Availability of public lands	6	6	6	6	6	6
Availability of private lands	3	3	4	4	5	5

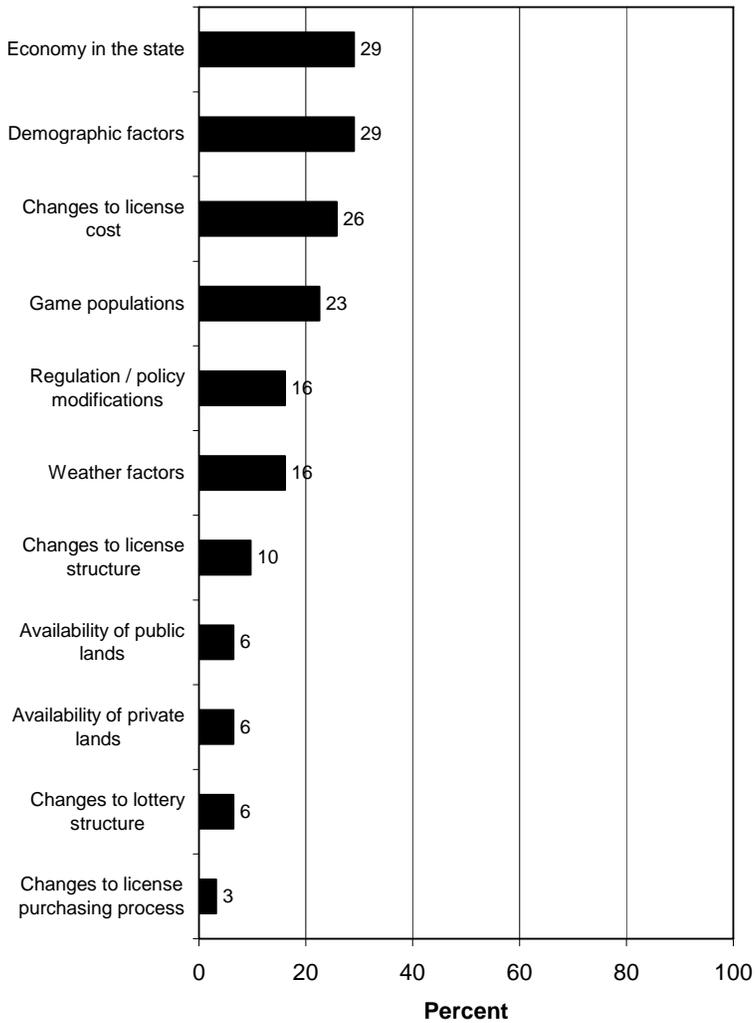
**Table 2.2. Agencies Indicating Factors Had an Impact on Increases in Nonresident License Participation**

Years the top contributing factors had an impact on an increase in nonresident hunting participation and/or license sales from 2006 to 2011.						
Factors	Year (Number of Agencies Indicating Factor Had an Impact)					
	2006	2007	2008	2009	2010	2011
Marketing	5	5	7	11	9	10
Availability of public lands	4	4	4	4	4	4
Availability of private lands	3	3	4	4	4	4

The top factors most commonly cited by agencies as having contributed to a *decrease* in hunting participation and/or license sales from 2006 to 2011 among resident and nonresident hunters include two factors beyond the control of the agencies: the economy in the state (29% of responding state agencies cited this as a factor in the decrease of resident hunting and 32% cited it as a factor in the decrease of nonresident hunting) and demographic factors (29% cited this for resident hunting and 23% for nonresident hunting) (Figures 2.5 and 2.6). Two additional top factors are changes to license cost (26% for resident hunting and 42% for nonresident hunting) and game populations (23% each for resident and nonresident hunting).

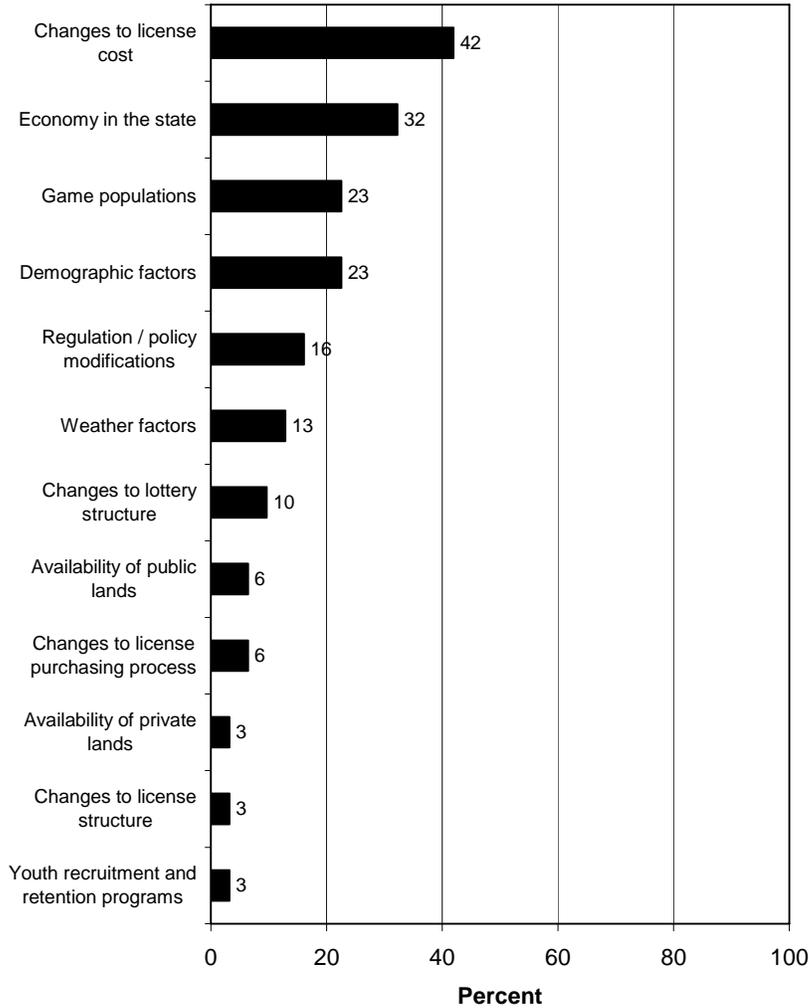
**Figure 2.5. Factors Contributing to Decrease in Resident Hunting Participation**

**Factors that contributed to a decrease in resident hunting participation and/or license sales in states from 2006 to 2011.**



**Figure 2.6. Factors Contributing to Decrease in Nonresident Hunting Participation**

**Factors that contributed to a decrease in nonresident hunting participation and/or license sales in states from 2006 to 2011.**

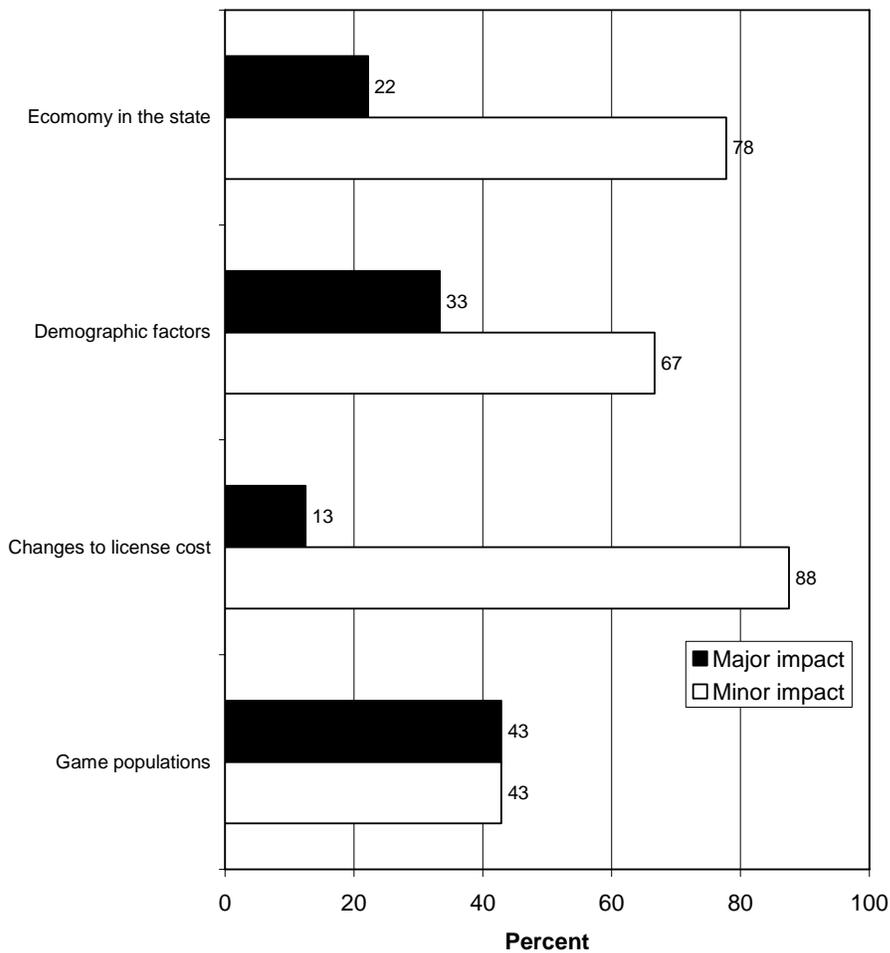


Results were mixed regarding whether each factor had a major or minor impact on the decrease in hunting participation and/or license sales. For most of the top factors, however, agency respondents were typically more likely to indicate that a factor had a minor impact or to be split on whether a factor had a major or minor impact (Figures 2.7 and 2.8).

**Figure 2.7. Breakdown of Factors Into Major or Minor Impacts on Decreases in Resident Hunting Participation**

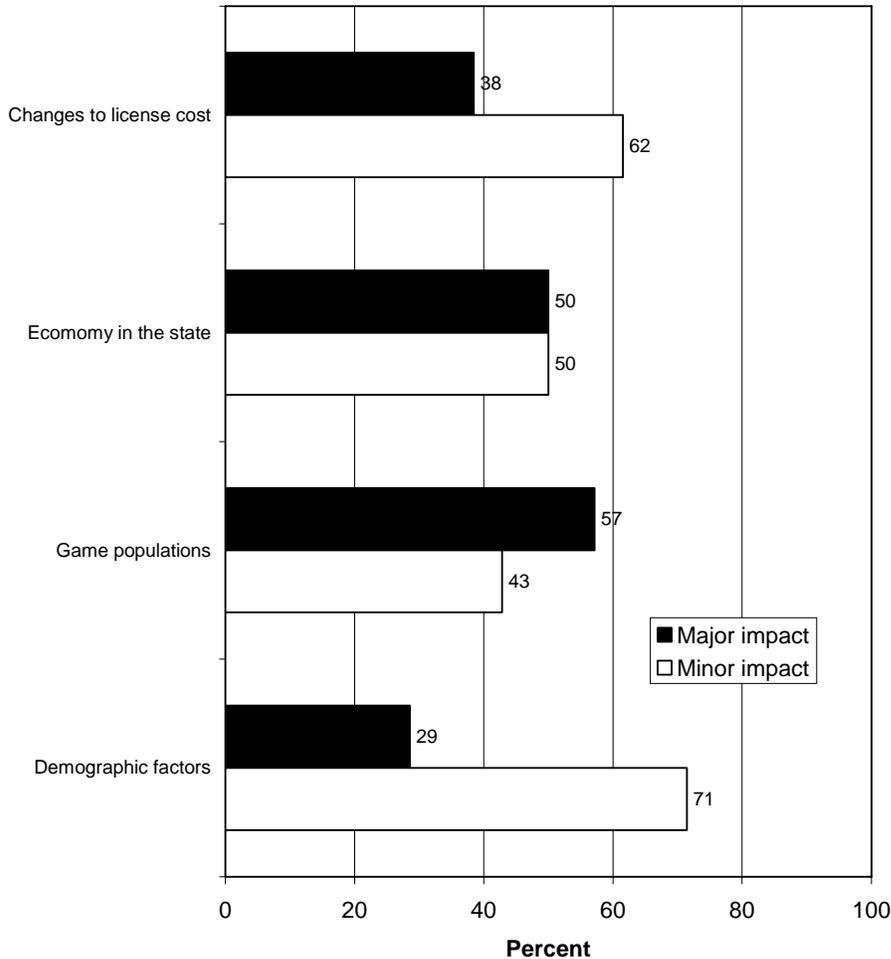
**To what degree did the following factors impact resident hunting participation and/or license sales in your state from 2006 to 2011?**

**(Shown for the top factors that contributed to a decrease in resident hunting participation and/or license sales from 2006 to 2011.)**



**Figure 2.8. Breakdown of Factors Into Major or Minor Impacts on Decreases in Nonresident Hunting Participation**

**To what degree did the following factors impact nonresident hunting participation and/or license sales in your state from 2006 to 2011?  
(Shown for the top factors that contributed to a decrease in nonresident hunting participation and/or license sales from 2006 to 2011.)**



The number of agencies indicating that each of the top four factors contributing to a decrease in hunting participation and/or license sales generally increased from 2006 to 2011 (but did not necessarily increase each year) for each factor for resident and nonresident hunting (Tables 2.3 and 2.4).

**Table 2.3. Agencies Indicating Factors Had an Impact on Decreases in Resident Hunting Participation**

<b>Years the top contributing factors had an impact on a decrease in resident hunting participation and/or license sales from 2006 to 2011.</b>						
<b>Factors</b>	<b>Year (Number of Agencies Indicating Factor Had an Impact)</b>					
	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Economy in the state	0	2	6	8	9	9
Demographic factors	6	6	7	7	7	7
Changes to license cost	1	2	3	3	5	4
Game populations	3	3	3	6	7	7

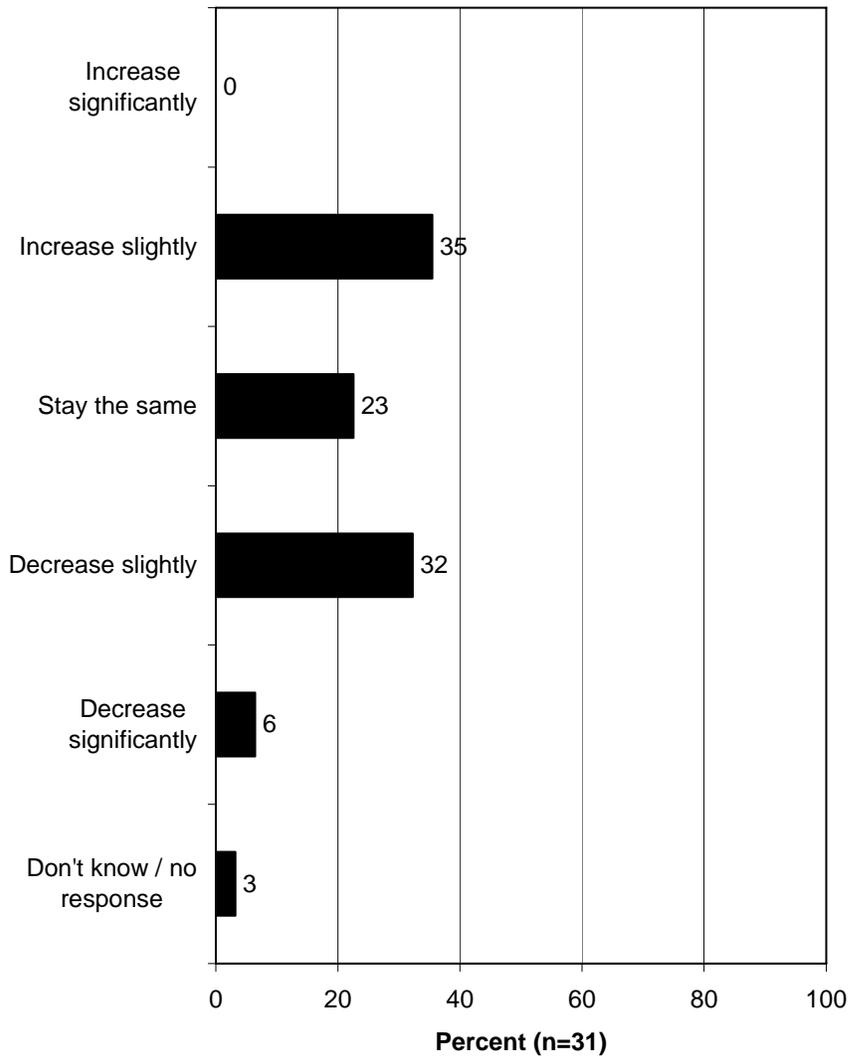
**Table 2.4. Agencies Indicating Factors Had an Impact on Decreases in Nonresident Hunting Participation**

<b>Years the top contributing factors had an impact on a decrease in nonresident hunting participation and/or license sales from 2006 to 2011.</b>						
<b>Factors</b>	<b>Year (Number of Agencies Indicating Factor Had an Impact)</b>					
	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Changes to license cost	1	2	4	5	8	6
Economy in the state	0	2	6	9	9	9
Game populations	2	2	2	5	6	6
Demographic factors	5	5	6	6	6	6

Most commonly, agencies are fairly evenly split between thinking overall hunting participation will increase slightly (35% gave this response) or decrease slightly (32%) over the next 10 years (Figure 2.9). Otherwise, 23% of respondents think hunting participation will stay the same.

**Figure 2.9. Opinions on Future Hunting Participation**

**In your opinion, over the next 10 years, do you think overall hunting participation numbers among residents and nonresidents in your state will increase, decrease, or stay the same?**

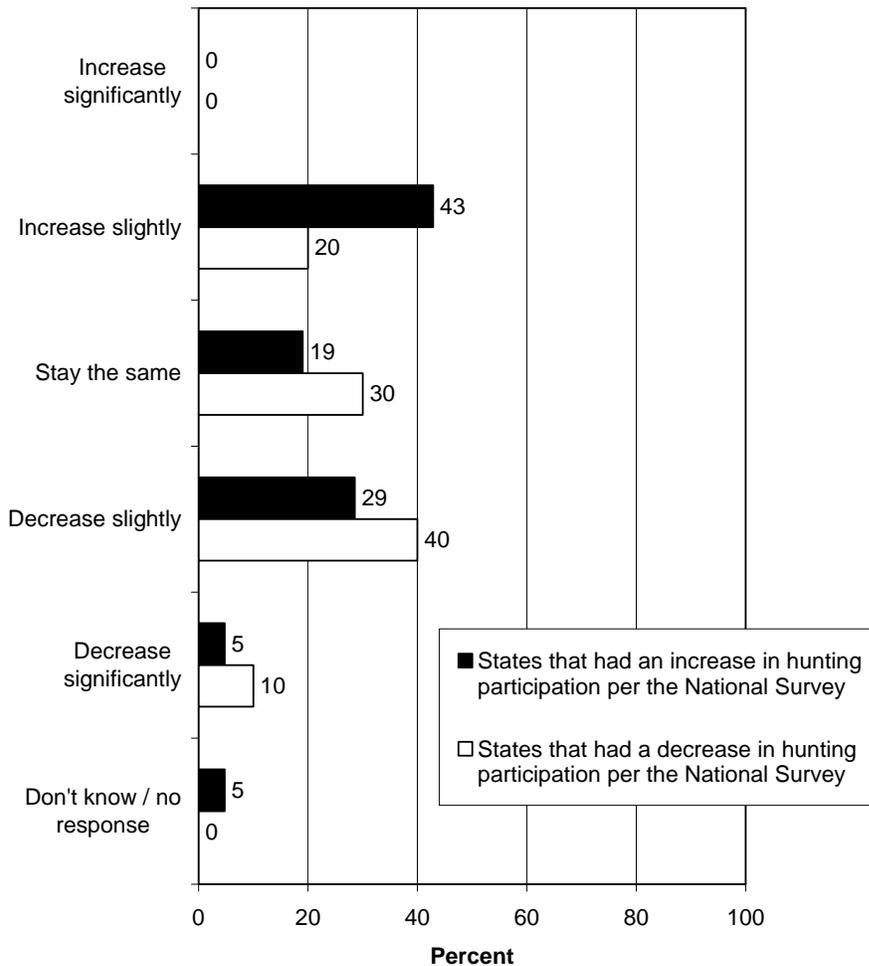


Not surprisingly, agencies in those states that experienced an increase in hunting participation from 2006 to 2011 according to the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* were more likely than agencies in states that experienced a decrease according to the *National Survey* to think they would also experience an increase in hunting participation over the next 10 years (Figure 2.10). Likewise, those that had experienced a decrease in hunting participation from 2006 to 2011 according to the *National Survey* were more likely to think they would experience a decrease over the next 10 years. Nonetheless, substantial

percentages of agency respondents think hunting participation will experience a change that will contrast with the increase or decrease reported for 2006 to 2011 in the *National Survey*.

**Figure 2.10. Opinions on Future Hunting Participation by Changes in Hunting Participation from 2006 to 2011 According to the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation***

**In your opinion, over the next 10 years, do you think overall hunting participation numbers among residents and nonresidents in your state will increase, decrease, or stay the same?**



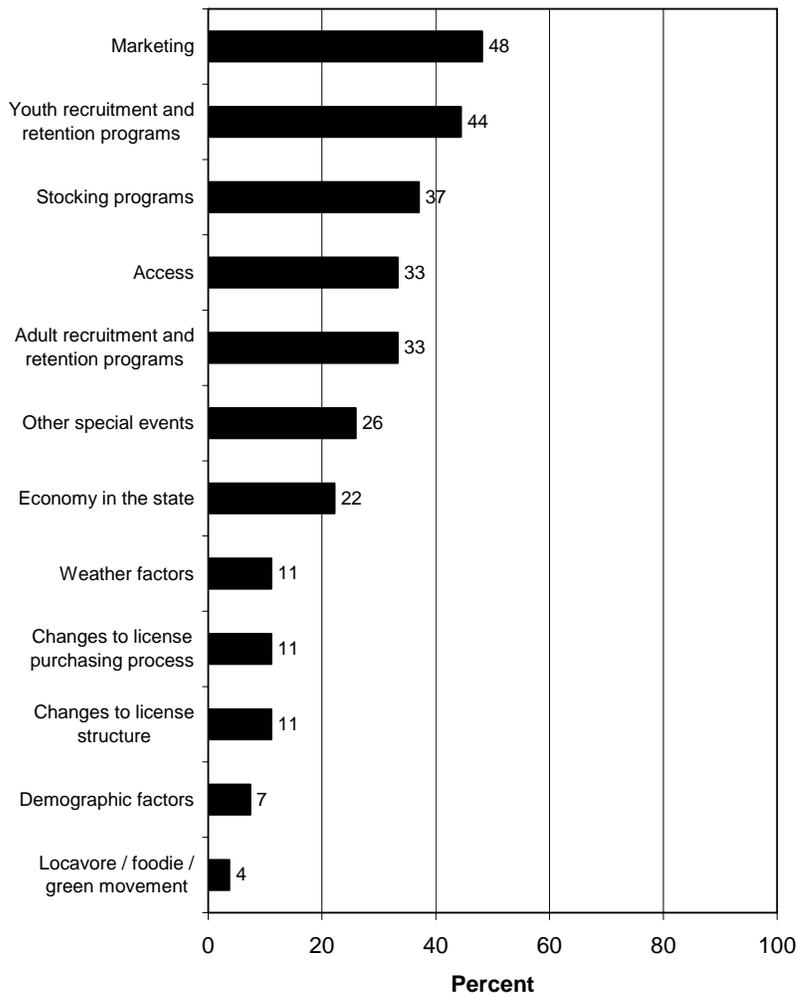
**Freshwater Fishing**

Marketing is a top factor most commonly cited by agencies as having contributed to an *increase* in freshwater fishing participation and/or license sales from 2006 to 2011 among resident and nonresident anglers (Figures 2.11 and 2.12). The top factors for resident and nonresident

freshwater fishing also include stocking programs and access. Finally, both youth and adult recruitment and retention programs were commonly cited by agencies as having contributed to an increase in freshwater fishing specifically among resident anglers.

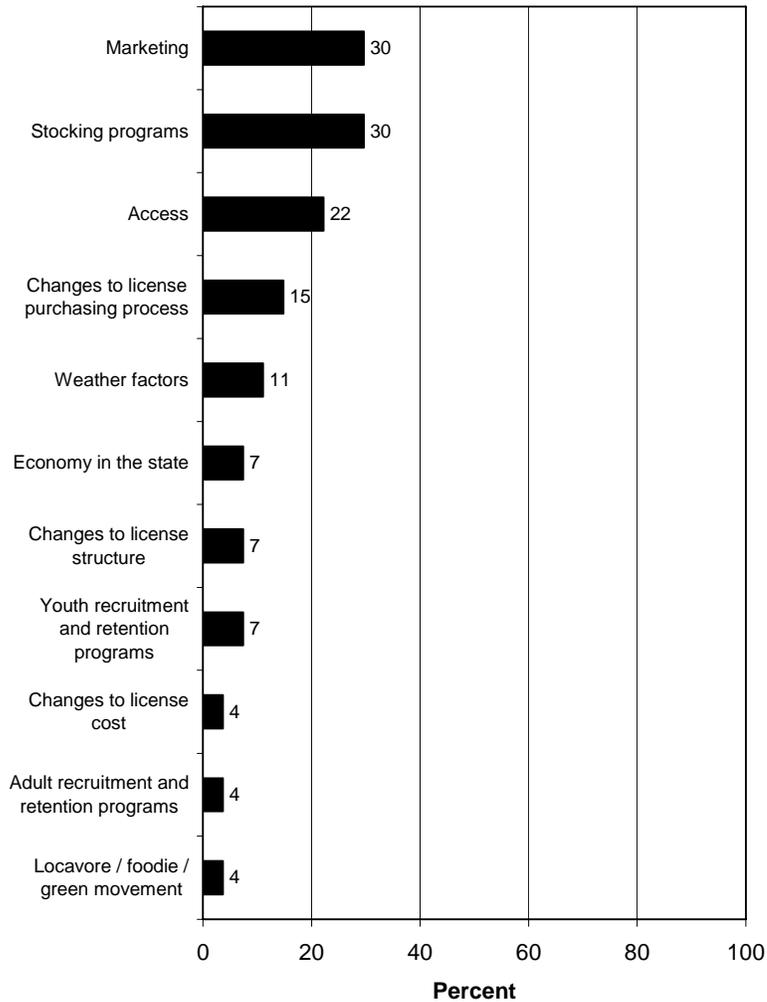
**Figure 2.11. Factors Contributing to Increases in Resident Freshwater Fishing Participation**

**Factors that contributed to an increase in resident freshwater fishing participation and/or license sales in states from 2006 to 2011.**



**Figure 2.12. Factors Contributing to Increases in Nonresident Freshwater Fishing Participation**

**Factors that contributed to an increase in nonresident freshwater fishing participation and/or license sales in states from 2006 to 2011.**

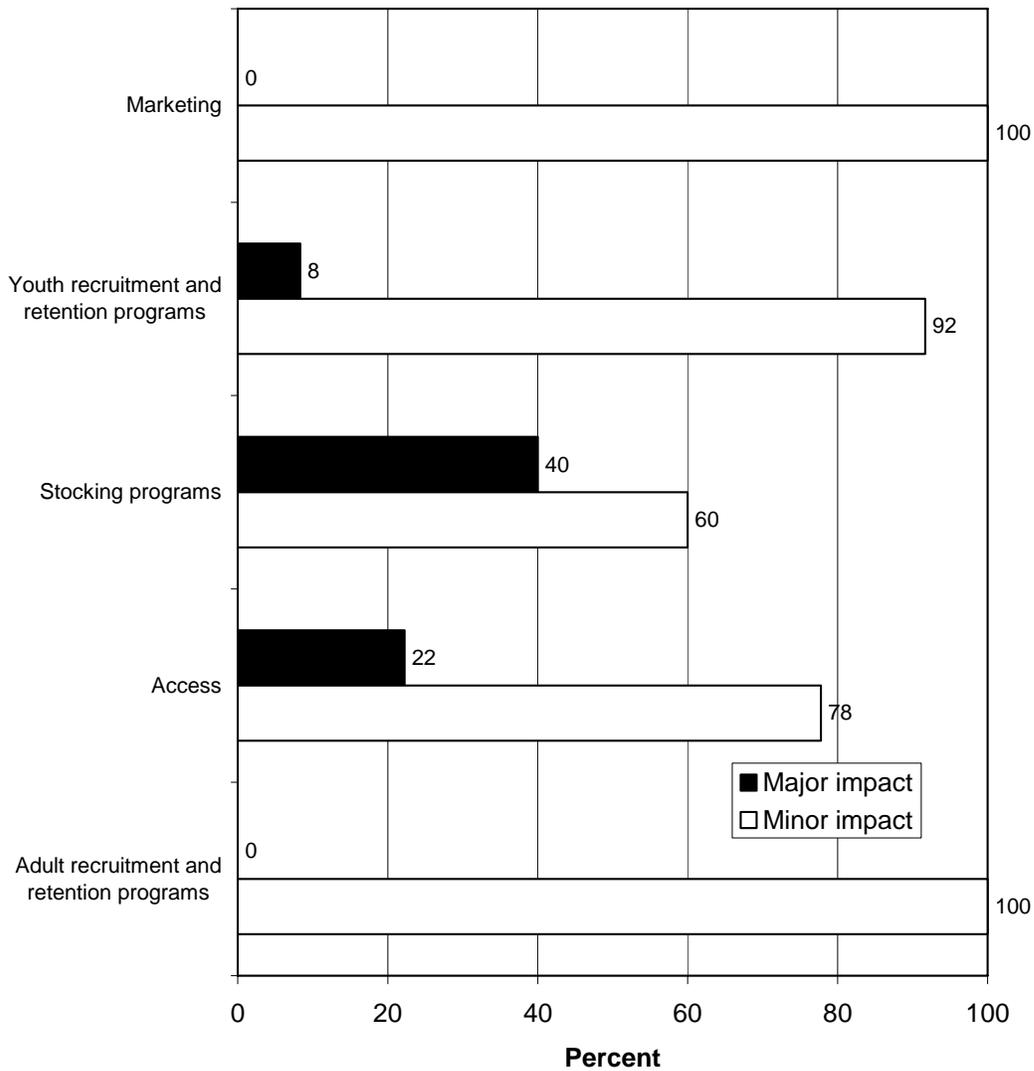


For each of the top factors discussed above for resident and nonresident freshwater fishing, agencies were more likely to indicate that the factor had a minor impact on the increase in freshwater fishing than to indicate it had a major impact (Figures 2.13 and 2.14).

**Figure 2.13. Breakdown of Factors Into Major or Minor Impacts on Increases in Resident Freshwater Fishing Participation**

**To what degree did the following factors impact resident freshwater fishing participation and/or license sales in your state from 2006 to 2011?**

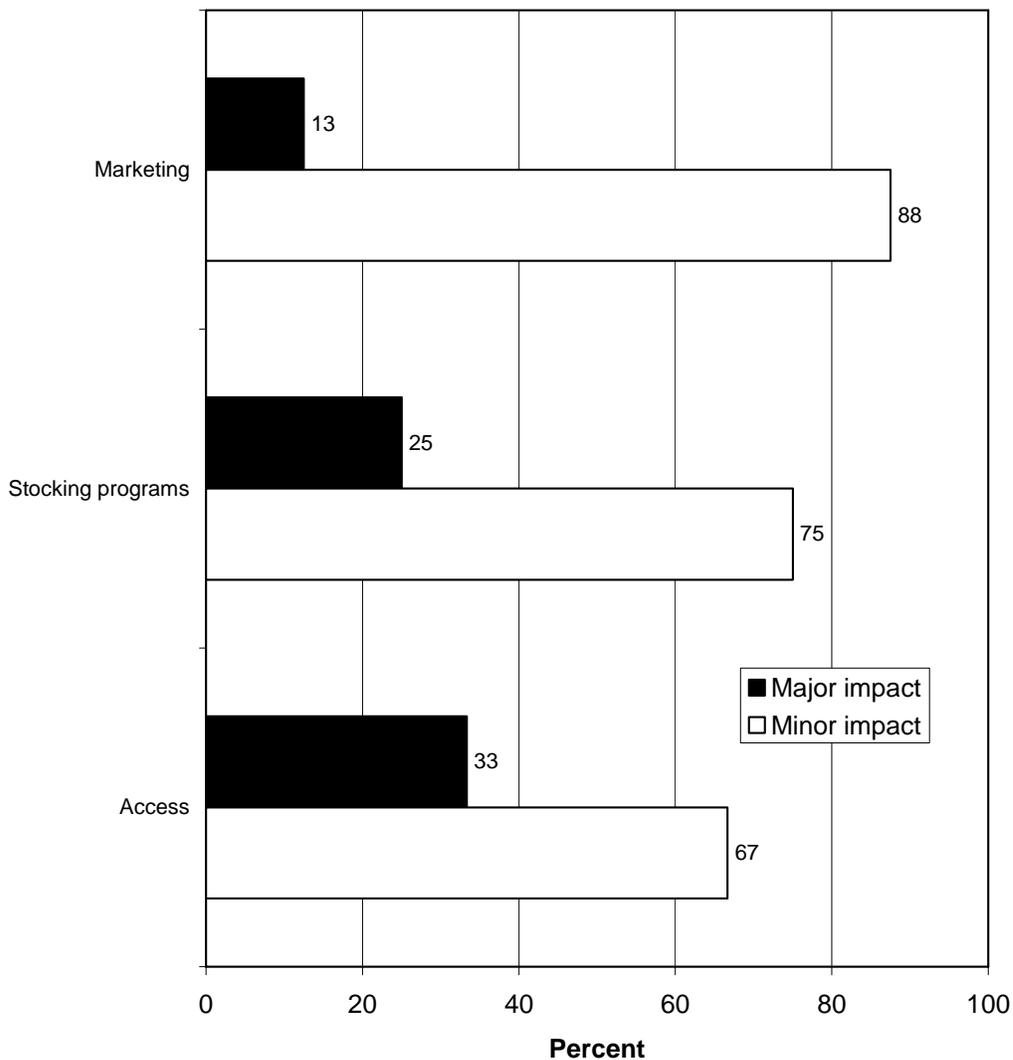
**(Shown for the top factors that contributed to an increase in resident freshwater fishing participation and/or license sales from 2006 to 2011.)**



**Figure 2.14. Breakdown of Factors Into Major or Minor Impacts on Increases in Nonresident Freshwater Fishing Participation**

**To what degree did the following factors impact nonresident freshwater fishing participation and/or license sales in your state from 2006 to 2011?**

**(Shown for the top factors that contributed to an increase in nonresident hunting participation and/or license sales from 2006 to 2011.)**



For each of the factors cited by agencies as having contributed to an increase in resident freshwater fishing participation and/or license sales, the number of agencies indicating the factor had an impact generally increased from 2009 to 2011 (Tables 2.5 and 2.6). The number of agencies indicating that the top factor, marketing, had an impact on increased nonresident

freshwater fishing peaked in 2009; however, all agencies citing stocking programs as a factor did so for each year from 2008 to 2011, and all agencies citing access as a factor did so for each year from 2006 to 2011.

**Table 2.5. Agencies Indicating Factors Had an Impact on Increases in Resident Freshwater Fishing Participation**

Years the top contributing factors had an impact on an increase in resident freshwater fishing participation and/or license sales from 2006 to 2011.						
Factors	Year (Number of Agencies Indicating Factor Had an Impact)					
	2006	2007	2008	2009	2010	2011
Marketing	6	8	10	11	9	11
Youth recruitment and retention programs	10	10	10	10	11	12
Stocking programs	8	8	9	10	10	10
Access	8	8	8	9	9	9
Adult recruitment and retention programs	6	6	6	6	8	8

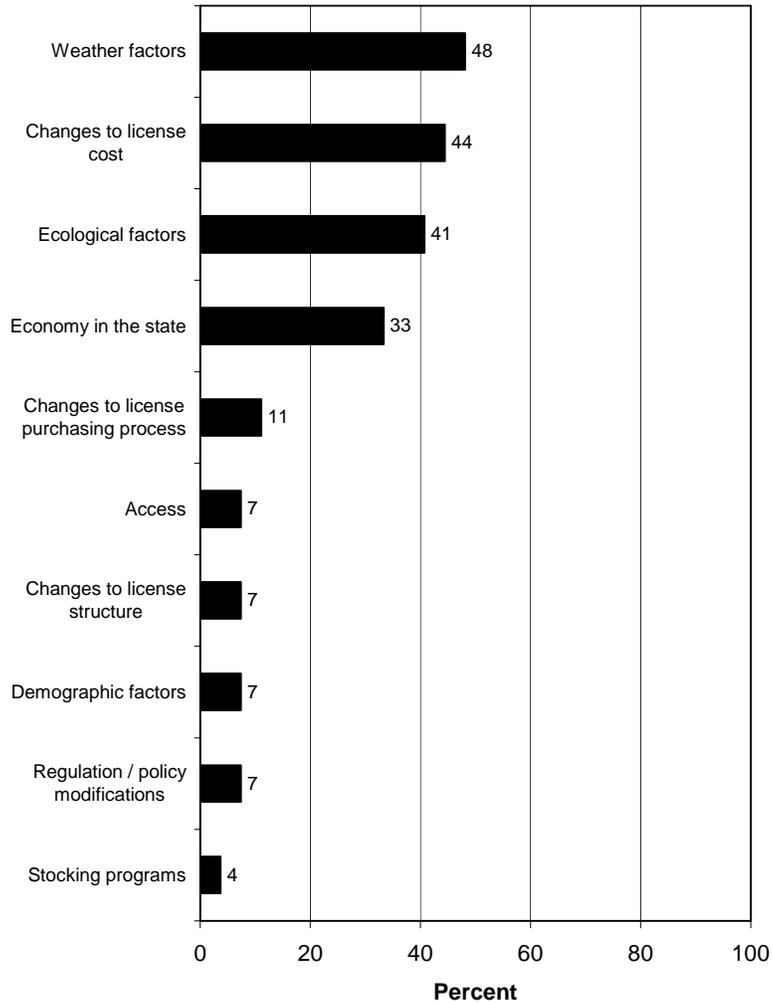
**Table 2.6. Agencies Indicating Factors Had an Impact on Increases in Nonresident Freshwater Fishing Participation**

Years the top contributing factors had an impact on an increase in nonresident freshwater fishing participation and/or license sales from 2006 to 2011.						
Factors	Year (Number of Agencies Indicating Factor Had an Impact)					
	2006	2007	2008	2009	2010	2011
Marketing	3	4	4	5	3	4
Stocking programs	7	7	8	8	8	8
Access	6	6	6	6	6	6

The top factors most commonly cited by agencies as having contributed to a *decrease* in freshwater fishing participation and/or license sales from 2006 to 2011 among resident and nonresident anglers include two factors beyond the control of the agencies: weather factors and the economy in the state (Figures 2.15 and 2.16). Two additional top factors cited as having contributed to the decrease for both resident and nonresident freshwater fishing are changes to license cost and ecological factors.

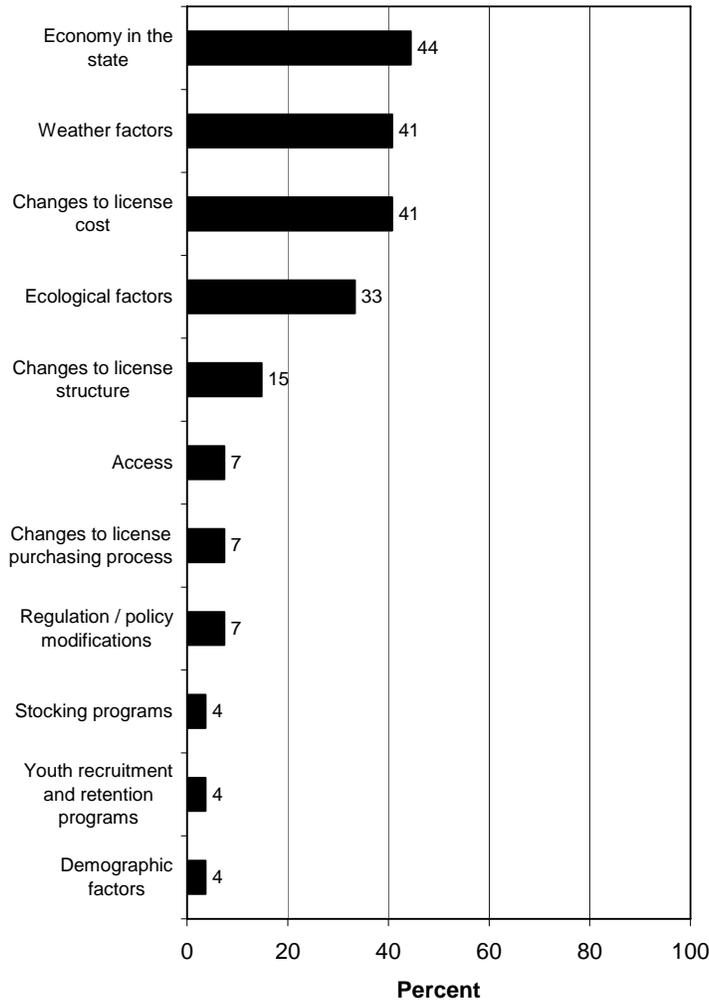
**Figure 2.15. Factors Contributing to Decreases in Resident Freshwater Fishing Participation**

**Factors that contributed to a decrease in resident freshwater fishing participation and/or license sales in states from 2006 to 2011.**



**Figure 2.16. Factors Contributing to Decreases in Nonresident Freshwater Fishing Participation**

**Factors that contributed to a decrease in nonresident freshwater fishing participation and/or license sales in states from 2006 to 2011.**

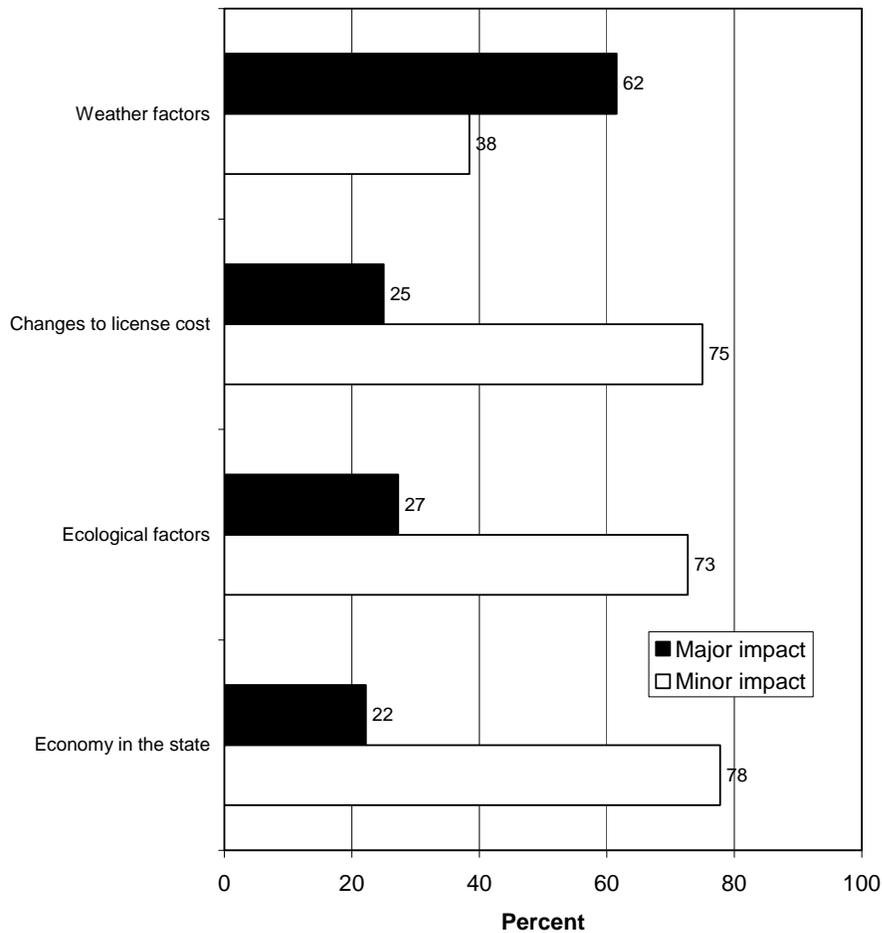


Respondents were more likely to indicate that weather factors had a major impact on the decrease in freshwater fishing among both resident and nonresident anglers than to indicate it had a minor impact. For each of the other three factors discussed above, respondents were more likely to indicate the factor had a minor impact on a decrease in freshwater fishing (Figures 2.17 and 2.18).

**Figure 2.17. Breakdown of Factors Into Major or Minor Impacts on Decreases in Resident Freshwater Fishing Participation**

**To what degree did the following factors impact resident freshwater fishing participation and/or license sales in your state from 2006 to 2011?**

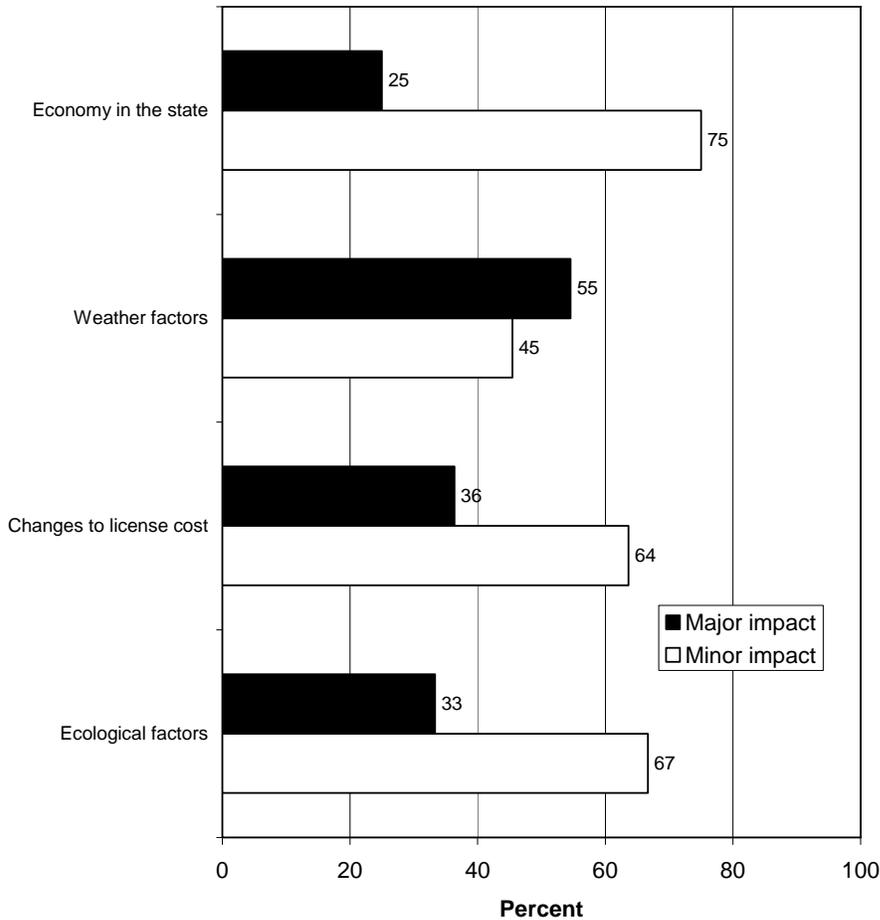
**(Shown for the top factors that contributed to a decrease in resident freshwater fishing participation and/or license sales from 2006 to 2011.)**



**Figure 2.18. Breakdown of Factors Into Major or Minor Impacts on Decreases in Nonresident Freshwater Fishing Participation**

**To what degree did the following factors impact nonresident freshwater fishing participation and/or license sales in your state from 2006 to 2011?**

**(Shown for the top factors that contributed to a decrease in nonresident freshwater fishing participation and/or license sales from 2006 to 2011.)**



For each of the top four factors contributing to a decrease in freshwater fishing participation, the number of agencies indicating the factor had an impact increased overall from 2006 to 2011 (but did not necessarily increase each year) (Tables 2.7 and 2.8).

**Table 2.7. Agencies Indicating Factors Had an Impact on Decreases in Resident Freshwater Fishing Participation**

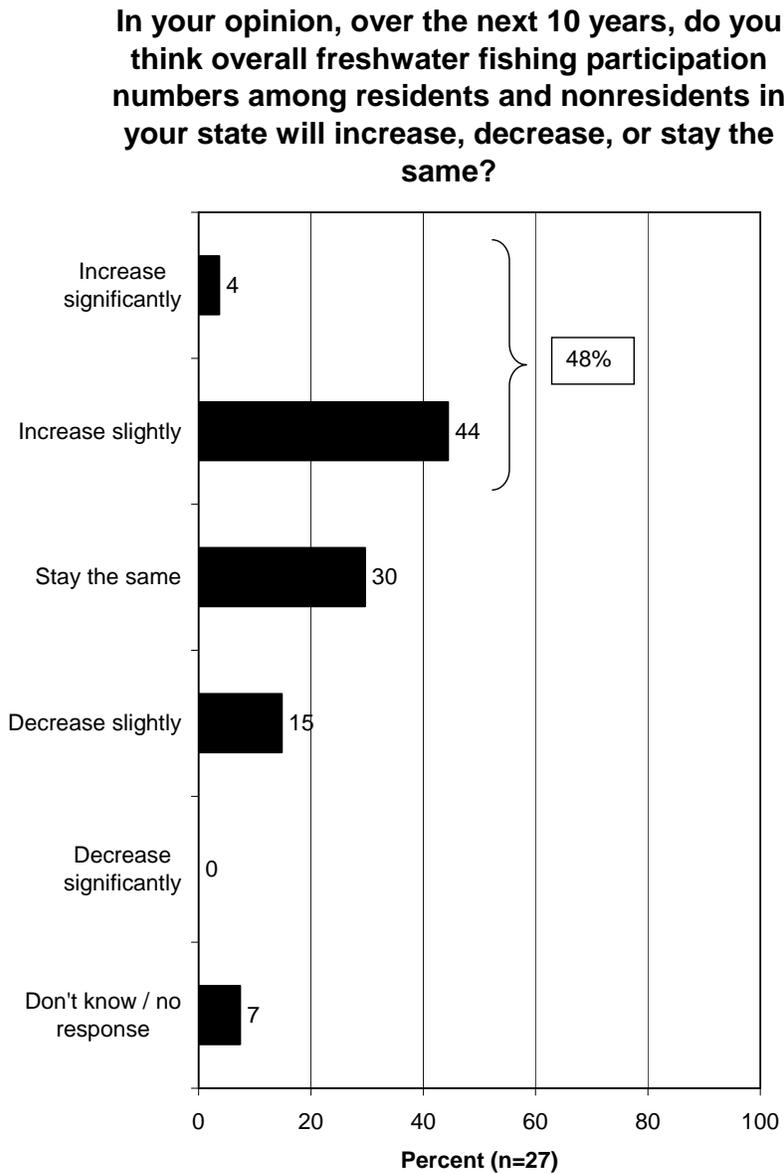
Years the top contributing factors had an impact on a decrease in resident freshwater fishing participation and/or license sales from 2006 to 2011.						
Factors	Year (Number of Agencies Indicating Factor Had an Impact)					
	2006	2007	2008	2009	2010	2011
Weather factors	3	3	3	4	7	9
Changes to license cost	1	4	3	5	8	5
Ecological factors	3	3	5	4	6	7
Economy in the state	0	2	4	6	7	7

**Table 2.8. Agencies Indicating Factors Had an Impact on Decreases in Nonresident Freshwater Fishing Participation**

Years the top contributing factors had an impact on a decrease in nonresident freshwater fishing participation and/or license sales from 2006 to 2011.						
Factors	Year (Number of Agencies Indicating Factor Had an Impact)					
	2006	2007	2008	2009	2010	2011
Economy in the state	0	2	5	9	10	10
Weather factors	2	3	3	3	5	8
Changes to license cost	1	3	2	2	5	4
Ecological factors	2	2	4	3	5	4

Nearly half of agency representatives (48%) think overall freshwater fishing participation will increase over the next 10 years, with most of those thinking it will increase slightly (Figure 2.19). Otherwise, 30% of respondents think freshwater fishing participation will stay the same, and 15% think it will decrease slightly.

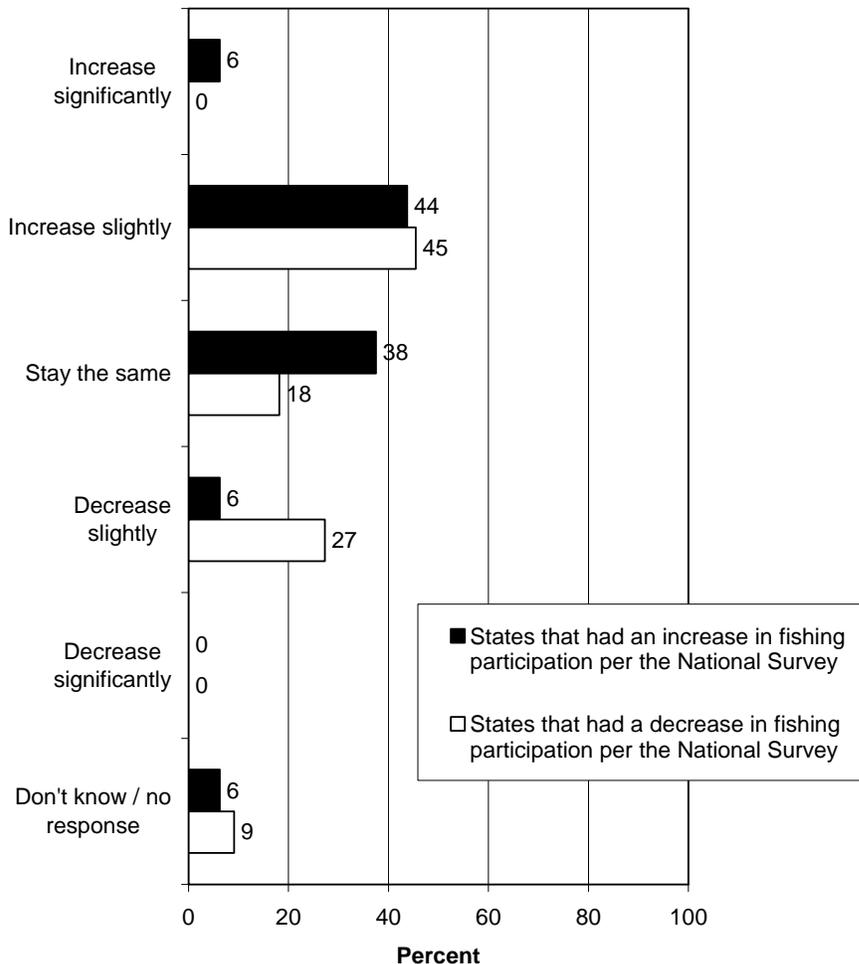
**Figure 2.19. Opinions on Future Freshwater Fishing Participation**



Not surprisingly, agencies in those states that experienced a decrease in freshwater fishing participation from 2006 to 2011 according to the *National Survey* were more likely than agencies in states that experienced an increase according to the *National Survey* to think they would experience a slight decrease in participation over the next 10 years (Figure 2.20).

**Figure 2.20. Opinions on Future Freshwater Fishing Participation by Changes in Freshwater Fishing Participation from 2006 to 2011 According to the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation***

**In your opinion, over the next 10 years, do you think overall freshwater fishing participation numbers among residents and nonresidents in your state will increase, decrease, or stay the same?**



### Saltwater Fishing

Because only a portion of the states have saltwater fishing, it is important to note that the overall n-values for survey questions specifically about saltwater fishing are lower than for hunting or freshwater fishing. As a result, responses are typically reported by number of respondents rather than as percentage and some graphs are not shown.

The top two factors most commonly cited by agencies as having contributed to an *increase* in saltwater fishing participation and/or license sales among resident and nonresident anglers are access and marketing (Tables 2.9 and 2.10). The remaining factors among both resident and nonresident saltwater anglers are led by regulation or policy modifications, changes to the license structure, and changes to the license purchasing process.

**Table 2.9. Factors Contributing to Increases in Resident Saltwater Fishing Participation**

<b>Factors that contributed to an increase in resident saltwater fishing participation and/or license sales from 2006 to 2011.</b>	
<b>Factors</b>	<b>Number of Agencies Indicating Factor Contributed to an Increase</b>
Access	6
Marketing	6
Regulation / policy modifications	4
Changes to license structure	4
Changes to license purchasing process	4
Youth recruitment and retention programs	3
Stocking programs	2
Other special events	2
Demographic factors	2
Changes to license cost	1
Economy in the state	1
Adult recruitment and retention programs	1

**Table 2.10. Factors Contributing to Increases in Nonresident Saltwater Fishing Participation**

<b>Factors that contributed to an increase in nonresident saltwater fishing participation and/or license sales from 2006 to 2011.</b>	
<b>Factors</b>	<b>Number of Agencies Indicating Factor Contributed to an Increase</b>
Access	6
Marketing	5
Regulation / policy modifications	4
Changes to license structure	3
Changes to license purchasing process	3
Changes to license cost	2
Stocking programs	2
Youth recruitment and retention programs	2
Other special events	2
Economy in the state	1
Adult recruitment and retention programs	1
Demographic factors	1

For each of the top two factors, access and marketing, agencies were more likely to indicate the factor had a minor impact on the increase in saltwater fishing for resident and nonresident anglers than to indicate it had a major impact (Tables 2.11 and 2.12).

**Table 2.11. Breakdown of Factors Into Major or Minor Impacts on Increases in Resident Saltwater Fishing Participation**

To what degree did the following factors impact resident saltwater fishing participation and/or license sales in your state from 2006 to 2011? (Shown for the top factors that contributed to an increase in resident saltwater fishing participation and/or license sales from 2006 to 2011.)		
Factors	Impact (Number of Agencies Indicating Factor Had Type of Impact)	
	Minor Impact	Major Impact
Access	4	2
Marketing	5	1

**Table 2.12. Breakdown of Factors Into Major or Minor Impacts on Increases in Nonresident Saltwater Fishing Participation**

To what degree did the following factors impact nonresident saltwater fishing participation and/or license sales in your state from 2006 to 2011? (Shown for the top factors that contributed to an increase in nonresident saltwater fishing participation and/or license sales from 2006 to 2011.)		
Factors	Impact (Number of Agencies Indicating Factor Had Type of Impact)	
	Minor Impact	Major Impact
Access	4	2
Marketing	3	2

The top two factors most commonly cited by agencies as having contributed to a *decrease* in saltwater fishing participation and/or license sales among resident and nonresident anglers are changes to license cost and the economy in the state, followed by regulation or policy modifications (Tables 2.13 and 2.14). Changes to the license structure was also commonly cited among the factors that contributed to a decrease in nonresident saltwater fishing.

**Table 2.13. Factors Contributing to Decreases in Resident Saltwater Fishing Participation**

<b>Factors that contributed to a decrease in resident saltwater fishing participation and/or license sales from 2006 to 2011.</b>	
<b>Factors</b>	<b>Number of Agencies Indicating Factor Contributed to a Decrease</b>
Changes to license cost	5
Economy in the state	5
Regulation / policy modifications	4
Changes to license structure	2
Ecological factors	2
Access	1
Changes to license purchasing process	1
Stocking programs	1
Weather factors	1

**Table 2.14. Factors Contributing to Decreases in Nonresident Saltwater Fishing Participation**

<b>Factors that contributed to a decrease in nonresident saltwater fishing participation and/or license sales from 2006 to 2011.</b>	
<b>Factors</b>	<b>Number of Agencies Indicating Factor Contributed to a Decrease</b>
Changes to license cost	5
Economy in the state	5
Regulation / policy modifications	4
Changes to license structure	4
Ecological factors	2
Access	1
Changes to license purchasing process	1
Stocking programs	1
Weather factors	1

For each of the factors discussed above, respondents were more likely to indicate the factor had a minor impact on the decrease in saltwater fishing than to indicate it had a major impact (Tables 2.15 and 2.16).

**Table 2.15. Breakdown of Factors Into Major or Minor Impacts on Decreases in Resident Saltwater Fishing Participation**

<b>To what degree did the following factors impact resident saltwater fishing participation and/or license sales in your state from 2006 to 2011? (Shown for the top factors that contributed to a decrease in resident saltwater fishing participation and/or license sales from 2006 to 2011.)</b>		
<b>Factors</b>	<b>Impact (Number of Agencies Indicating Factor Had Type of Impact)</b>	
	<b>Minor Impact</b>	<b>Major Impact</b>
Changes to license cost	3	2
Economy in the state	5	0
Regulation / policy modifications	4	0

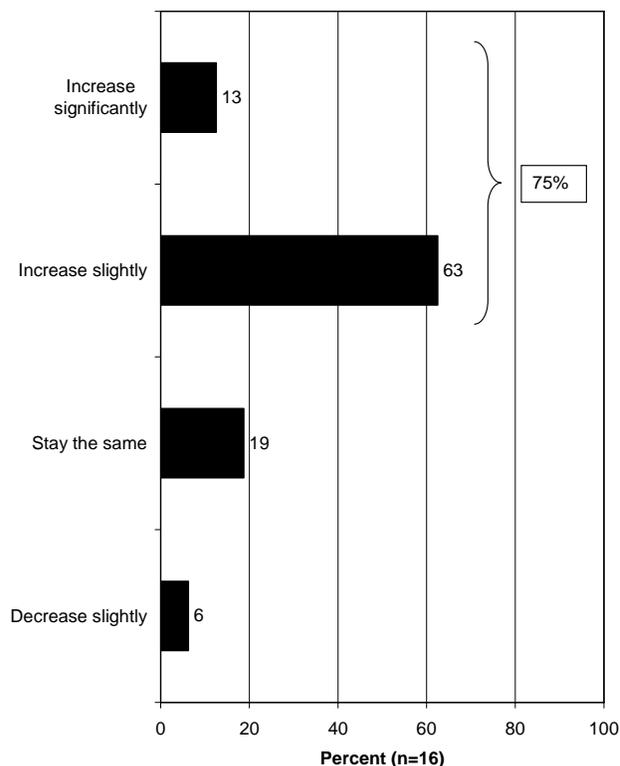
**Table 2.16. Breakdown of Factors Into Major or Minor Impacts on Decreases in Nonresident Saltwater Fishing Participation**

To what degree did the following factors impact nonresident saltwater fishing participation and/or license sales in your state from 2006 to 2011? (Shown for the top factors that contributed to a decrease in nonresident saltwater fishing participation and/or license sales from 2006 to 2011.)		
Factors	Impact (Number of Agencies Indicating Factor Had Type of Impact)	
	Minor Impact	Major Impact
Changes to license cost	3	2
Economy in the state	4	1
Regulation / policy modifications	4	0
Changes to license structure	4	0

A majority of the agencies representatives responding to the survey for saltwater fishing (12 of 16 agencies, or 75%) think overall saltwater fishing participation will increase over the next 10 years, with most of those thinking it will increase slightly (Figure 2.21).

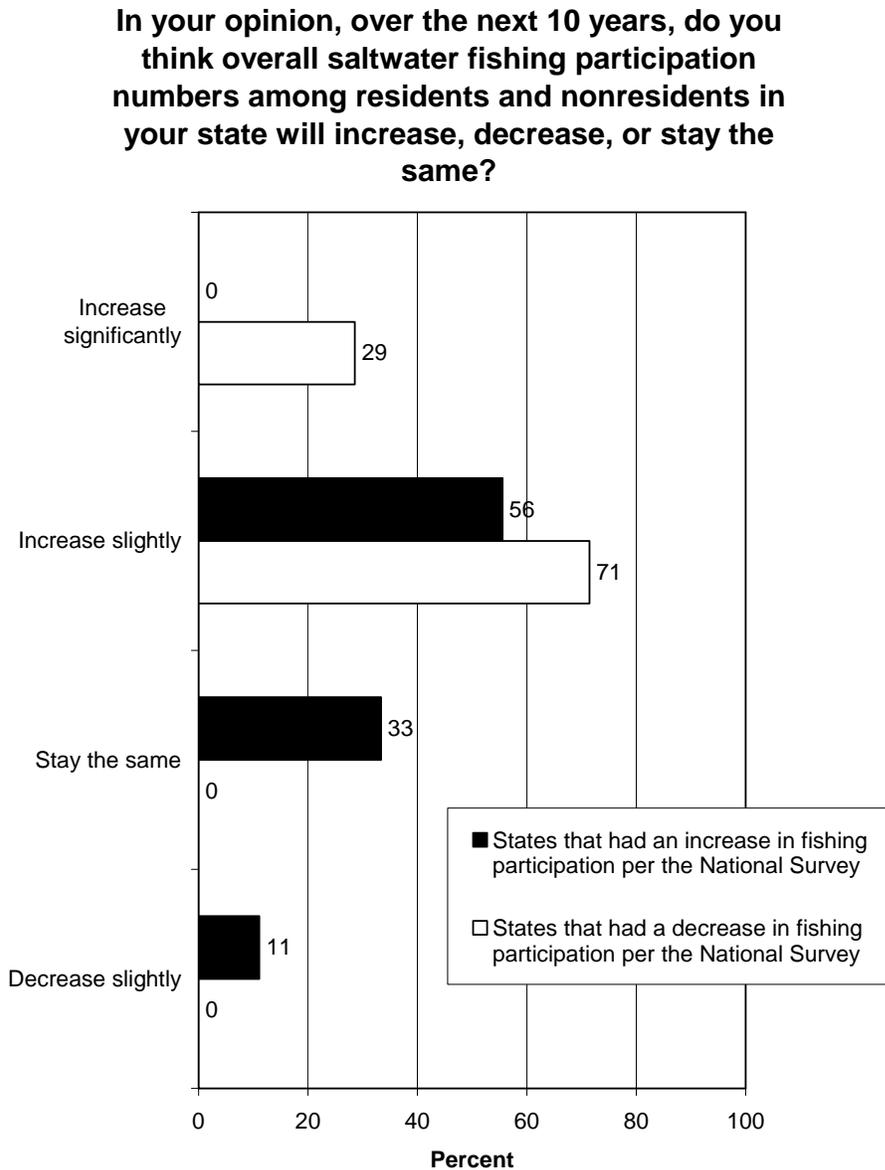
**Figure 2.21. Opinions on Future Saltwater Fishing Participation**

**In your opinion, over the next 10 years, do you think overall saltwater fishing participation numbers among residents and nonresidents in your state will increase, decrease, or stay the same?**



Interestingly, agencies in those states that experienced a decrease in saltwater fishing participation from 2006 to 2011 according to the *National Survey* were more likely than agencies in states that experienced an increase according to the *National Survey* to think they would experience an increase in participation over the next 10 years (Figure 2.22).

**Figure 2.22. Opinions on Future Saltwater Fishing Participation by Changes in Saltwater Fishing Participation from 2006 to 2011 According to the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation***



## **Additional Opinions on Factors Influencing Participation and License Sales**

It is important to note that personal interviews with agency representatives and additional qualitative data provided by agency representatives completing the survey suggest that respondents are uncomfortable with specifying which factors were responsible for or had a direct impact on any changes in participation and/or license sales for each of the three activities, that is, hunting, freshwater fishing, and saltwater fishing. A substantial number of respondents indicated they simply do not feel like they know specifically what caused an increase or decrease and that their responses to the survey are based more on opinions and perceptions rather than formal measurements or tracking efforts. Furthermore, some respondents noted that the agency actually does not have the resources or ability to track or otherwise measure their efforts, such as marketing and recruitment and retention efforts, to determine the impact on participation and license sales. A sample of the comments received regarding the factors is shown below.

*We can make assumptions about what may have increased or decreased license sales (which is different than participation), but those are just assumptions and someone's perspective, not a generalizable survey from the customer about why they may or may not have purchased a license.*

*We do not have sufficient information to answer most of these questions. The consumers of this research should be aware that determinations about which factors did or did not affect hunting license sales and participation were mostly based on the opinions of the staff person who responded to a particular survey item.*

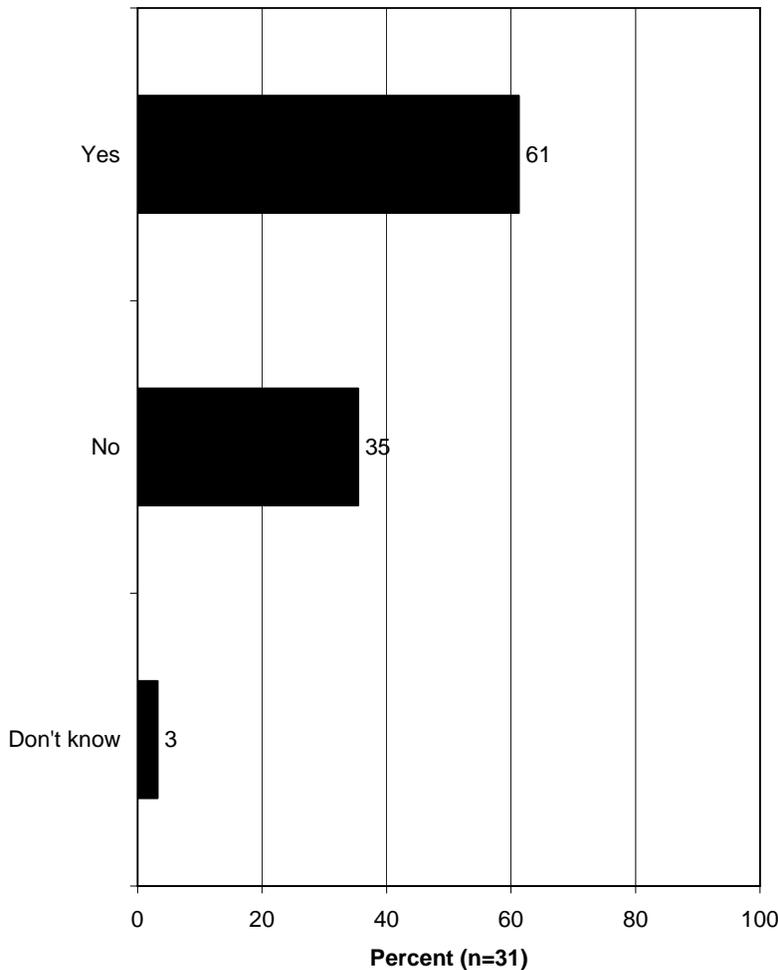
## **RECRUITMENT AND RETENTION PROGRAMS**

### **Hunting**

The majority of state agencies responding to the survey (61%) have a marketing or recruitment and retention plan to increase hunting participation; however, about a third of agencies (35%) do not have a plan (Figure 2.23).

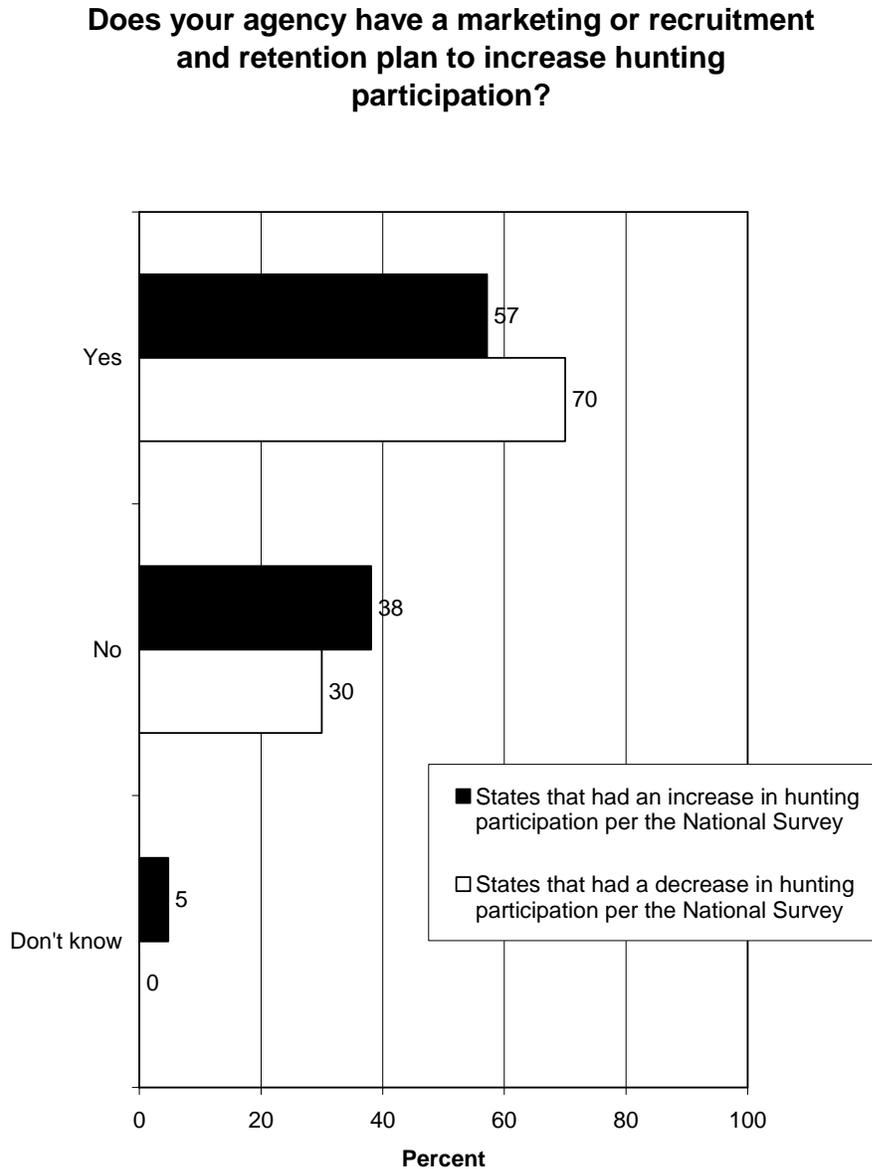
**Figure 2.23. Percent of Agencies With a Marketing or Recruitment and Retention Plan to Increase Hunting Participation**

**Does your agency have a marketing or recruitment and retention plan to increase hunting participation?**



Interestingly, agencies in those states that experienced a decrease in hunting participation from 2006 to 2011 according to the *National Survey* are more likely to have a marketing or recruitment and retention plan than are agencies in those states that experienced an increase in hunting participation according to the *National Survey* (Figure 2.24).

**Figure 2.24. Percent of Agencies With a Marketing or Recruitment and Retention Plan to Increase Hunting Participation by Changes in Hunting Participation from 2006 to 2011 According to the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation***

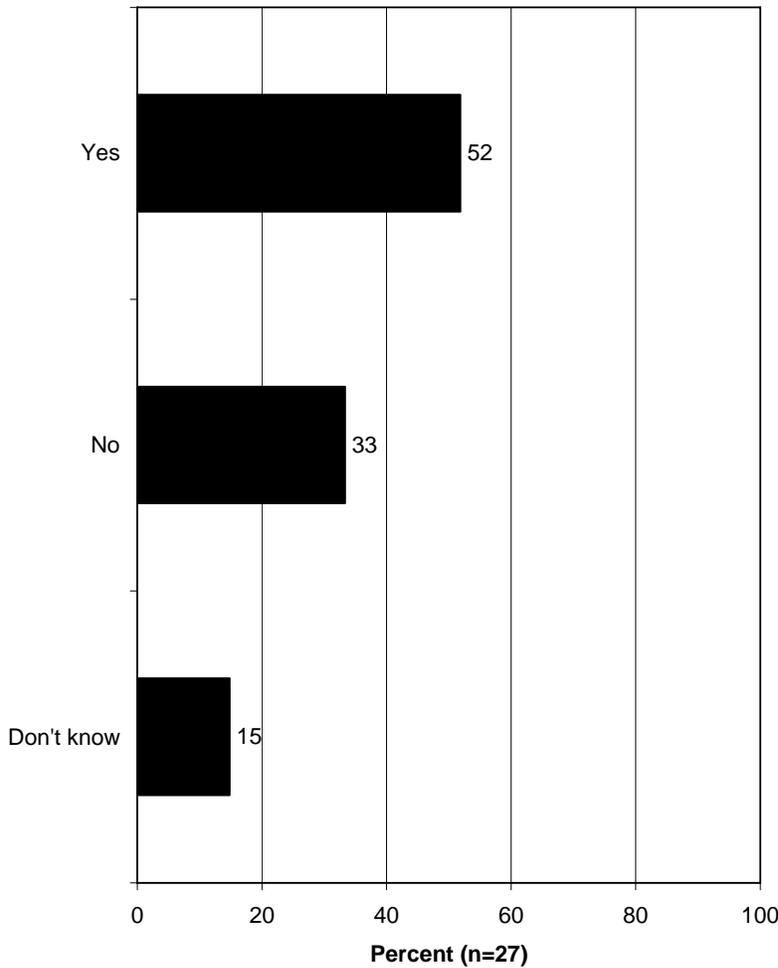


### Freshwater Fishing

Slightly more than half of state agencies responding to the survey (52%) have a marketing or recruitment and retention plan to increase freshwater fishing participation (Figure 2.25). A substantial percentage (15%) did not know if the agency has a marketing or recruitment and retention plan for freshwater fishing.

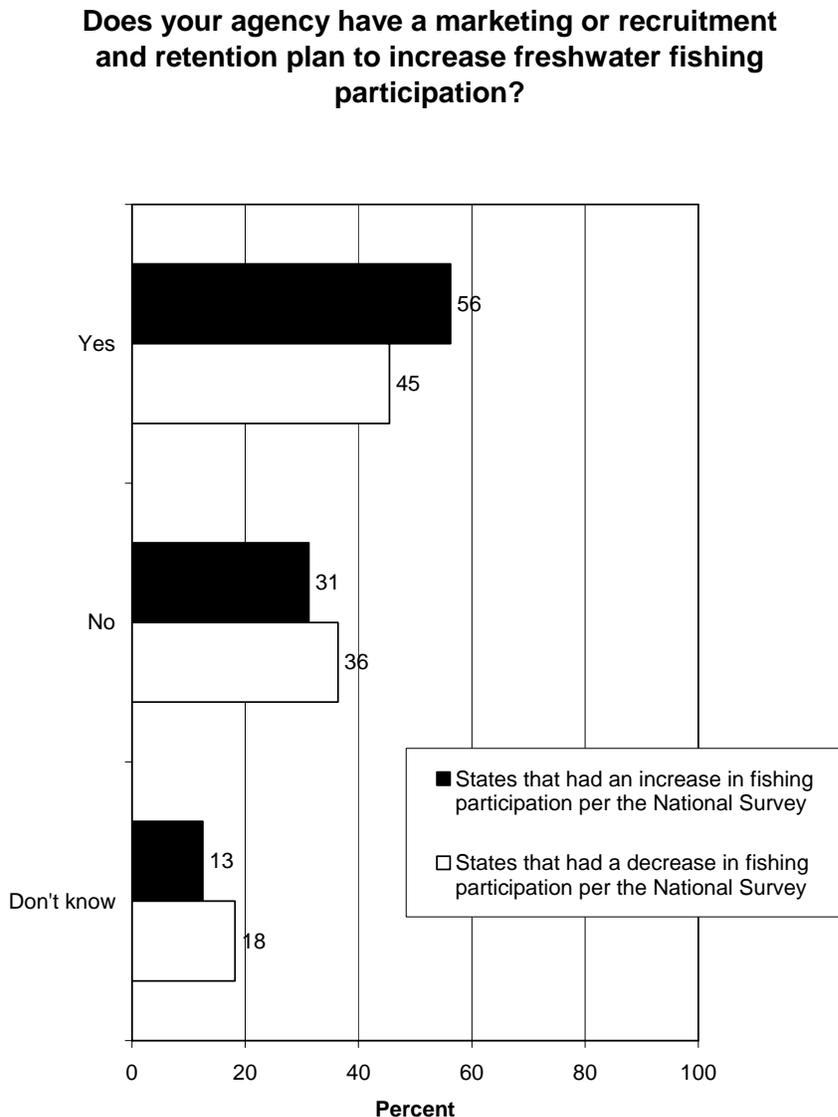
**Figure 2.25. Percent of Agencies With a Marketing or Recruitment and Retention Plan to Increase Freshwater Fishing Participation**

**Does your agency have a marketing or recruitment and retention plan to increase freshwater fishing participation?**



Agencies in those states that experienced an increase in freshwater fishing participation from 2006 to 2011 according to the *National Survey* are more likely to have a marketing or recruitment and retention plan than are agencies in those states that experienced a decrease in freshwater fishing participation according to the *National Survey* (Figure 2.26).

**Figure 2.26. Percent of Agencies With a Marketing or Recruitment and Retention Plan to Increase Freshwater Fishing Participation by Changes in Freshwater Fishing Participation from 2006 to 2011 According to the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation***



### Saltwater Fishing

The survey found that 6 of the state agencies responding to the saltwater fishing survey have a marketing or recruitment and retention plan to increase saltwater fishing participation, and 7 do not.

Agencies in those states that experienced an increase in saltwater fishing participation from 2006 to 2011 according to the *National Survey* are more likely to have a marketing or recruitment and

retention plan than are agencies in those states that experienced a decrease in saltwater fishing participation according to the *National Survey*.

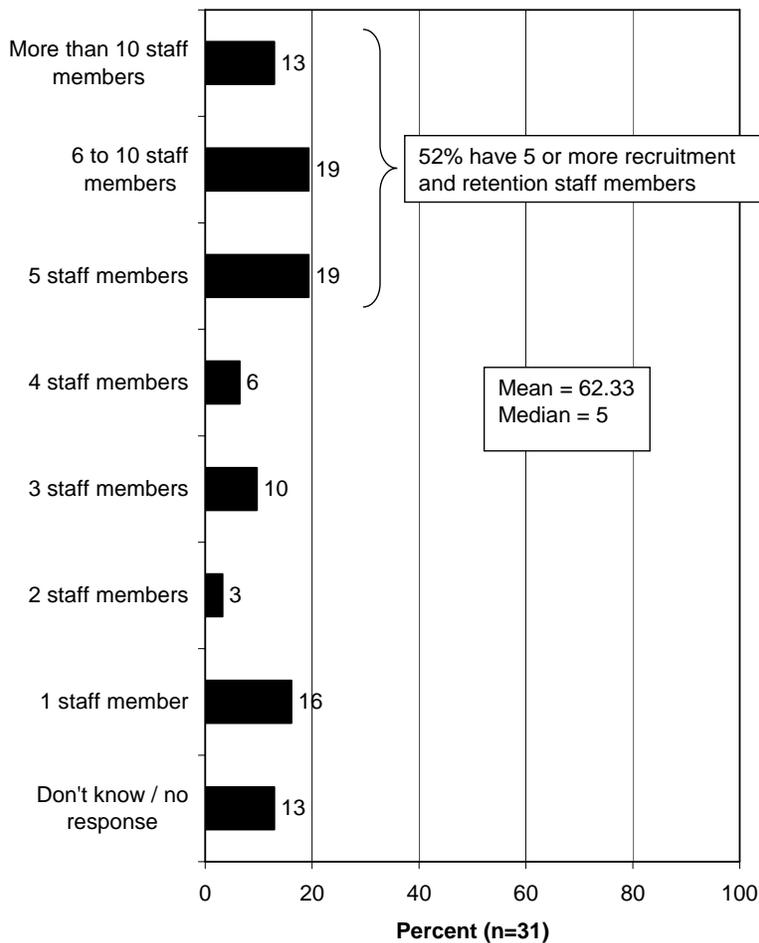
## STAFFING SUPPORT

### Hunting

All state agencies responding to the survey have staff members or positions in the agency with responsibilities that include implementation of hunting recruitment and retention efforts, initiatives, or programs. About half of state agencies (52%) have at least 5 staff members with responsibilities related to hunting recruitment and retention efforts (Figure 2.27).

**Figure 2.27. Number of Agency Staff Members With Hunting Recruitment and Retention Responsibilities**

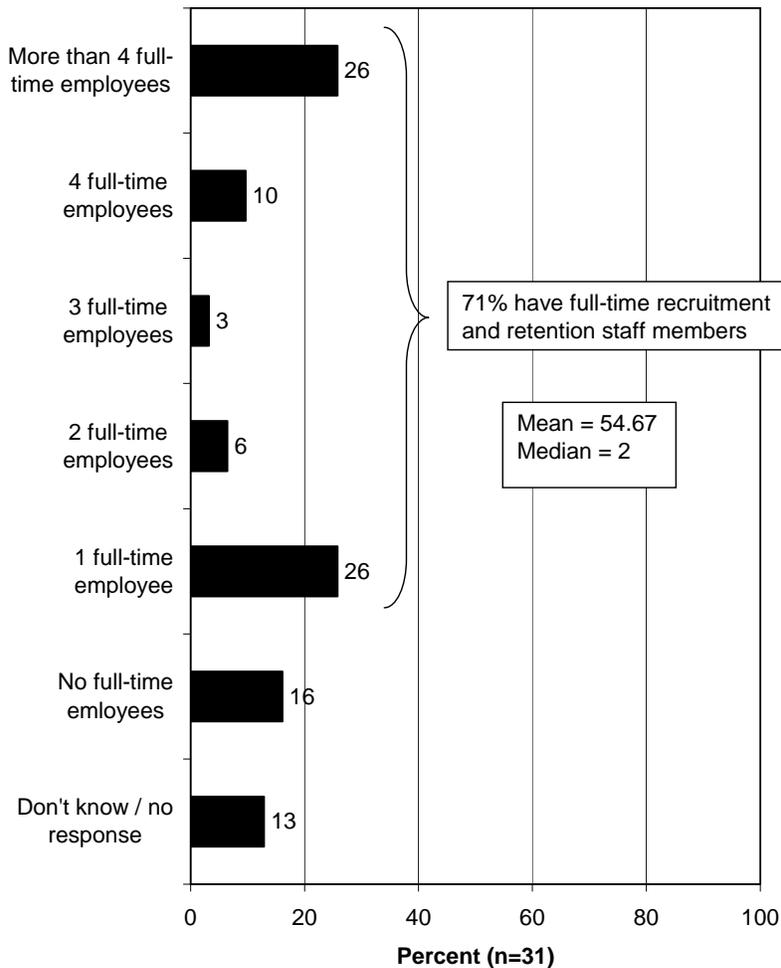
**How many full-time and/or part-time staff members in your agency have responsibilities that include implementation of hunting recruitment and retention efforts, initiatives, and programs?**



While the majority of state agencies (71%) have full-time staff members with responsibilities related to hunting recruitment and retention efforts, slightly less than half (48%) have part-time staff members with related responsibilities (Figures 2.28 and 2.29).

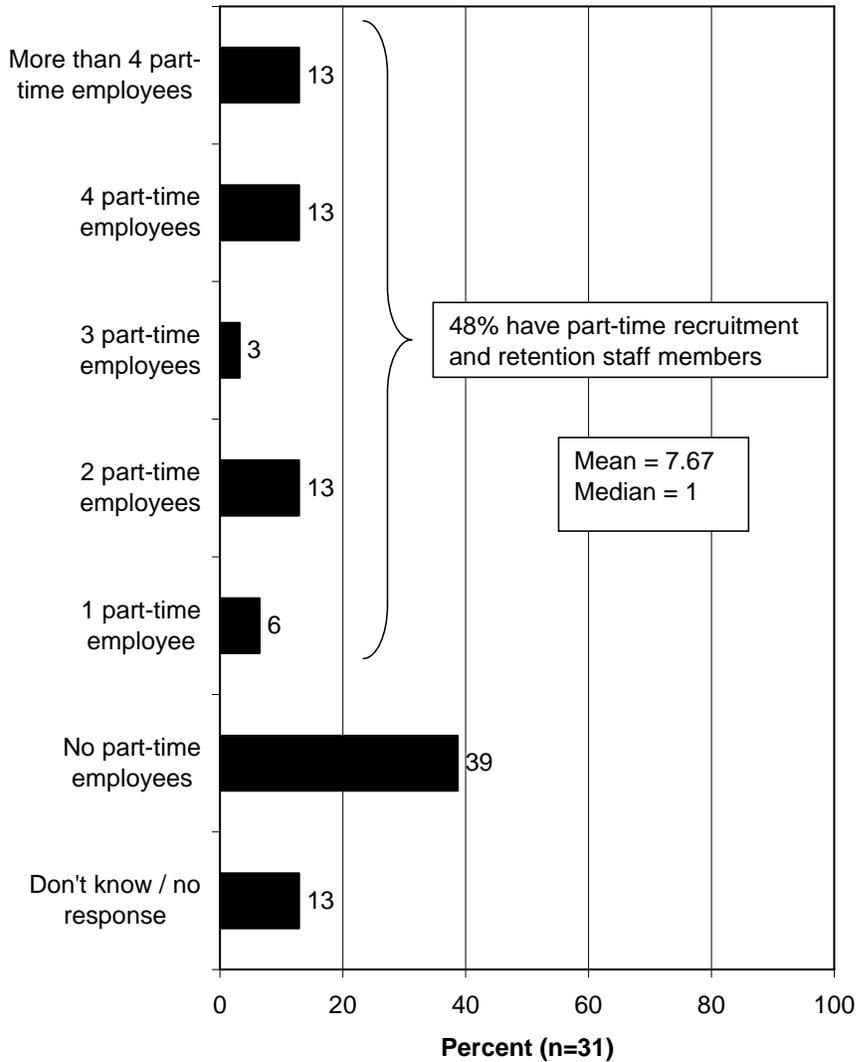
**Figure 2.28. Number of Full-Time Agency Staff Members With Hunting Recruitment and Retention Responsibilities**

**How many full-time staff members in your agency have responsibilities that include implementation of hunting recruitment and retention efforts, initiatives, and programs?**



**Figure 2.29. Number of Part-Time Agency Staff Members With Hunting Recruitment and Retention Responsibilities**

**How many part-time staff members in your agency have responsibilities that include implementation of hunting recruitment and retention efforts, initiatives, and programs?**

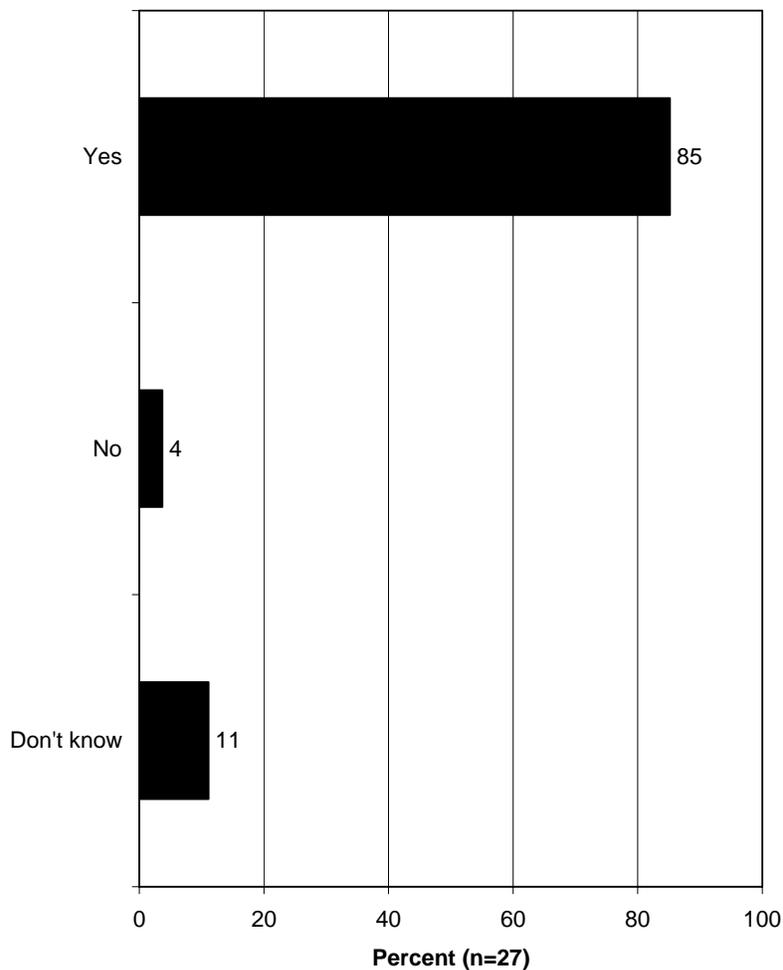


## Freshwater Fishing

A large majority of state agencies responding to the survey (85%) have staff members or positions in the agency with responsibilities that include implementation of freshwater fishing recruitment and retention efforts, initiatives, or programs (Figure 2.30).

**Figure 2.30. Percent of Agencies That Have Staff Members With Freshwater Fishing Recruitment and Retention Responsibilities**

**Do you have a staff member(s) or position(s) in your agency with responsibilities that include implementation of freshwater fishing recruitment and retention efforts, initiatives, or programs?**

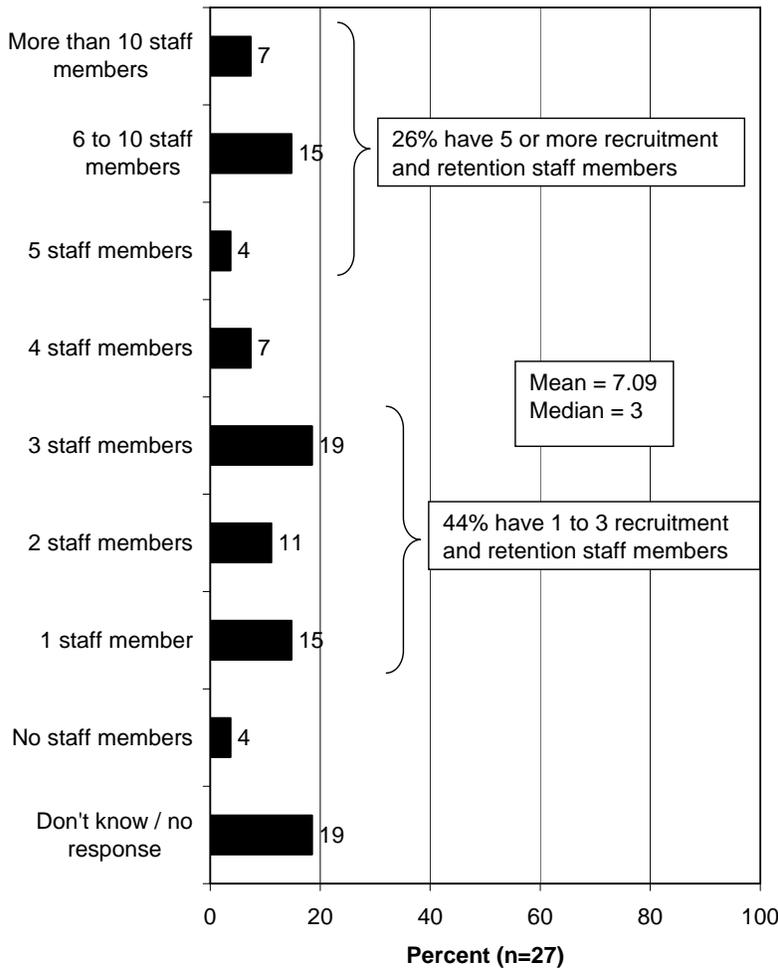


Just under half (44%) of all state agencies responding to the survey have 1 to 3 staff members with responsibilities related to freshwater fishing recruitment and retention efforts (Figure 2.31). About a quarter (26%) of agencies have 5 or more staff members with recruitment and retention

responsibilities. The mean number of staff members with recruitment and retention responsibilities is 7.

**Figure 2.31. Number of Agency Staff Members With Freshwater Fishing Recruitment and Retention Responsibilities**

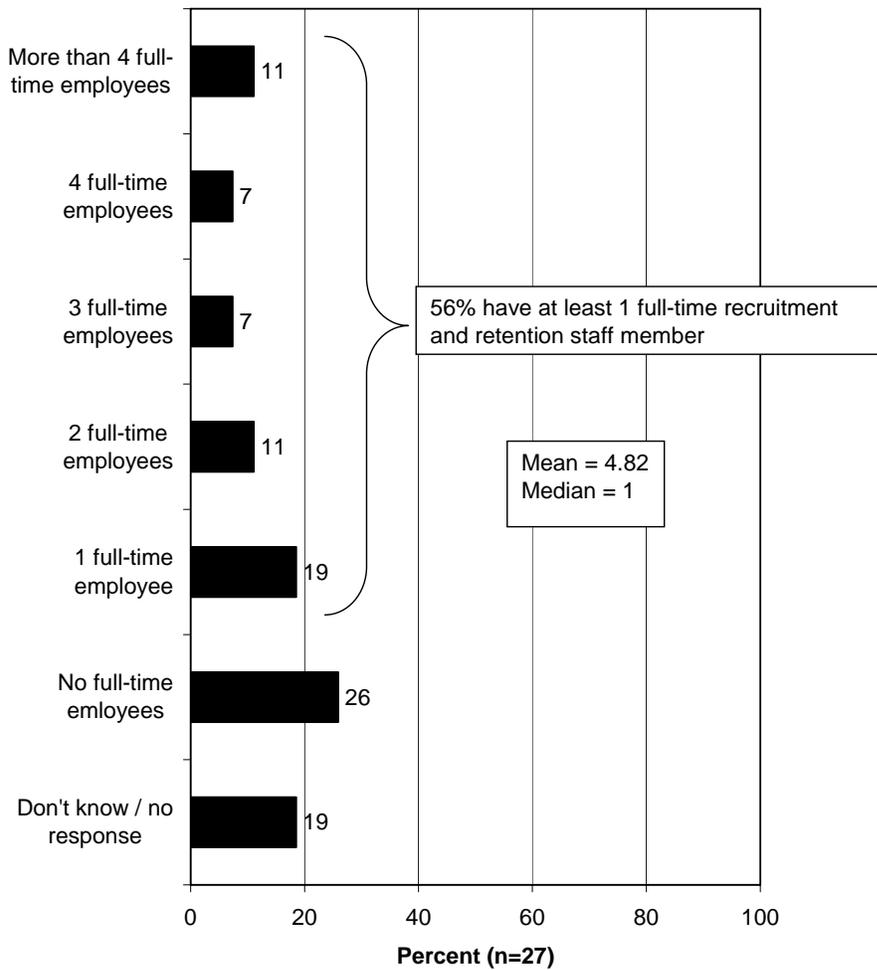
**How many full-time and/or part-time staff members in your agency have responsibilities that include implementation of freshwater fishing recruitment and retention efforts, initiatives, and programs?**



More than half of all state agencies responding to the survey (56%) have at least 1 full-time staff member and 44% have at least 1 part-time staff member with responsibilities that include implementation of freshwater fishing recruitment and retention efforts, initiatives, or programs (Figures 2.32 and 2.33).

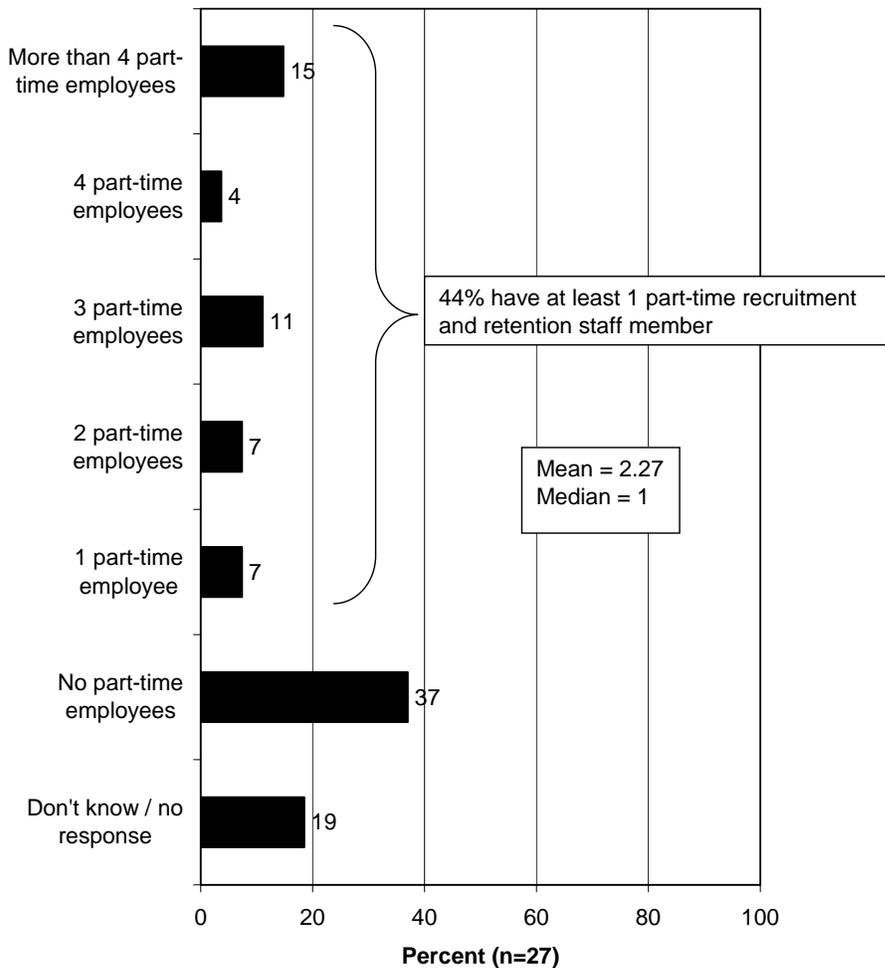
**Figure 2.32. Number of Full-Time Agency Staff Members With Freshwater Fishing Recruitment and Retention Responsibilities**

**How many full-time staff members in your agency have responsibilities that include implementation of freshwater fishing recruitment and retention efforts, initiatives, and programs?**



**Figure 2.33. Number of Part-Time Agency Staff Members With Freshwater Fishing Recruitment and Retention Responsibilities**

**How many part-time staff members in your agency have responsibilities that include implementation of freshwater fishing recruitment and retention efforts, initiatives, and programs?**



### Saltwater Fishing

The survey found that 9 of the 16 state agencies responding to the survey for saltwater fishing have staff members or positions in the agency with responsibilities that include implementation of saltwater fishing recruitment and retention efforts, initiatives, or programs. No agency providing an estimate had more than 2 staff members, full-time or part-time, with responsibilities related to saltwater fishing recruitment and retention efforts.

## Additional Opinions on Staffing Support

Very few agencies were able to provide what they considered accurate estimates of the time spent by staff on hunting recruitment and retention efforts. In addition to the many respondents who simply did not answer the questions, some respondents specifically noted in the personal interviews or in qualitative data collected in the survey that it is not possible to provide the estimates of staff time requested. A sample of the comments received regarding employee time is shown below.

*It's impossible to quantify the time and money our staff put into media outreach for promoting hunting. We do dozens of press releases, ad buys, and countless interviews around the state. With upwards of 200 conservation wardens and 150 wildlife biologists nearly all who spend some time on [hunting recruitment and retention], we just aren't comfortable putting any number down. Some of this may be quantifiable but time recording codes do not allow us to get that detailed with everyone's time.*

*We know that one fisheries staff contributes 60% of his time towards recruitment and retention but other divisions did not track how many staff and what percentage of their time worked towards recruitment and retention. I'm sorry that our answers were not more complete, but I believe we gave you the best we could.*

## BUDGETARY SUPPORT

Each state agency was asked about the amount spent by the agency as well as the external budget, that is, the amount spent by groups external to the agency, to promote each activity, that is, hunting, freshwater fishing, and saltwater fishing, in the state. Very few respondents were able to provide what they considered accurate budget estimates for the promotion of each activity, either internally or externally. In addition to the many respondents who simply did not answer the questions, some respondents specifically noted in the personal interviews or in qualitative data collected in the survey that it is not possible to provide the figures requested. A sample of the comments received regarding budget estimates is shown below.

*No one was sure of the agency and external budget dollars. We knew how much Federal Aid was contributed, but I understand that was a small portion.*

*We do not believe there is any way for us to accurately answer that question because the budget for such efforts is spread across several different divisions and promotion of hunting and fishing is also integrated into the work we do on all of our communication products.*

*It's impossible to quantify the time and money our staff put into media outreach for promoting hunting. We do dozens of press releases, ad buys, and countless interviews around the state.*

## CHAPTER 3. MULTIVARIATE ANALYSES RESULTS

This chapter presents the findings of analyses of several possible factors that could affect hunting and fishing participation by looking at Federal Aid data. As the data that follow will show, five factors were found to have an effect on participation in one or both outdoor activities. The analyses show that *increasing per capita income* has a positive effect on participation—suggesting a scenario where some hunters and anglers have more to spend and can thus afford to take hunting and fishing trips. At the same time, *increasing unemployment* also is positively correlated with increasing participation—suggesting that some hunters and anglers have more time to go hunting and fishing and perhaps more need to go to obtain food (some additional evidence suggests that there was a recent slight rise in utilitarian motivations for hunting and fishing). A third factor that had a positive effect on participation was the *percent of hunters in the state rating the quality of overall access to hunting lands as excellent or good*—access is an important issue that has acted as a constraint when there are problems with it, so good access would logically have a positive effect.

The data that follow will also show that two factors had a negative effect on participation, with one of them being somewhat obvious: *increasing license fees*, which tended to cause drops in participation. A second negative factor may be related to employment. Just as increasing unemployment seemed to have a positive effect on participation, increasing building activity, as measured by *increasing building permits*, has a negative correlation to hunting and fishing participation. It suggests a scenario where hunters and anglers have less time to go (as discussed in Chapter 1, one of the top occupations of active hunters and anglers is the category related to construction). Additionally, they may have less need to go to supplement their food budgets with meat and fish.

There were several factors that were examined and that did not show a correlation to increasing hunting and fishing participation. However, it cannot be said definitively that these factors have no effect on participation; rather, these multivariate analyses did not find a correlation. However, it is difficult to fully separate each factor, and it may be that some of these factors have positive effects on participation, even if only that they increase the satisfaction that hunters and anglers derive from their participation. Additionally, these same factors may have longer term effects on participation that would not be discernable in these analyses, which examined short-term increases in participation. Nonetheless, in this examination of short-term increases, the Families Afield program and the allowance of Sunday hunting did not show a correlation to the participation increases that were examined in this study. Additional factors that did not show a correlation include increases in the elderly population, increases in the youth population, and acreage of lands or waters that can be used for these activities.

### METHODS USED IN THE MULTIVARIATE ANALYSES

To examine the forces that affect participation in hunting and fishing, regression analyses were conducted on national and state-level data. Time-series regression studies were conducted with national data and selected states in each of the six Association of Fish and Wildlife Agencies (AFWA) regions of the country to determine the factors associated with changes in hunting and fishing participation rates between 1975 and 2010. A cross-section regression analysis of

changes in the absolute numbers of anglers and hunters between 2005 and 2010 was conducted to examine statistically why some states saw increases in the numbers of sportsmen in recent years while other states saw declines.

Four states were selected from each AFWA region to represent different rates of growth or decline in the numbers of licensed anglers and hunters. The numbers of licensed anglers and hunters were obtained from Federal Aid data (previously described in Chapter 1). The key data from these reports are the numbers of paid license holders in each state and the gross cost of all licenses, tags, permits, and stamps that they purchased. The data provide consistent measures of hunting and fishing participation and the average expenditures for licenses, but the data do not distinguish between resident and nonresident hunters and anglers, and the data do not distinguish individual license types. Because the goal of the project is to examine the factors that drive overall participation, these data are suitable for this purpose. The models are not intended to determine factors that affect sales of individual types of licenses or estimate the price elasticity for specific licenses, tags, permits, or stamps.

The hunting and fishing models are built on standard economic theory, meaning that many common factors should consistently be found to influence license demand (sales). These typically include such economic factors as income and prices and demographic factors such as population and age distribution. Many state-specific factors can also affect the number of licensed hunters or anglers at specific points in time. For example, some states have issued fish consumption advisories, which are expected to have an immediate, if not longer, negative effect on demand. Also, state agencies occasionally make regulatory changes that can lead to increased or decreased participation. While these factors are important considerations, the considerable resources needed to track and interpret state-specific factors were beyond the scope of this project.

The common factors that appear in most models, and the rationale for their inclusion, are listed below. In most cases, combinations of these factors account for 85% to 95% of the change in fishing and hunting participation.

- **License fees.** In the demand for virtually any good or service, price is normally thought to be an explaining factor.
- **Prices of substitutes and complements.** When prices of substitutes or complements change, demand changes in response. For example, with fishing, the prices of fishing gear would be considered a complement. When prices of fishing gear go up, one would expect the demand for fishing licenses to decrease. Because travel is typically required to participate in hunting and fishing, the price of gasoline is also considered a complementary expense.
- **Income.** The rationale for including income in a demand model is very strong. For normal products, when income rises, more of the product is consumed or purchased.
- **Leisure time.** Hunting and fishing can require substantial amounts of time. While it is not possible to model this at a detailed level, there are some state-level data that can be used. For example, when the unemployment rate goes up, it is conjectured that fishing may increase due to the availability of more leisure time.

- **Habits, experiences, culture, and equipment.** These factors tend to influence persistence. If someone has acquired a fishing license, a boat, and other fishing gear, then he is more likely to fish the following year. This persistence effect is often captured in a model by use of a one-period lagged dependent variable. This is saying, “the number of hunters/anglers this year is partially dependent on the number last year...”, which seems fairly reasonable and is a common approach in time-series studies.
- **Changing demographics.** In some cases, the analysts have strong foreknowledge of the expected relation between an explanatory variable and hunting or fishing. With demographic changes, the expected relations are less sure. For example, traditionally when the number of residents between the ages of 14 and 17 increased, it was thought to increase the demand for hunting and fishing licenses. However, this may no longer be the case.
- **Other factors.** Many other factors that affect hunting and fishing cannot be exactly accounted for by way of locating specific explanatory variables. Because some of these factors are changing over time, one method is to use a trend variable to capture the effect of the missing variables. For example, two factors that are believed to negatively affect hunting strongly (and fishing to a lesser extent) are access to hunting (and fishing) locations and cultural changes that affect the way many people view killing wildlife (and fish).

Statistical considerations when developing statistical models are important in relation to this study. These include:

- **Real and nominal prices.** There is general agreement among economists that real prices (adjusted to remove the effect of inflation) should be used in demand analyses. Thus, all fees, as well as other monetary values, have been inflation adjusted. While it is not usual to mix nominal and real prices in a demand model, there are exceptions. One exception is for items that do not experience regular price changes. Some products experience fairly regular price movements, and consumers are to some extent expecting some price variation. However, in other cases, prices tend to be fairly “sticky” and not move much. When prices are set and do not move much, they are sometimes referred to as sticky prices. When sticky prices do change, the change is often inordinately noticed by the consumer. For example, it is common for hunting or fishing licenses to be fixed for several consecutive years and then be increased by 10 percent or more. This often produces what might be called a “nominal price shock” with a noticeable drop in demand. In cases such as this, there is reason to include both a real price variable as well as an indicator variable to account for these nominal price changes.
- **Issues regarding statistical significance in regression models.** Regression models have a statistical basis that relies on random variation. When basic variation is lacking, finding statistical significance can be problematic. Consider the case in the extreme, where a variable does not vary whatsoever; for example, a fishing license cost that does not vary over a period of time. In this case it would be impossible to estimate the individual effect of the license price on the demand for licenses using traditional regression techniques. While extreme cases like these are not usual, in the grand scheme of things, license prices do really vary significantly over time, resulting in overall problems in regression modeling. Thus, it is not uncommon to find cases where the license price is not a

significant factor in demand. This is not to say that price is not relevant, but it is a result when prices do not vary significantly over the period of study.

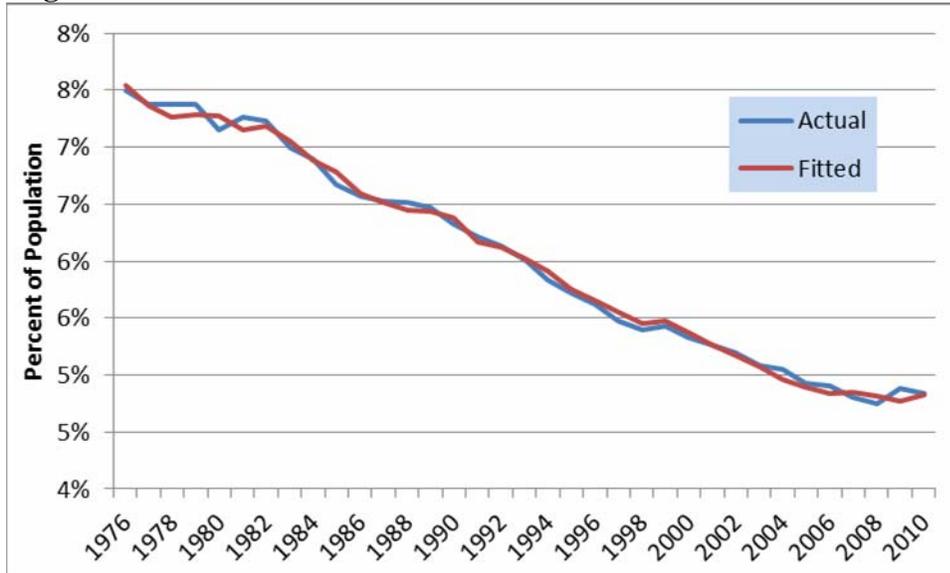
- **Trend factors.** Explanatory factors not included in the hunting and fishing models can be captured by including a trend variable.
- **Statistical efficiency with aggregated data.** In models of this nature, there is a limit to the number of variables that can be included and still uncover variables with statistical significance. Thus, there will never be a perfect model, as it involves selecting the best subset of the variables based on economic theory and statistical fit. Part of this is the nature of the model where a complex and changing phenomenon is being modeled with aggregated data. There is also the issue of multicollinearity, where many things are moving together; this has the effect of confounding the model.

Two types of regression models were created to examine hunting and fishing participation at the national level. Time-series models were developed to determine the factors associated with changing participation rates over the period from 1975 to 2010. Cross-section models were used to examine the differences across states in the change in numbers of hunters and anglers in more recent years.

### **NATIONAL HUNTER MODEL: TIME SERIES**

The hunting participation rate is defined as the percent of the population that purchases a hunting license in any given year. The national time-series model accounts for 99% of the variation in participation rates over the 35-year period from 1975 to 2010. Figure 3.1 shows the accuracy with which the model fits the actual participation rates over time. As with fishing, the persistence effect is particularly strong at the national level, accounting for 62% of the participation rate in any given year. Most of the other factors in the model are statistically significant, although the size of the influence on participation is small. As expected, the price of licenses and permits has a negative effect on participation. Construction activity (with building permits as a proxy measure) has a negative effect on participation—increased construction activity may be associated with less leisure time to fish and hunt.

**Figure 3.1. Participation in Hunting in the United States 1975 to 2010 and the Results of a Regression Model**



<b>Dependent Variable: HUNTERSPOP</b>				
<b>Included observations: 35</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.63531	0.27072	2.34678	0.02624
YEAR	-0.00031	0.00013	-2.30102	0.02905
RHUNTPRICE	-0.00014	0.00005	-2.95182	0.00633
HUNTERLGPRC	0.00221	0.00090	2.45854	0.02040
USHUNTERLAG	0.61944	0.14408	4.29936	0.00019
BUILDUNITS	-0.00000	0.00000	-2.31396	0.02823
REALPCINC	0.00000	0.00000	0.94499	0.35275
R-squared	0.99532	F-statistic		992.967
Adjusted R-squared	0.99432	Prob (F-statistic)		0.000000

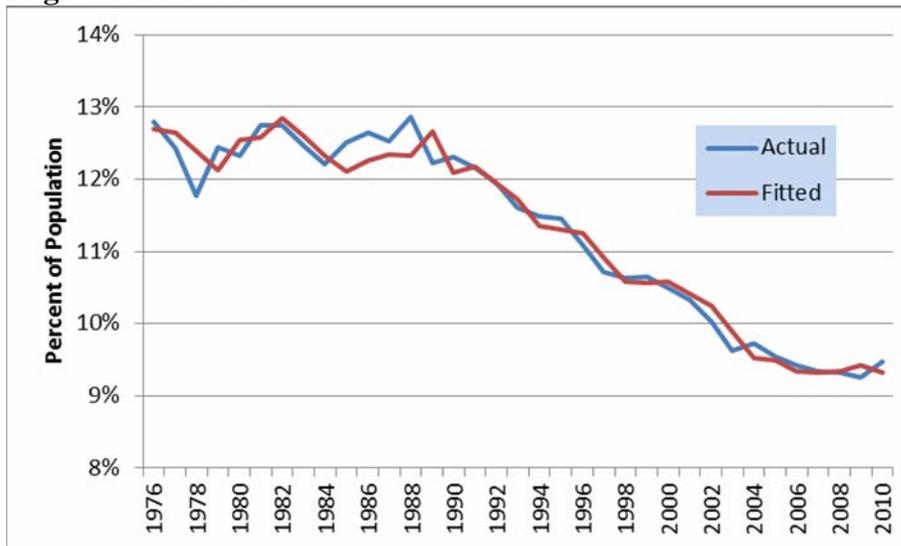
Where:

- Hunterspop = Percent of total population that purchased a hunting privilege
- C = Constant
- Year = Year (trend)
- Rhuntprice = Real cost of average expenditure for hunting privileges
- Hunterlgprc = Indicator variable (change in nominal cost of hunting privileges > 20%)
- Ushunterlag = Lagged variable (number of licensed hunters in the prior year)
- Buildunits = Number of housing units authorized by building permits
- Realpcinc = Inflation-adjusted per capita income

## NATIONAL ANGLER MODEL: TIME SERIES

The fishing participation rate is defined as the percent of the population that purchases a fishing license in any given year. The national time-series model accounts for 96% of the variation in participation rates over the 35-year period from 1975 to 2010, and the close fit of the model to actual participation rates is shown (Figure 3.2). As with hunting, the persistence effect is particularly strong at the national level—61% of the participation rate in any given year is explained by the participation rate in the previous year. As expected, the cost of fishing licenses and permits has a negative effect on participation—as prices go up, participation rates go down. However, price is not statistically significant in the model. The lack of statistical significance is likely due, in part, to the aggregated nature of the data used as a proxy for license prices. The data used in the analysis are a compendium of all expenditures for licenses, tags, permits, and stamps. The number of housing units has a negative effect, but it is negligible in the national model.

**Figure 3.2. Participation in Fishing in the United States 1975 to 2010 and the Results of a Regression Model**



<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 35</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.78075	0.35240	2.21551	0.03473
YEAR	-0.00036	0.00017	-2.16654	0.03863
RFISHPRICE	-0.00094	0.00057	-1.64321	0.11114
LANGLERSPOP	0.61667	0.16137	3.82148	0.00065
BUILDUNITS	-0.00000	0.00000	-1.70467	0.09895
REALGAS	-0.00100	0.00131	-0.76307	0.45159
R-squared	0.96462	F-statistic		158.138
Adjusted R-squared	0.95852	Prob (F-statistic)		0.000000

Where:

Anglerspop	= Percent of total population that purchased a fishing privilege
C	= Constant
Year	= Year (trend)
Rfishprice	= Real cost of average expenditure for fishing privileges
Langerspop	= Lagged variable (number of licensed anglers in the prior year)
Buildunits	= Number of housing units authorized by building permits
Realgas	= Inflation-adjusted price per gallon of gasoline

## NATIONAL HUNTER MODEL: CROSS-SECTION

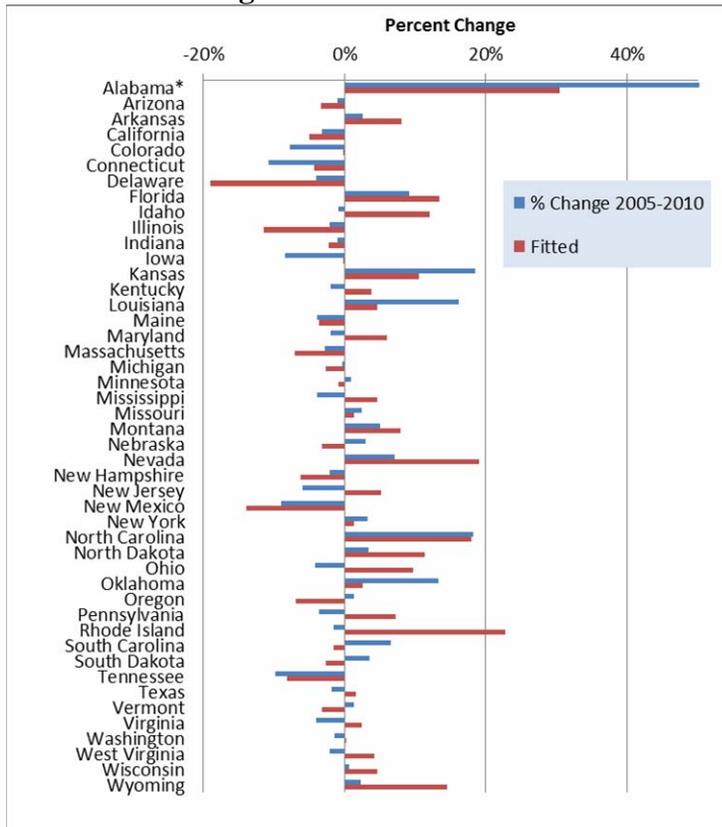
The national cross-section models analyze differences in several demographic and economic measures across the states to explain why some states have seen growth in hunters and anglers in recent years while other states have seen declines. The time period covered in these models is 2005 to 2010. Change in hunters and anglers is defined as the percent growth or decline in numbers of license buyers between 2005 and 2010. The economic and demographic variables used to explain the differences in the states also incorporate change during the same time period (e.g., change in license price, change in population). Other indicator variables are included to account for other differences across the states (e.g., coastal state, participated in Recreational Boating and Fishing Foundation (RBFF) programs, quality of hunting). The amount of variation in the observed variable that is explained by the model (the R-squared measure) for cross-section models is typically much lower than that found in time-series models. This is true for these models.

The national cross-section model of changes in the number of hunters is less effective at explaining difference between states than the angler model (discussed further on), but it includes additional variables that are significantly related to changes in license buyers. The R-squared measure (the amount of variation in the observed variable that is explained by the model) suggests the hunter model accounts for 22% of the differences in hunter growth or decline across the 45 states included in the model (some data were not available for all states for all years). This means that some differences in growth or decline are the result of factors not in the model. Figure 3.3 compares the actual change in hunters in each state with that projected by the model. There are several states in which the model projects an increase in hunters where the numbers actually declined, or vice versa.

Changes in license prices were clearly related to changes in numbers of hunters. States that increased licenses prices during the time period were likely to experience decreases in numbers of license buyers. Two economic factors were statistically important. The positive effect of the unemployment rate suggests that availability of leisure time is a factor in hunting participation—an increasing unemployment rate is associated with increased numbers of hunters. At the same time, growing per capita income is also associated with increased hunting. It seems that having both time and money is especially important to hunting participation. In a 2008 study, Responsive Management asked sportsmen to rate the quality of overall access to hunting lands within their states. This showed up in the hunter model as an important factor in hunter participation. States with higher percentages of hunters who rate access as good or excellent were more likely to experience growth in the number of hunters between 2005 and 2010.

Finally, two age-related factors were interesting, although they were not statistically significant. Growth in elderly populations (age 65 and older) was associated with declining numbers of hunters, while increasing youth populations (age 14 to 17) were linked to growing numbers of hunters.

**Figure 3.3. Actual Change in Numbers of Hunters 2005 to 2010 and the Fitted Results of a Cross-Section Regression Model**



\*Actual change in Alabama was 104%

<b>Dependent Variable: HUNTERCHG</b>				
<b>Included observations: 45</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	-0.7946	0.3434	-2.3141	0.0260
HUNTLICCHG	-0.2508	0.0860	-2.9168	0.0058
POP65CHG	-0.4122	0.5862	-0.7031	0.4862
POP14-17CHG	0.8307	0.6825	1.2172	0.2308
PCTGOODHUNT	1.0858	0.5405	2.0089	0.0515
UNEMPCHG	0.1313	0.0722	1.8182	0.0767
PCINCCHG	1.2178	0.6049	2.0131	0.0510
R-squared	0.3258	F-statistic		3.141
Adjusted R-squared	0.222	Prob (F-statistic)		0.013

Where:

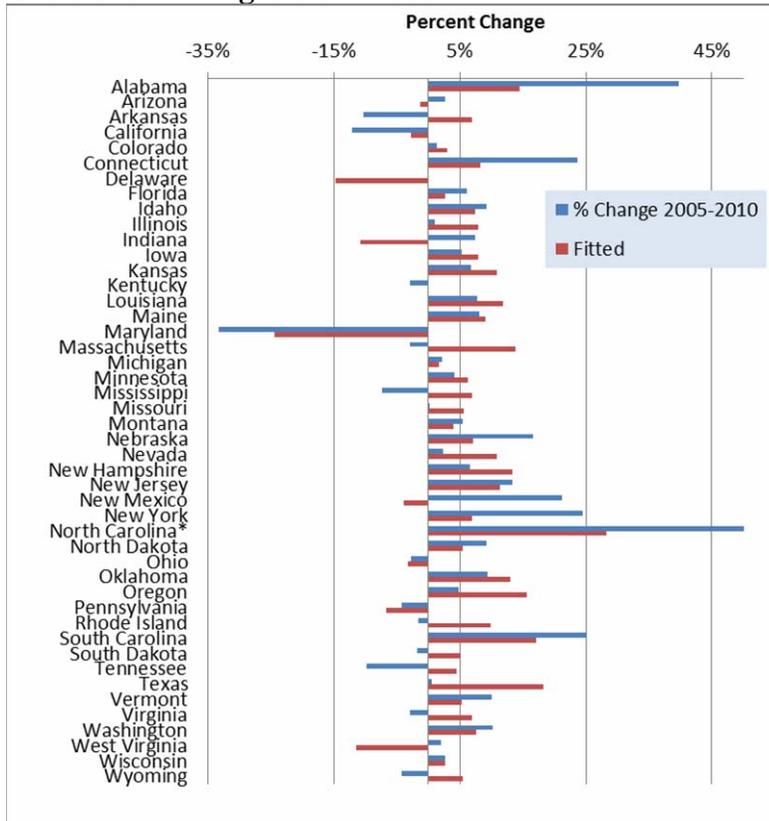
C	= Constant
HuntLicChg	= Percent change in average expenditure for hunting privileges, 2005-2010
Pop65Chg	= Percent change in population age 65 and older, 2005-2010
Pop14-17Chg	= Percent change in population age 14 to 17, 2005-2010
PctGoodHunt	= Percent in state who rate hunting access overall as excellent or good (these ratings were taken from Responsive Management's report on hunting access (RM/National Shooting Sports Foundation, 2010))
UnempChg	= Percent change in unemployment rate, 2005-2010
PCIncChg	= Percent change of per capita income, 2005-2010

### **NATIONAL ANGLER MODEL: CROSS-SECTION**

The national angler model accounts for 27% of the differences in angler growth or decline across the 45 states included in the model (some data were not available for all states for all years). This means that some differences in growth or decline are the result of factors not in the model. Figure 3.4 compares the actual change in anglers in each state with that projected by the model. In most cases, the model is accurate in predicting the direction of change and the general magnitude of change. However, there are states in which the model projects an increase in anglers where the numbers actually declined, or vice versa.

Nevertheless, the model's results provide useful insights. Change in license prices is a clear factor in explaining the differences in growth or decline in anglers between the states and is the dominant factor. States that increased license prices during the time period were likely to experience decreases in numbers of license buyers. The strength of the price effect overshadows the importance of some of the other factors in the model. As a result, some factors in the model are not statistically significant but have the expected effect. Coastal states are more likely to experience increased license sales than non-coastal states. Overall population growth is associated with increased numbers of anglers, and states that participated in RBFF programs were more likely to have increases in anglers than states that did not participate.

**Figure 3.4. Actual Change in Numbers of Anglers 2005 to 2010 and the Fitted Results of a Cross-Section Regression Model**



\*Actual change in North Carolina was 64%

Dependent Variable: ANGLERCHG				
Included observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.1045	0.0932	1.1208	0.2692
FISHLICCHG	-0.3494	0.0935	-3.7374	0.0006
POPCHG	0.9169	0.6010	1.5256	0.1352
COASTAL	0.0662	0.0384	1.7251	0.0924
BUILDUNITCHG	0.1368	0.1440	0.9495	0.3482
RBF	0.0303	0.0429	0.7062	0.4843
R-squared	0.3531	F-statistic	4.257	
Adjusted R-squared	0.2702	Prob (F-statistic)	0.003	

Where:

- C = Constant
- FishLicChg = Percent change in average expenditure for fishing privileges, 2005-2010
- PopChg = Percent change in total population, 2005-2010
- Coastal = Indicator variable for coastal states
- BuildUnitChg = Percent change in authorized housing units, 2005-2010
- RBF = Indicator variable for state participation in RBF program, 2008-2010

## **STATE TIME SERIES MODELS**

Four states in each AFWA region were selected for time series regression analyses of both fishing and hunting participation rates. In each case, the hunting or fishing participation rate is defined as the percent of the population that purchased a hunting or fishing privilege in any given year. The goal of the analyses was to identify the factors that explain changes in participation over time. The national cross-section models did not detect any differences in recent hunting and fishing participation that can be attributed to regional differences.

The states analyzed in the study include the following:

### **Northeast**

- Maine
- Massachusetts
- New York
- Rhode Island

### **Midwest**

- Iowa
- Kansas
- Ohio
- Wisconsin

### **Southeast**

- Arkansas
- Florida
- Louisiana
- Mississippi

### **West**

- Idaho
- Montana
- Nevada
- Oregon

A variety of factors were explored to find the unique combinations in each state that best explained changes in participation over time. Table 3.1 below lists the complete list of factors that were used and their definitions. Not all of these factors appear in the models.

**Table 3.1. State Model Variable Definitions**

<b>Independent Variables</b>	
HUNTERSPOP	Percent of the total population that purchased a hunting privilege
ANGLERSPOP	Percent of the total population that purchased a fishing privilege
<b>Model Control Variables</b>	
C	Constant
YEAR	Year (trend variable)
<b>Hunting Model Variables</b>	
RHUNTPRICE	Inflation-adjusted average expenditure for hunting privileges
LGHUNTPCHNG	Indicator variable for nominal price increases >20%
LHUNTERSPOP	Lagged variable, hunting participation in the prior year
<b>Fishing Model Variables</b>	
RFISHPRICE	Inflation-adjusted average expenditure for fishing privileges
LGFISHPCHNG	Indicator variable for nominal price increases >20%
LANGLERSPOP	Lagged variable, fishing participation in the prior year
<b>Economic Variables</b>	
BUILDUNITS	Number of housing units authorized by building permits
RPC_DISPINC	Inflation-adjusted per capita disposable income
RPC_PERSINC	Inflation-adjusted per capita personal income
RATE	Unemployment rate
REALGAS	Inflation-adjusted price per gallon of gasoline
<b>Demographic Variables</b>	
POP	Total population
YOUNGPOPCT	Population age 14 to 17
OLDPOPCT	Population age 65 and older
RBFF	Indicator variable for years that state participated in RBFF marketing

## **State Model Results**

The states included in this study experienced a range of differences in hunting and fishing license sales between 1975 and 2010. Some states saw consistent, and sometimes sharp, declines in the numbers of license buyers, while declines in other states have been more modest, with periods of growth. A few states have seen the number of license buyers actually increase, especially in more recent years. The models rely on numbers of licenses that include both residents and nonresidents and aggregated license revenue from the sales of all types of licenses, tags, permits, and stamps. The average expenditure for hunting and fishing privileges is a proxy for license prices and is the gross revenue divided by the number of license buyers. This approach masks the effect of price on specific licenses and does not precisely address the sharp differences in resident and nonresident license prices in most states.

- There is a consistent persistence effect where the number of hunters or anglers in one year is positively affected by the number in the previous year. Sunk costs for equipment accessories provide an impetus for hunters and anglers to continue participating each year after making that investment. However, the converse of the persistence effect is that any interruption in annual license purchases reduces the likelihood that a hunter or angler will return to participating in the future.
- Even at an aggregated level, a dominant factor in sporting participation is the inflation-adjusted price of licenses, tags, permits, and stamps. Rising costs reduce participation rates. However, nominal prices are also important. Large changes in nominal prices (greater than 20%) often resulted in substantial decreases in license demand. This is problematic for long-run license sales due to the persistence effect. A large increase in nominal prices could potentially drive some participants out of the sport indefinitely. In only one state-level model did price prove to be an insignificant factor in relation to participation rates.
- The impact of recent marketing and promotion efforts by the RBFF was consistently positive in every state where it was included in the state-level models, although in only one state was that effect statistically significant. The lack of statistical significance means that we cannot say with certainty that the measured effect is different from zero. We can draw several conclusions from this finding. First, the RBFF direct mail program has targeted only a small portion of anglers (i.e., only lapsed anglers) in participating states, so its effect on total fishing activity may be too small to measure. Second, the RBFF program was in effect for only the last 3 years included in the models. This limited experience could be overshadowed by other stronger factors during that particular time period.
- The importance of demographic factors is mixed. For example, in some cases a change in percent of population between 14 and 17 resulted in an increase in demand, while in others it resulted in a decrease.
- The overall prevailing trend in sales in general was negative, and this was revealed in a frequent negative trend variable.

Many of the models share a common set of factors that explain most of the variation in participation rates over time. The most frequently observed ones include:

- Real price of gas. Gasoline expense is a complementary factor that affects participation in the same way that license prices do. Increases in the inflation-adjusted price of gasoline generally have a negative effect on participation rates.
- Building permits. This is the annual number of housing units authorized by building permits. This is one of two variables that occur in a number of models and appear to confirm recent survey findings about the lack of available time as a key reason many hunters and anglers give to explain why they participate at a reduced level or they no longer participate in hunting or fishing at all. In the models, building permits is *inversely* related to participation rates: as the number of building permits increase, the percent of the population that participates in hunting or fishing declines. This is a measure of construction activity, and as such it competes with leisure time available for hunting and fishing.
- Unemployment rate. This is the second of two variables that confirm the importance of leisure time for hunting and fishing. As the unemployment rate goes up, participation rates in hunting and fishing also go up. With increased unemployment, more people have time available to fish and hunt. It may also be that they are more in need of the meat or fish for eating that the sports provide.

The national cross-section model did not uncover any regional effects to explain differences in growth or decline between the states, and the individual state models confirm those results. Each region includes states that experienced a variety of changes in participation over the study period. Likewise, there is no overall pattern to changes in fishing participation versus hunting participation. Even as an aggregated measure, the average expenditure for fishing and hunting privileges shows up fairly consistently as a key factor in participation rates.

## Hunting Participation

Hunting participation tends to be somewhat lower than fishing, and the rates have generally declined more and for a longer period of time, although there are exceptions and differences between the states. While some states share common patterns of growth or decline in participation rates, there is nothing in the regression models to explain their common experiences.

Most of the states have experienced fairly steady declines in participation over the entire period from 1975 through 2010. In some states, the declines started a little later. In Maine, Oregon, Kansas, and Wisconsin, the rates held fairly steady through the latter part of the 1970s before beginning a long-term decline.

Some states have seen their participation rates level off in recent years. For example, Florida, Montana, Nevada, New York, and Wisconsin have participation rates that have been more or less steady since 2005. Louisiana has seen its participation rate increase during that period. In Kansas, Iowa, and Arkansas, the participation rates for hunting have been more or less steady since around 1990.

## **Fishing Participation**

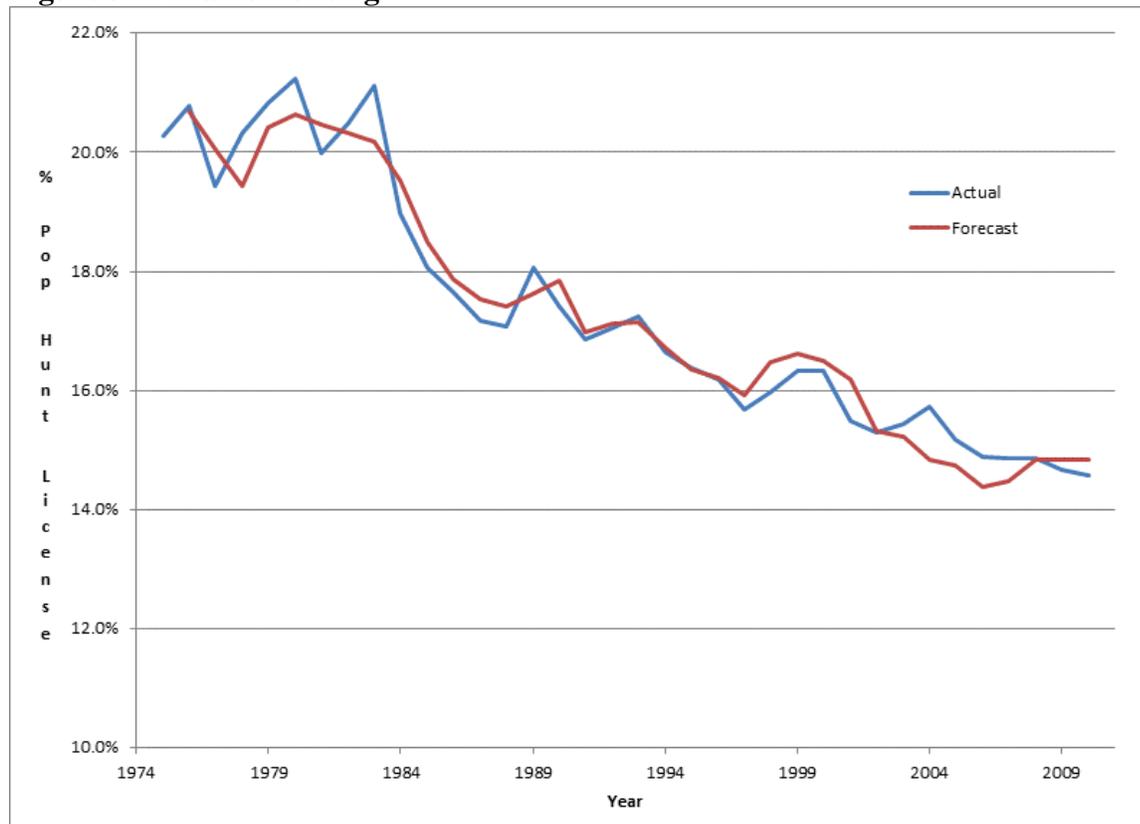
There is no clear pattern in the participation rate for licensed anglers across the states. Several states saw strong growth in participation rates from the late 1970s through the 1980s. This was true in Massachusetts, New York, Ohio, and Montana. In those states, the early growth was generally followed by a period of declining participation. In Massachusetts and Montana, participation rates leveled off around 2000, while Rhode Island and Ohio saw continuing declines through most of the period after 2000. New York experienced robust growth in participation rates after 2007.

Several states have seen nearly steady declines in participation rates through almost the entire period of 1975 through 2010, although the decline started a little late in some states. Kansas, Iowa, Wisconsin, Mississippi, Nevada, Oregon, and Idaho all experienced steady reductions in participation rates. In Oregon and Kansas, participation rates were reduced by nearly one-half during that period, dropping from 30% to 16% and from 16% to 9%, respectively. Participation rates in Nevada went from 25% to 5% in that 35-year span.

Two states with trends that deviate from most others are Florida and Louisiana. In Florida, participation rates declined sharply in the late 1970s, but since then rates have varied somewhat from year to year with an overall slight growth. In Louisiana, participation rates have risen almost steadily from about 1978 through 2010. There is no common factor in the regression models for those two states to explain their growth, except that both states are in the Southeast region. However, Arkansas and Mississippi are also southeastern states, and both experienced steady declines in participation rates.

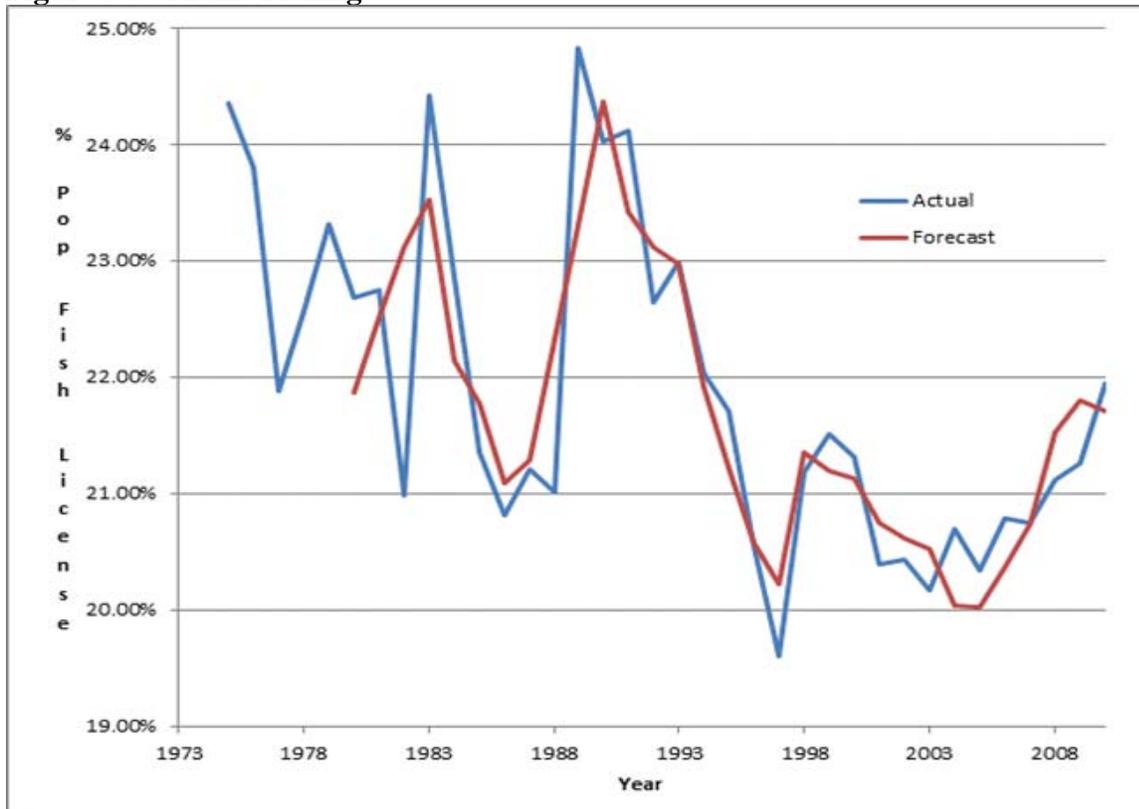
## State-by-State Results for the Northeastern States

**Figure 3.5. Maine Hunting**

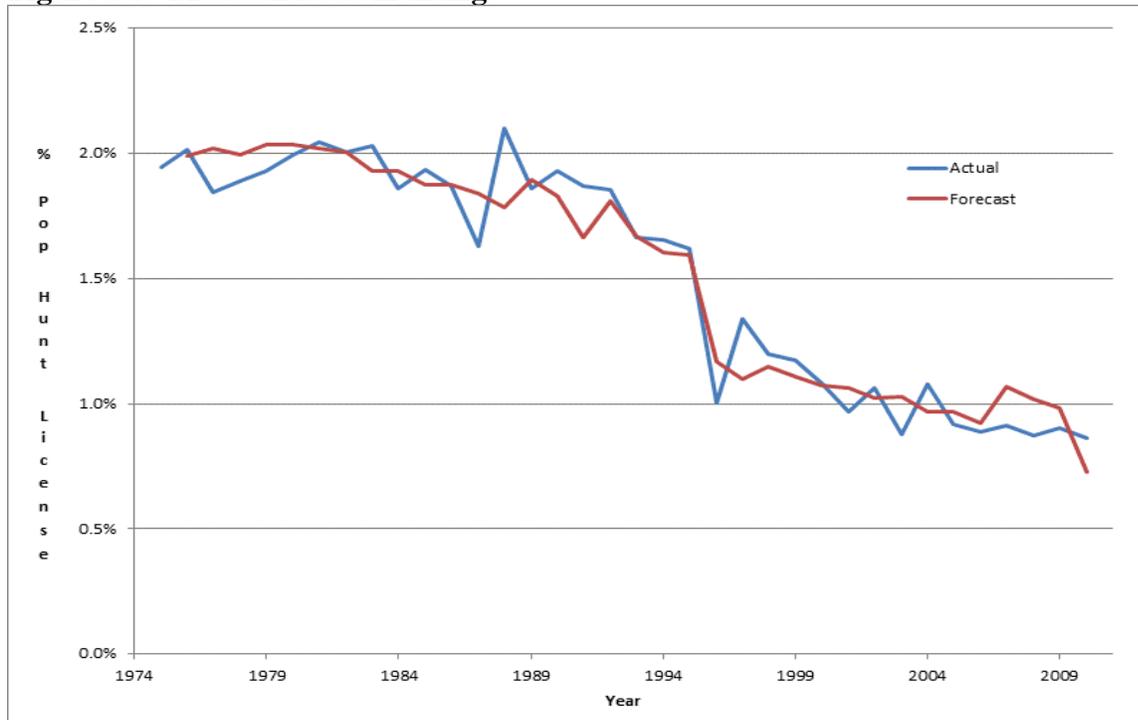


<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	3.885273	0.679697	5.716186	0.0000
LHUNTERSPOP	0.057175	0.159147	0.359258	0.7219
YEAR	-0.001844	0.000324	-5.694230	0.0000
RHUNTPRICE	-0.188786	0.045673	-4.133427	0.0003
BUILDUNITS	-1.40E-06	4.31E-07	-3.246260	0.0029
R-squared	0.956038	F-statistic		163.1024
Adjusted R-squared	0.950177	Prob (F-statistic)		0.000000

**Figure 3.6. Maine Fishing**

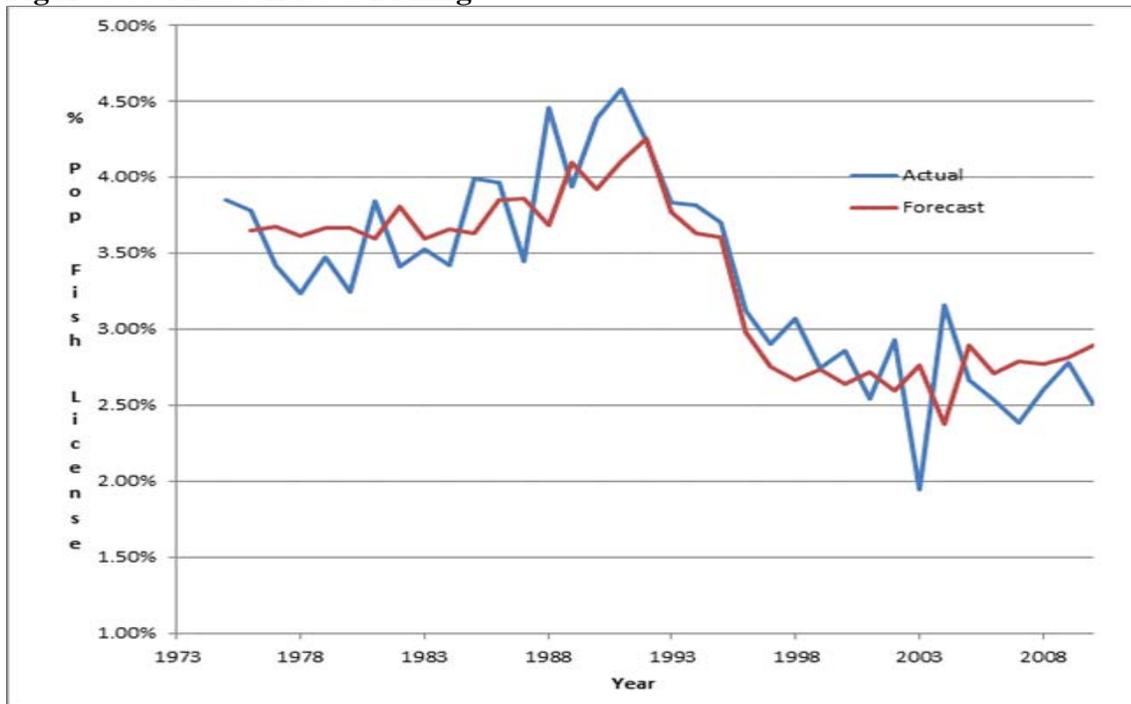


<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 31 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	4.570359	0.769118	5.942335	0.0000
LANGLERSPOP	0.005137	0.151907	0.033819	0.9733
YEAR	-0.002081	0.000360	-5.785509	0.0000
RFISHPRICE	-0.335982	0.083999	-3.999836	0.0005
BUILDUNITS	-1.30E-06	7.50E-07	-1.739692	0.0942
YOUNGPOPCT	-2.569448	0.498329	-5.156129	0.0000
R-squared	0.739316	F-statistic		14.18030
Adjusted R-squared	0.687179	Prob (F-statistic)		0.000001

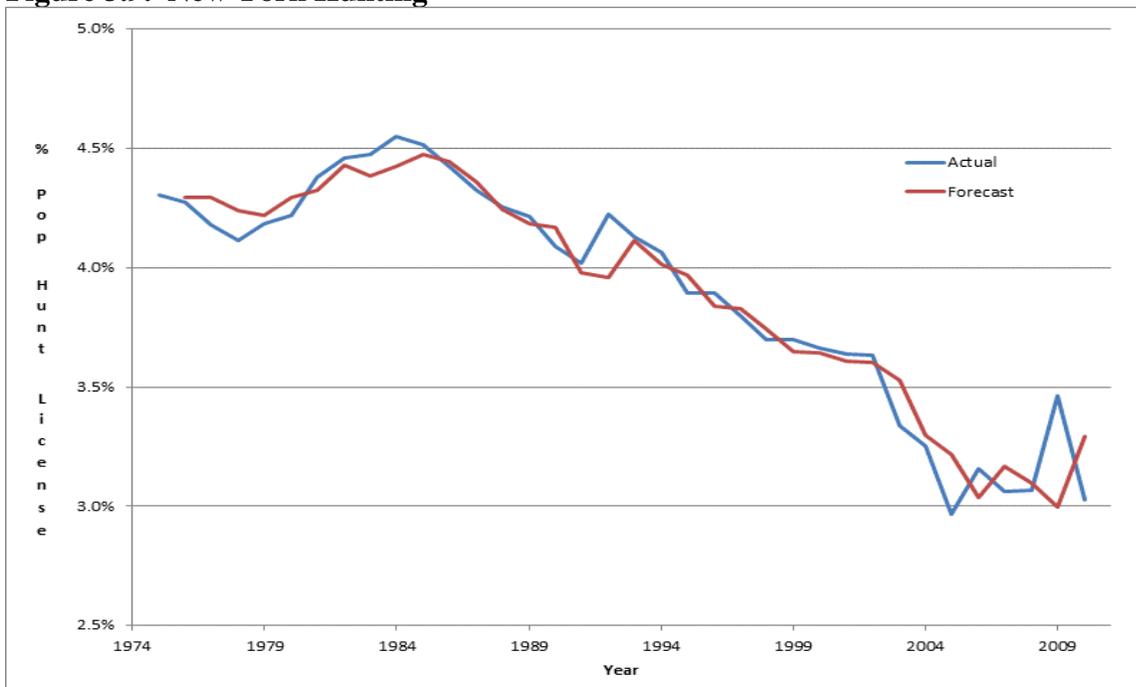
**Figure 3.7. Massachusetts Hunting**

<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.461305	0.102688	4.492283	0.0001
LHUNTPOP	0.266552	0.127260	2.094548	0.0445
RHUNTPRICE	-0.037899	0.008504	-4.456513	0.0001
YEAR	-0.000223	5.06E-05	-4.405804	0.0001
R-squared	0.931932	F-statistic		141.4767
Adjusted R-squared	0.925345	Prob (F-statistic)		0.000000

**Figure 3.8. Massachusetts Fishing**

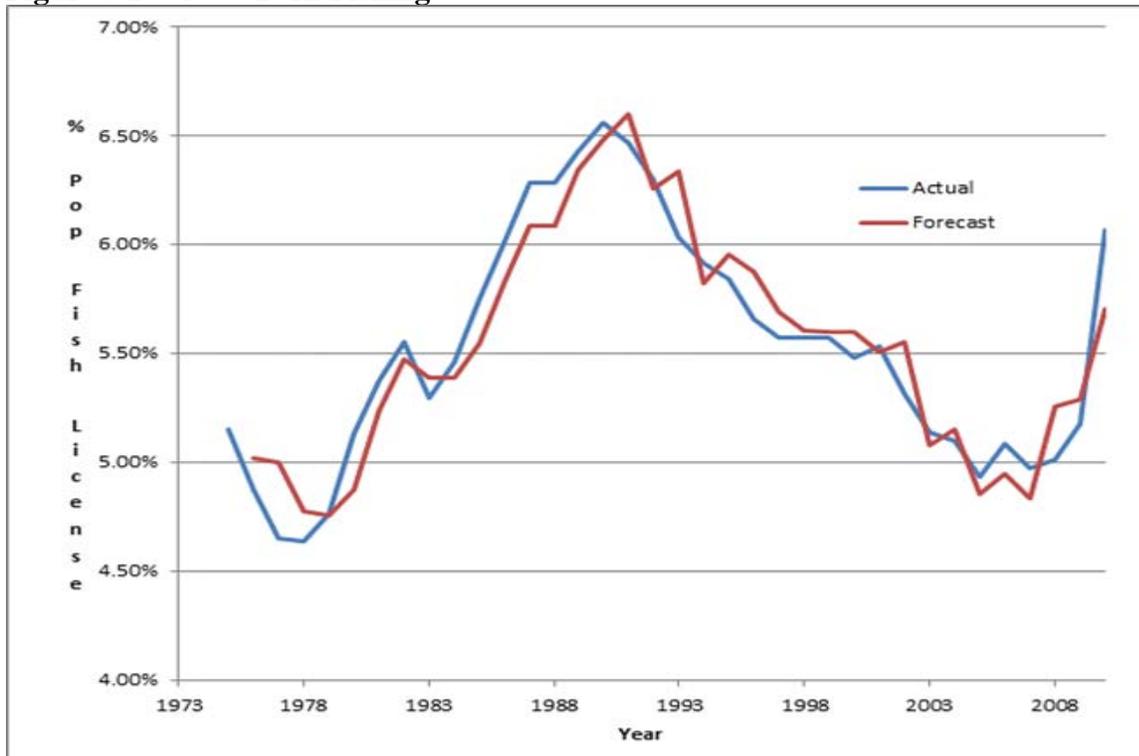


<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.396432	0.160086	2.476365	0.0189
LANGLERSPOP	0.381315	0.145748	2.616268	0.0136
RFISHPRICE	-0.103246	0.034404	-3.001008	0.0053
YEAR	-0.000182	7.88E-05	-2.316418	0.0273
R-squared	0.704548	F-statistic		24.64129
Adjusted R-squared	0.675956	Prob (F-statistic)		0.000000

**Figure 3.9. New York Hunting**

<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.218206	0.100431	2.172698	0.0376
LHUNTERSPOP	0.770964	0.106508	7.238558	0.0000
RHUNTPRICE	-0.021638	0.014773	-1.464702	0.1531
YEAR	-0.000103	4.88E-05	-2.120529	0.0421
R-squared	0.925904	F-statistic		129.1256
Adjusted R-squared	0.918734	Prob (F-statistic)		0.000000

Figure 3.10. New York Fishing

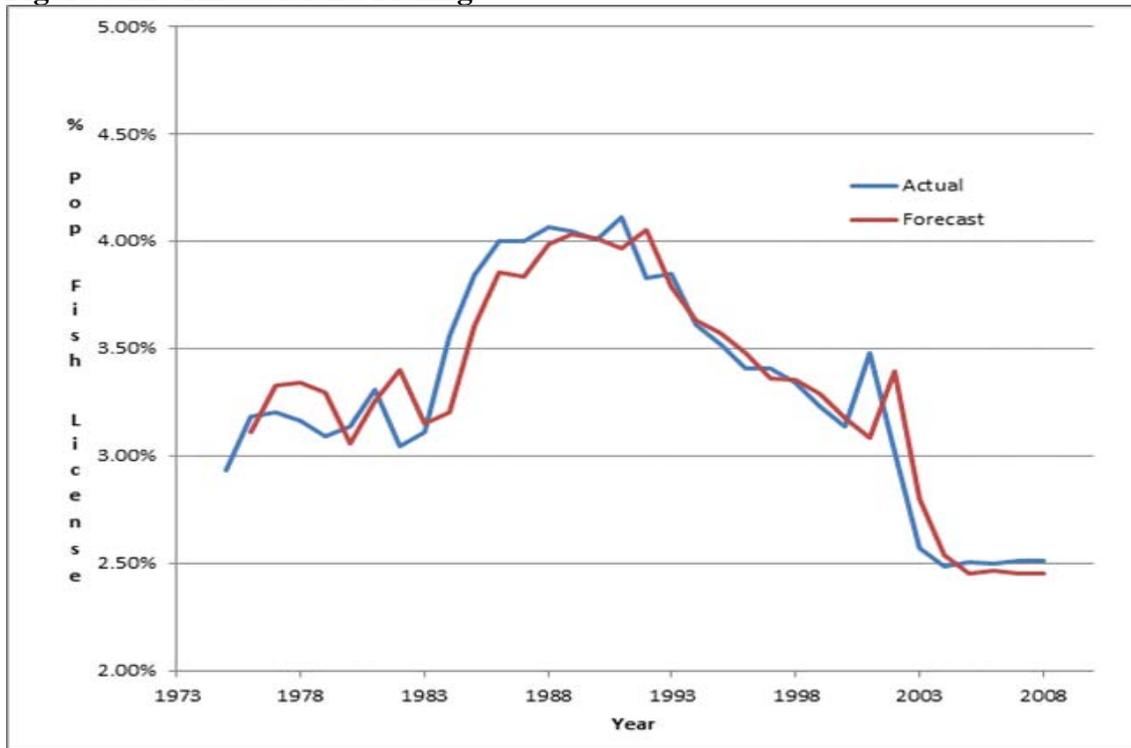


<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.079038	0.068892	1.147272	0.2603
LANGLERSPOP	0.985050	0.059706	16.49834	0.0000
RBF	0.005364	0.001316	4.075866	0.0003
LGFISHPCHNG	-0.002539	0.000698	-3.640018	0.0010
YEAR	-3.90E-05	3.48E-05	-1.120085	0.2716
R-squared	0.904295	F-statistic		70.86580
Adjusted R-squared	0.891534	Prob (F-statistic)		0.000000

**Figure 3.11. Rhode Island Hunting**

<b>Dependent Variable: HUNTERSPOP</b>				
<b>Included observations: 33 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.170479	0.069614	2.448919	0.0206
LHUNTERSPOP	0.724773	0.085485	8.478322	0.0000
RHUNTPRICE	-0.008581	0.003207	-2.675424	0.0120
R-squared	0.948855	F-statistic		278.2812
Adjusted R-squared	0.945445	Prob (F-statistic)		0.000000

**Figure 3.12. Rhode Island Fishing**



<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 33 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.170479	0.069614	2.448919	0.0206
LANGLERSPOP	0.914171	0.067519	13.53942	0.0000
YEAR	-8.41E-05	3.46E-05	-2.433755	0.0213
LGFISHPCHNG	-0.001613	0.000958	-1.683210	0.1031
R-squared	0.890632	F-statistic		78.72011
Adjusted R-squared	0.879318	Prob (F-statistic)		0.000000

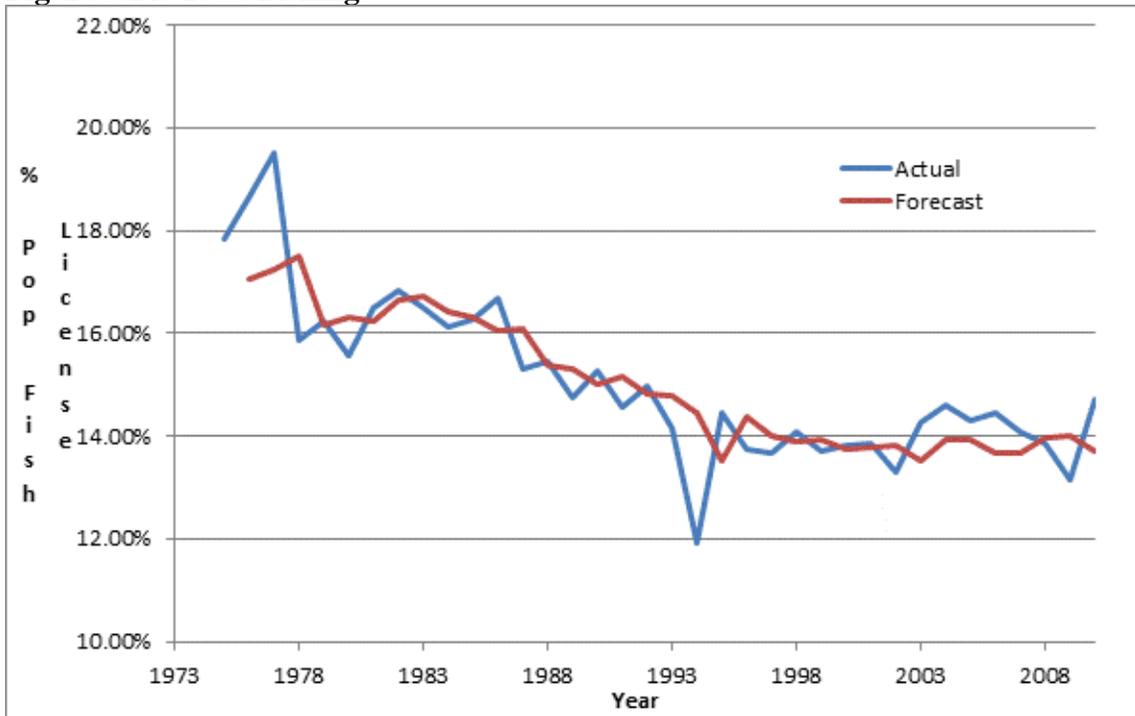
## State-by-State Results for the Midwestern States

**Figure 3.13. Iowa Hunting**

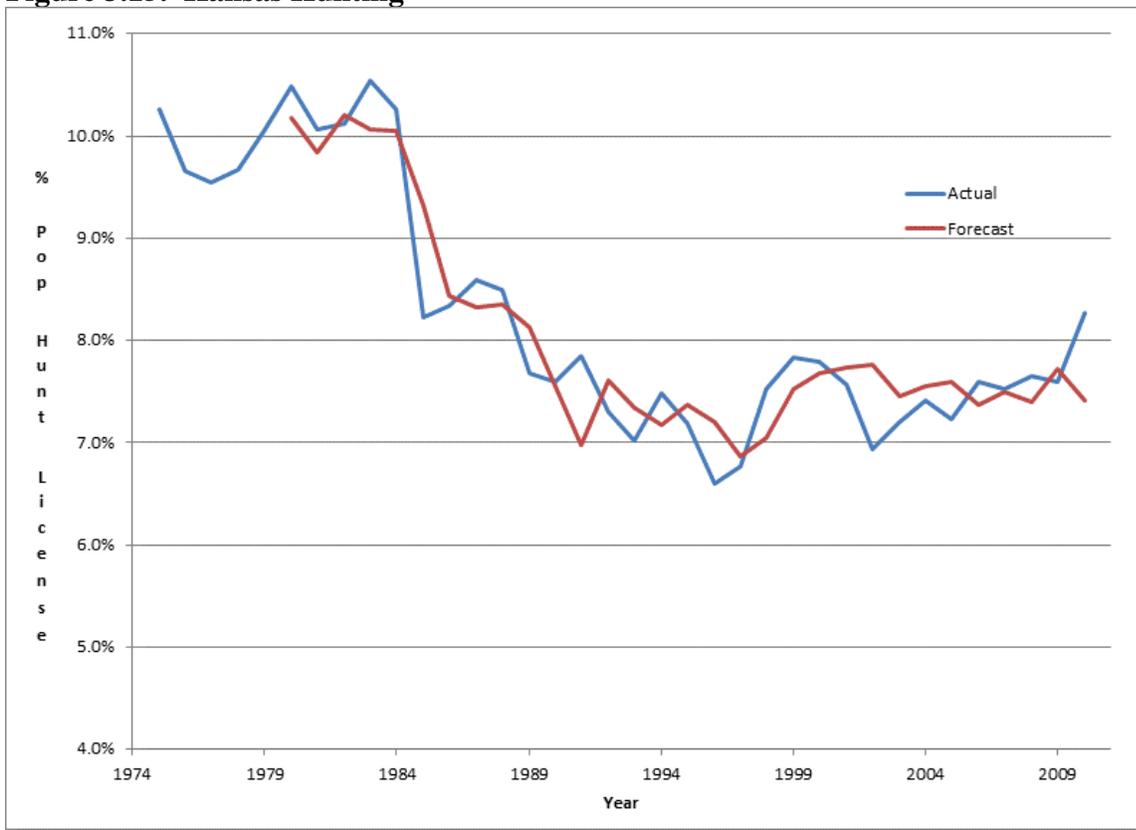


<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.287824	0.194644	1.478718	0.1493
LHUNTERSPOP	0.745322	0.083145	8.964141	0.0000
YEAR	-0.000132	9.50E-05	-1.390593	0.1743
LGHUNTPCHNG	-0.007328	0.002358	-3.107140	0.0040
R-squared	0.842638	F-statistic	55.33270	
Adjusted R-squared	0.827410	Prob (F-statistic)	0.000000	

Figure 3.14. Iowa Fishing

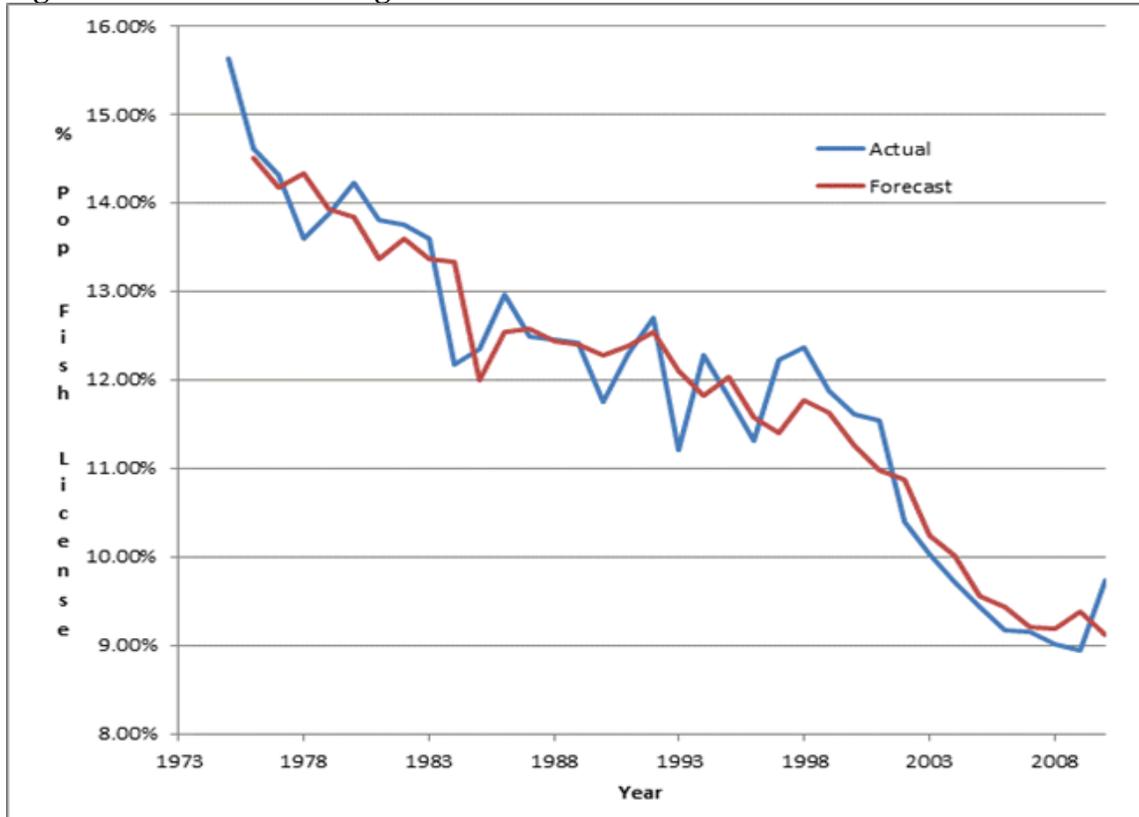


Dependent Variable: ANGLERSPOP				
Included observations: 35 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.408281	0.658593	2.138318	0.0410
LANGLERSPOP	0.371745	0.176493	2.106285	0.0440
RBF	0.004291	0.007173	0.598229	0.5543
RATE	0.001287	0.001242	1.035596	0.3089
LGFISHPCHNG	-0.000818	0.005052	-0.161828	0.8726
YEAR	-0.000663	0.000319	-2.074243	0.0470
R-squared	0.683925	F-statistic		12.55009
Adjusted R-squared	0.629430	Prob (F-statistic)		0.000002

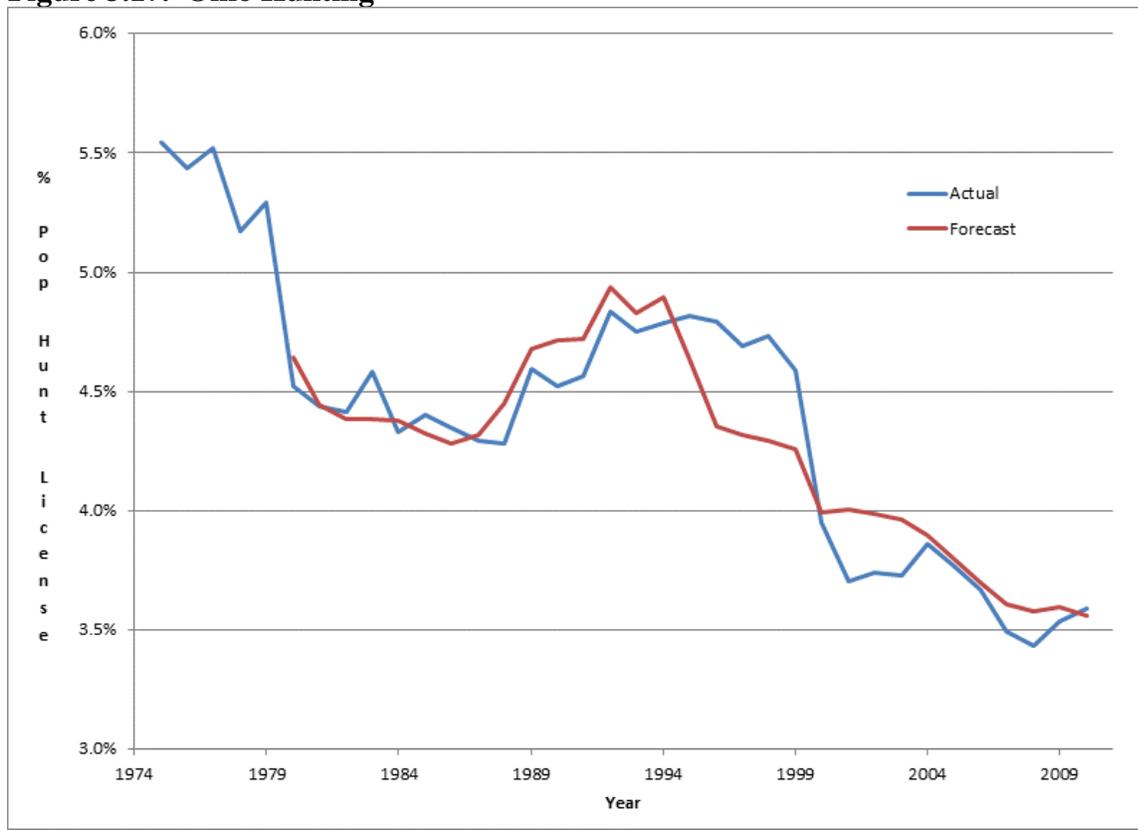
**Figure 3.15. Kansas Hunting**

<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 31 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	1.067481	0.525663	2.030732	0.0530
LHUNTERSPOP	0.571838	0.180839	3.162145	0.0041
YEAR	-0.000457	0.000235	-1.949213	0.0626
LGHUNTPCHNG	-0.004618	0.003190	-1.447673	0.1601
OLDPOPPCT	-0.946239	0.444628	-2.128158	0.0434
RATE	0.001161	0.001094	1.061063	0.2988
R-squared	0.852942	F-statistic		29.00019
Adjusted R-squared	0.823530	Prob (F-statistic)		0.000000

**Figure 3.16. Kansas Fishing**

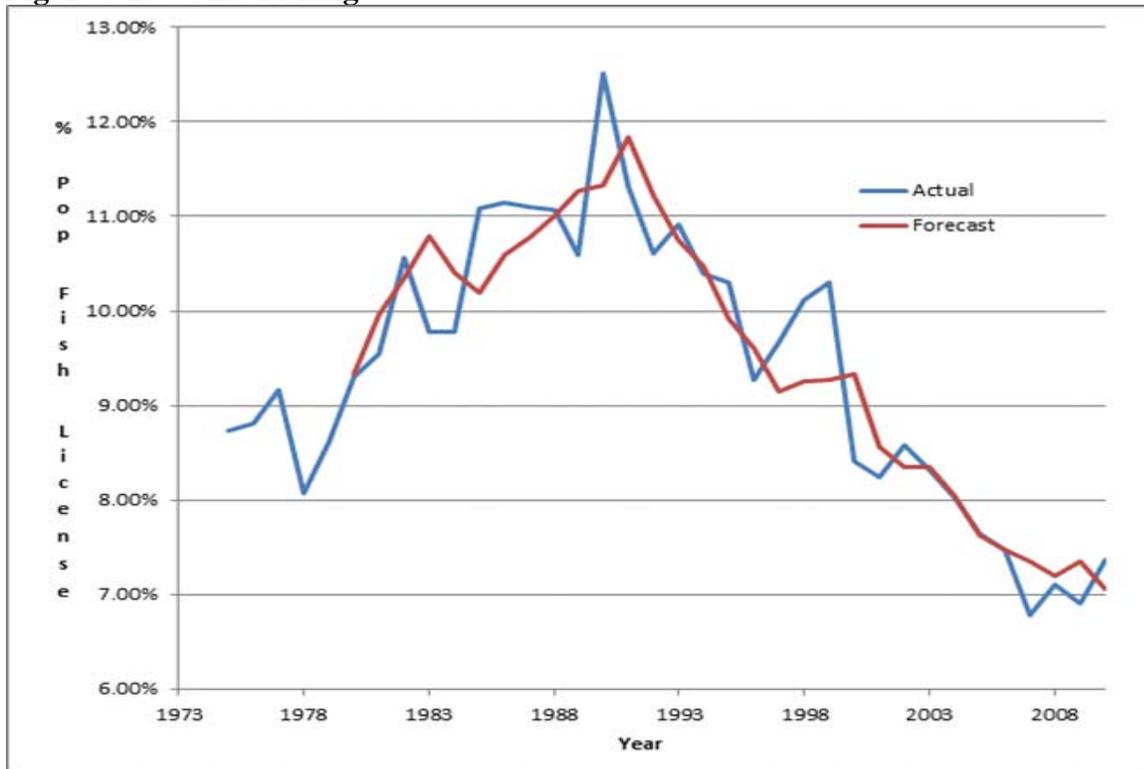


<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	2.159471	0.569585	3.791308	0.0007
LANGLERSPOP	0.348173	0.166869	2.086512	0.0462
YEAR	-0.001034	0.000274	-3.769099	0.0008
RFISHPRICE	-0.167686	0.086131	-1.946857	0.0616
RBF	0.001325	0.003856	0.343536	0.7338
LGFISHPCHNG	-0.002527	0.002929	-0.862490	0.3957
REALGAS	-0.794512	0.444063	-1.789190	0.0844
R-squared	0.928956	F-statistic		61.01998
Adjusted R-squared	0.913732	Prob (F-statistic)		0.000000

**Figure 3.17. Ohio Hunting**

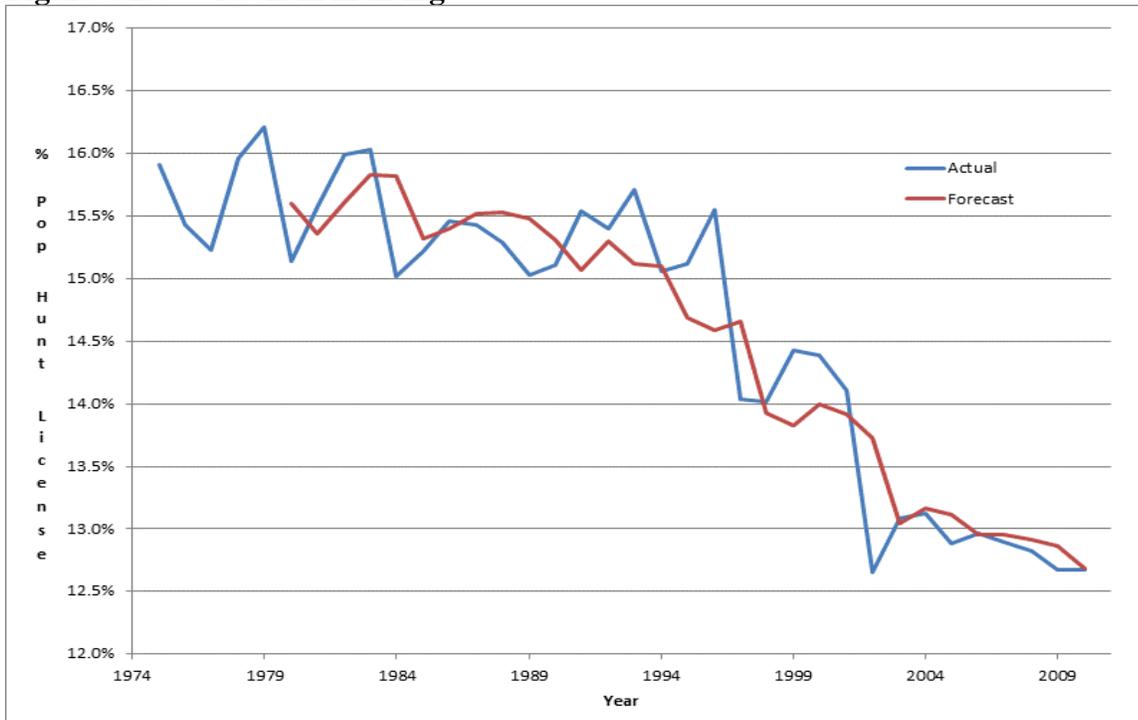
<b>Dependent Variable: HUNTERPOP</b>				
<b>Included observations: 31 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.440781	0.116679	3.777721	0.0008
LHUNTERSPOP	0.872777	0.096702	9.025393	0.0000
YEAR	-0.000204	5.55E-05	-3.678483	0.0011
LGHUNTPCHNG	-0.002520	0.000817	-3.083401	0.0048
YOUNGPOPCT	-0.467839	0.092252	-5.071296	0.0000
R-squared	0.912843	F-statistic		68.07786
Adjusted R-squared	0.899434	Prob (F-statistic)		0.000000

Figure 3.18. Ohio Fishing



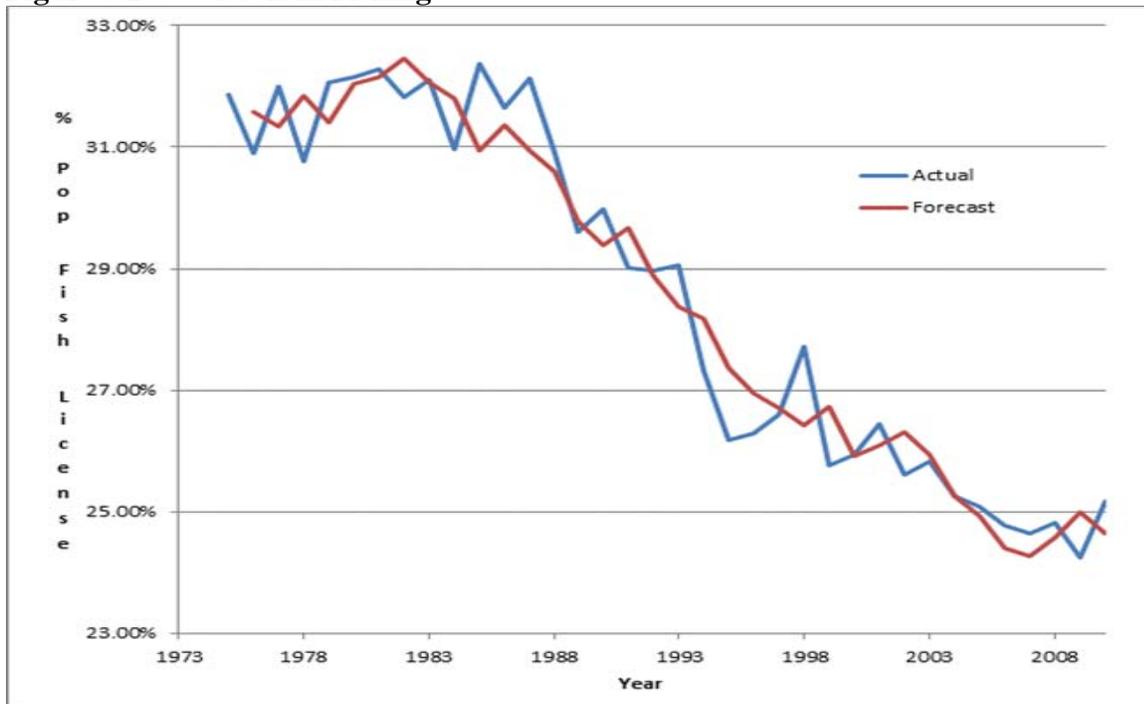
<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 31 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	2.988052	0.833749	3.583875	0.0014
LANGLERSPOP	0.343442	0.169338	2.028149	0.0529
YEAR	-0.001421	0.000394	-3.610307	0.0013
LGFISHPCHNG	-0.001093	0.003367	-0.324503	0.7482
YOUNGPOPCT	-1.526657	0.627035	-2.434725	0.0221
R-squared	0.865751	F-statistic		41.91752
Adjusted R-squared	0.845097	Prob (F-statistic)		0.000000

**Figure 3.19. Wisconsin Hunting**



<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 31 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	1.674931	0.480029	3.489232	0.0017
LHUNTPOP	0.438287	0.161656	2.711234	0.0117
YEAR	-0.000787	0.000227	-3.461547	0.0019
YOUNGPOPPCT	-0.409821	0.218423	-1.876274	0.0719
LGHUNTPCHNG	-0.001619	0.003466	-0.467036	0.6444
R-squared	0.867426	F-statistic		42.52929
Adjusted R-squared	0.847030	Prob (F-statistic)		0.000000

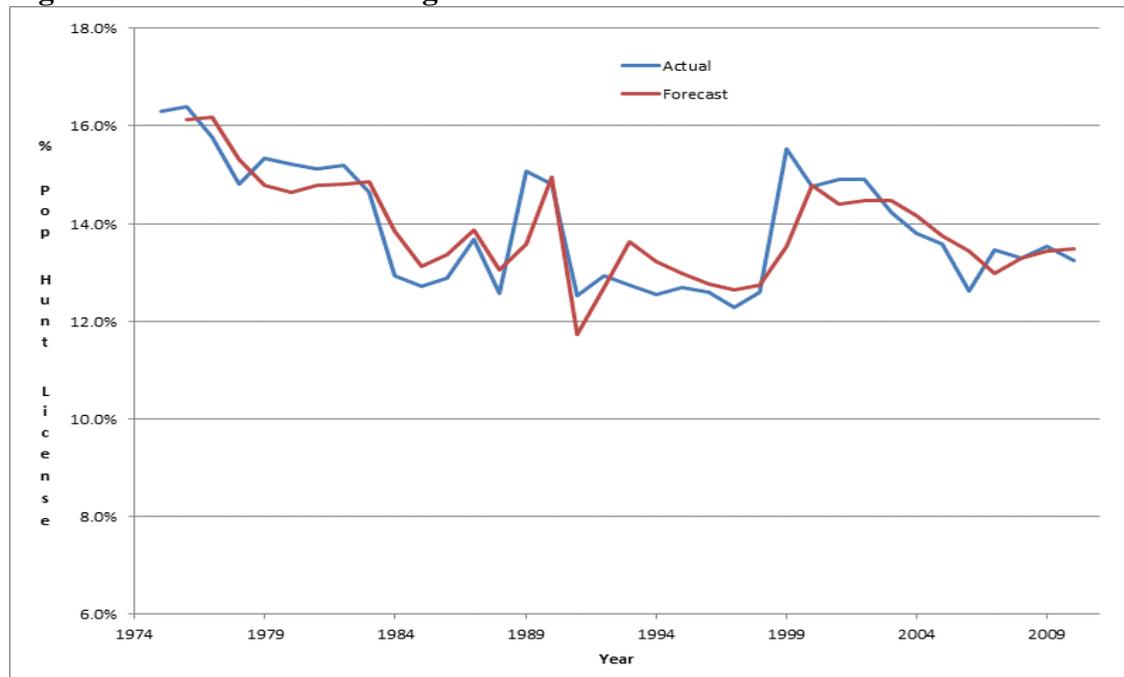
Figure 3.20. Wisconsin Fishing



Dependent Variable: ANGLERSPOP				
Included observations: 35 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.983204	0.817332	3.649928	0.0010
LANGLERSPOP	0.398196	0.151205	2.633491	0.0134
RFISHPRICE	-0.360836	0.199683	-1.807039	0.0811
RBFF	0.003205	0.006042	0.530514	0.5998
YEAR	-0.001397	0.000389	-3.589646	0.0012
RATE	0.001282	0.000891	1.438842	0.1609
R-squared	0.945280	F-statistic		100.1950
Adjusted R-squared	0.935846	Prob (F-statistic)		0.000000

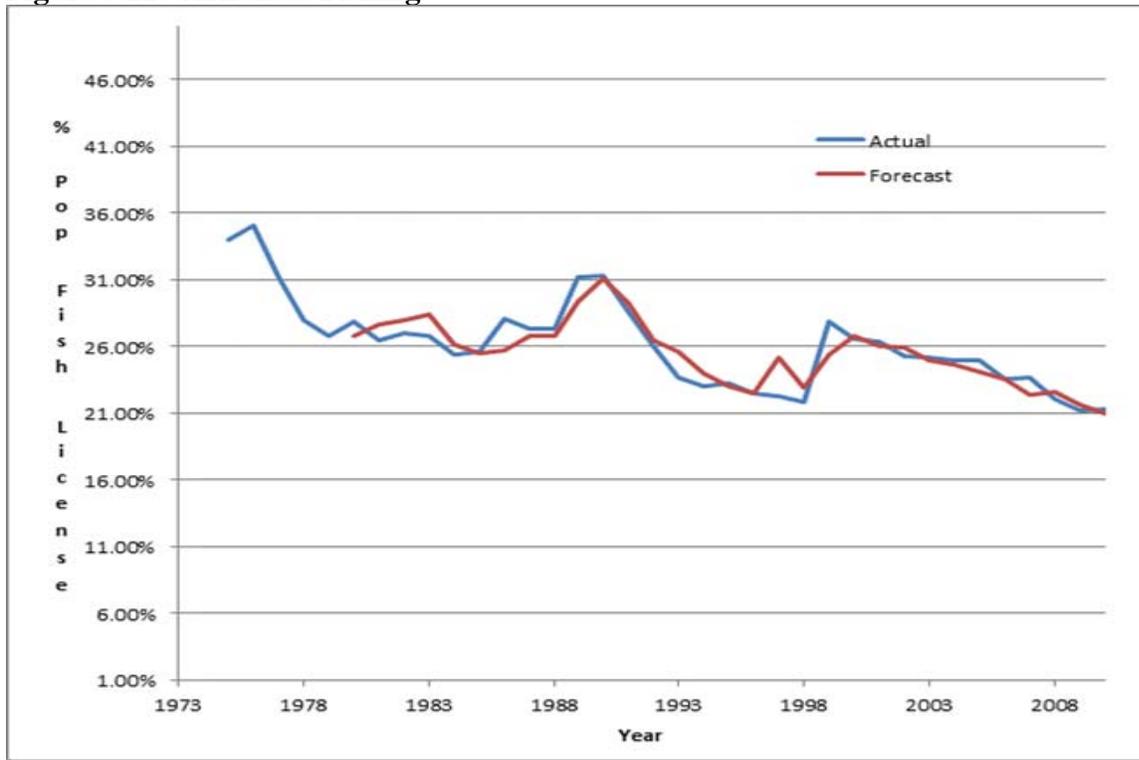
## State-by-State Results for the Southeastern States

**Figure 3.21. Arkansas Hunting**



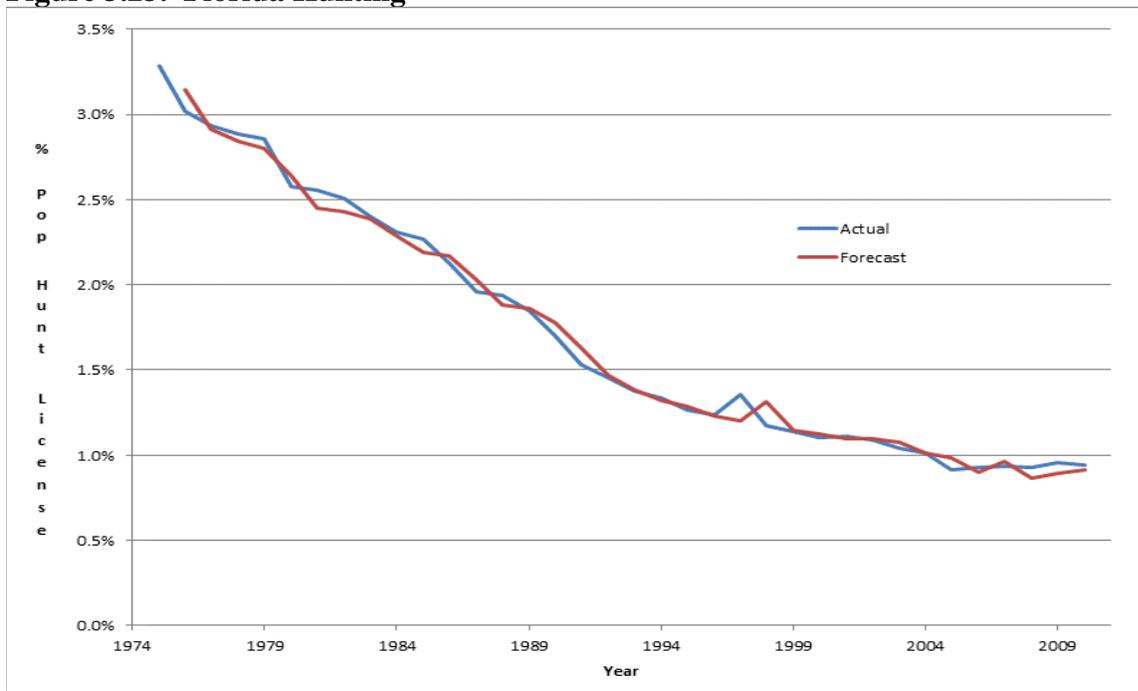
<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.303590	0.255964	1.186066	0.2449
LHUNTERSPOP	0.510179	0.111973	4.556271	0.0001
RHUNTPRICE	-0.196726	0.039472	-4.983967	0.0000
REALGAS	-0.997116	0.537308	-1.855761	0.0733
YEAR	-9.62E-05	0.000125	-0.768259	0.4483
R-squared	0.724642	F-statistic		19.73726
Adjusted R-squared	0.687928	Prob (F-statistic)		0.000000

Figure 3.22. Arkansas Fishing



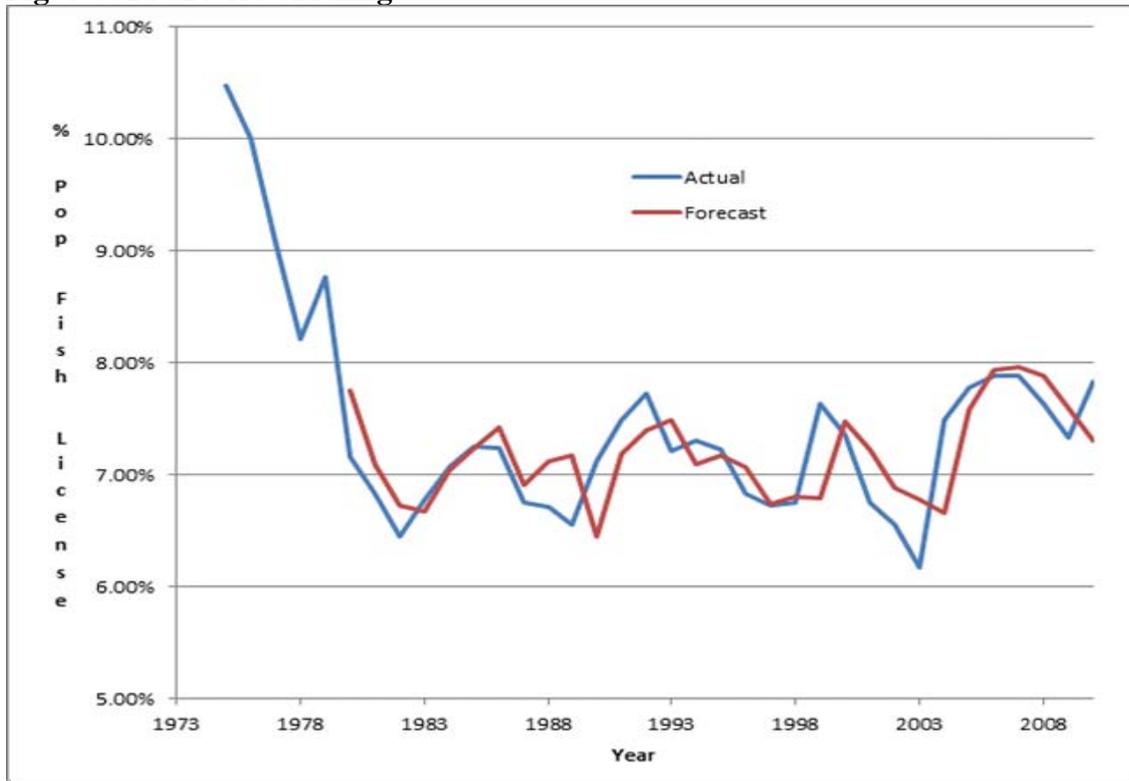
Dependent Variable: ANGLERSPOP				
Included observations: 35 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.683014	1.349636	5.692655	0.0000
LANGLERSPOP	0.376159	0.105532	3.564409	0.0012
RFISHPRICE	-1.798894	0.343216	-5.241288	0.0000
REALGAS	-1.817916	0.878221	-2.069998	0.0472
YEAR	-0.003692	0.000654	-5.647592	0.0000
R-squared	0.858212	F-statistic		45.39580
Adjusted R-squared	0.839307	Prob (F-statistic)		0.000000

**Figure 3.23. Florida Hunting**



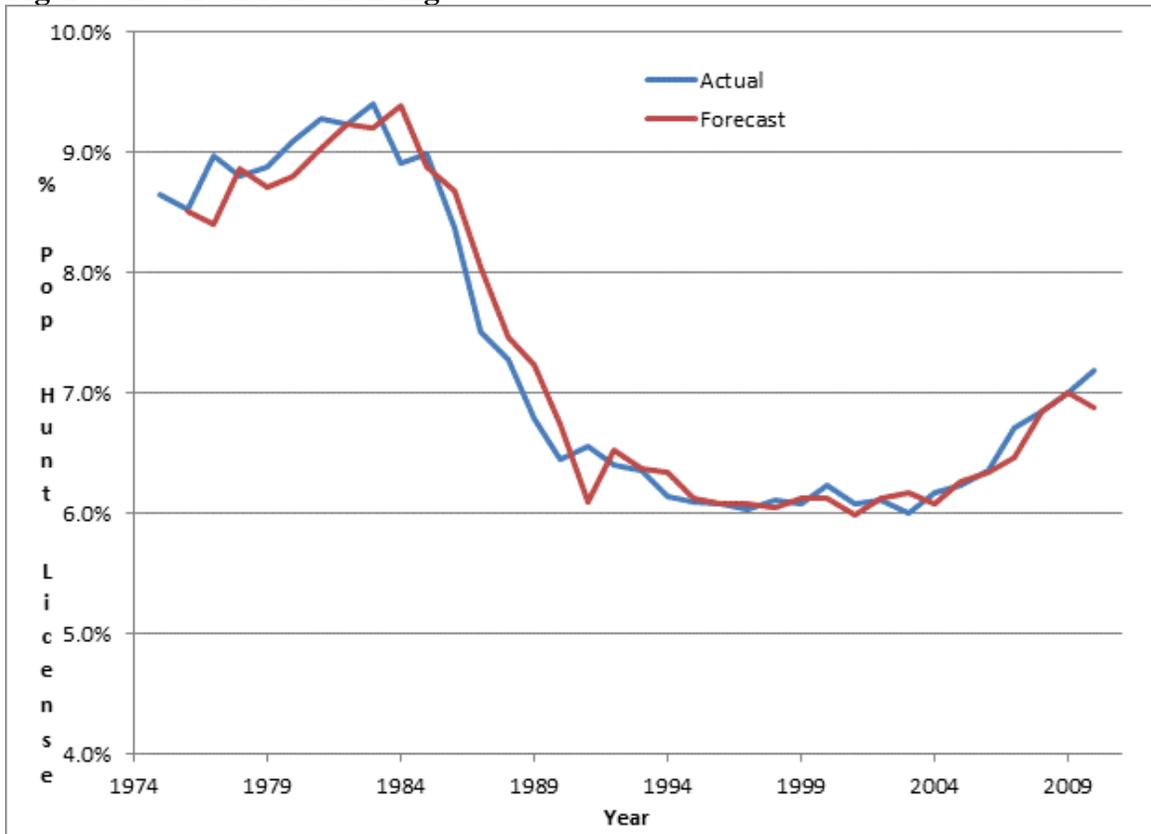
<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 36</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.104085	0.129648	0.802826	0.4284
LHUNTERSPOP	0.860892	0.094246	9.134509	0.0000
LGHUNTPCHNG	-0.000379	0.000576	-0.658608	0.5152
YEAR	-5.05E-05	6.39E-05	-0.790493	0.4354
RHUNTPRICE	-0.010632	0.006671	-1.593926	0.1214
R-squared	0.991748	F-statistic		901.3162
Adjusted R-squared	0.990647	Prob (F-statistic)		0.000000

Figure 3.24. Florida Fishing



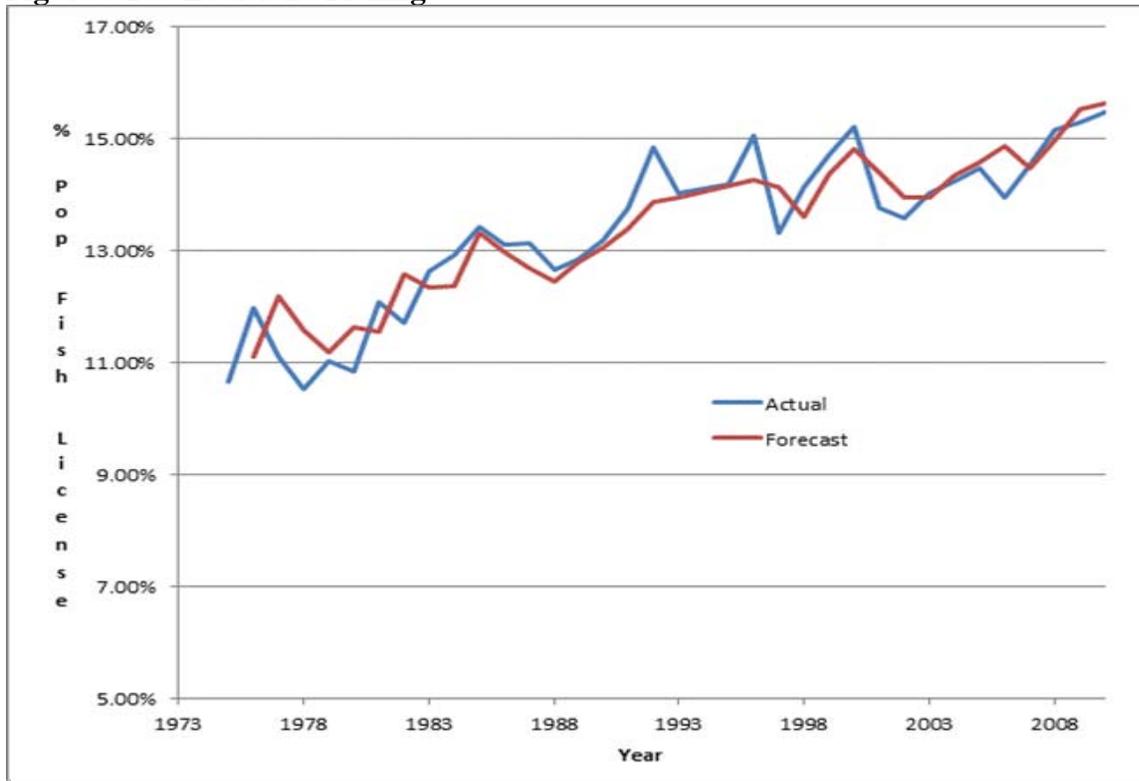
Dependent Variable: ANGLERSPOP				
Included observations: 35 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.450778	0.822617	1.763613	0.0883
LANGLERSPOP	0.701024	0.090606	7.737090	0.0000
LGFISHPCHNG	-0.004960	0.002498	-1.985493	0.0566
RPC_DISPINC	0.000365	0.000196	1.864012	0.0725
RBF	0.000316	0.003145	0.100564	0.9206
YEAR	-0.000742	0.000425	-1.745064	0.0916
R-squared	0.734168	F-statistic		16.01826
Adjusted R-squared	0.688334	Prob (F-statistic)		0.000000

**Figure 3.25. Louisiana Hunting**



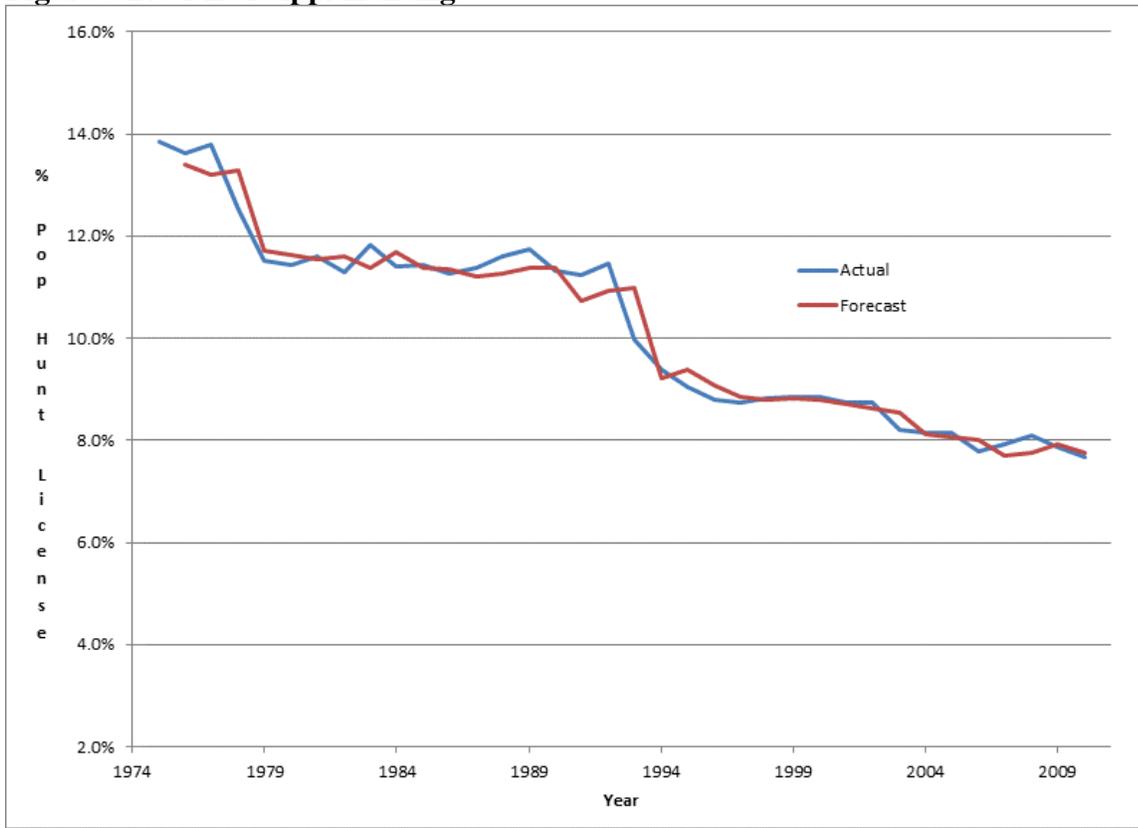
<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	-0.217649	0.151951	-1.432361	0.1620
LHUNTERSPOP	1.034468	0.060032	17.23185	0.0000
LGHUNTPCHNG	-0.002970	0.001241	-2.392917	0.0230
YEAR	0.000108	7.44E-05	1.450084	0.1571
R-squared	0.962809	F-statistic		267.5095
Adjusted R-squared	0.959210	Prob (F-statistic)		0.000000

Figure 3.26. Louisiana Fishing



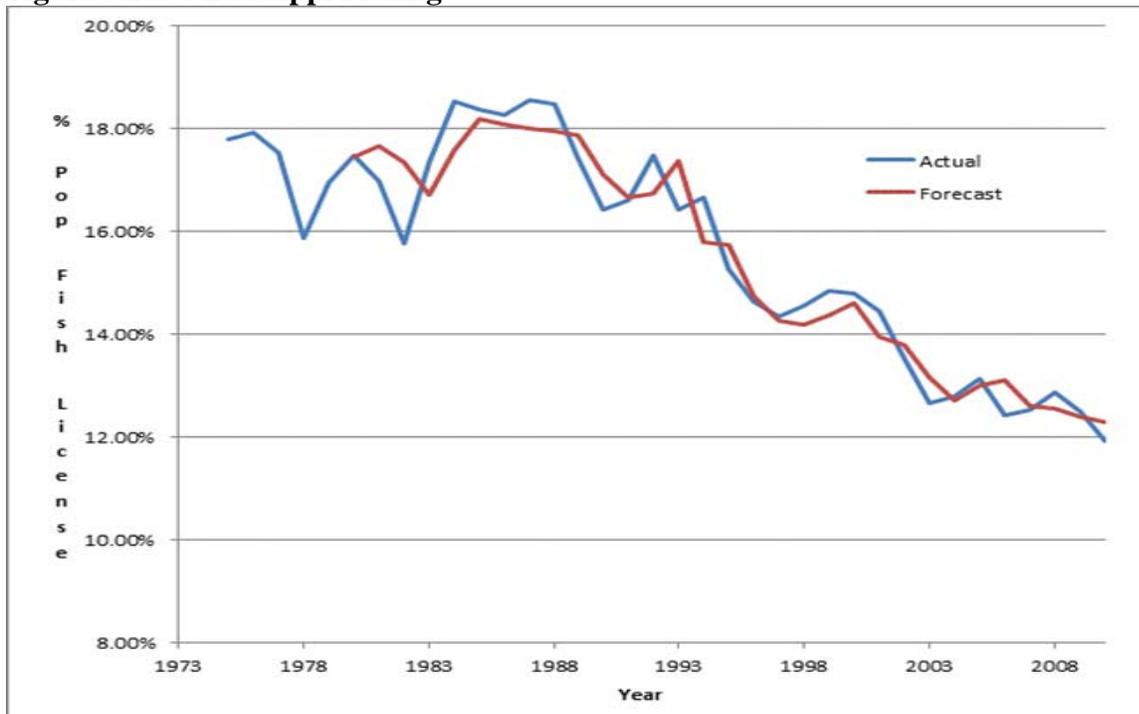
Dependent Variable: ANGLERSPOP				
Included observations: 35 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.661013	0.485509	-1.361482	0.1835
LANGLERSPOP	0.780081	0.188975	4.127948	0.0003
RFISHPRICE	-0.098594	0.079194	-1.244958	0.2228
LGFISHPCHNG	-0.006557	0.003151	-2.081071	0.0461
YEAR	0.000351	0.000254	1.380362	0.1777
R-squared	0.839415	F-statistic		39.20435
Adjusted R-squared	0.818004	Prob (F-statistic)		0.000000

**Figure 3.27. Mississippi Hunting**



<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.806068	0.420156	1.918495	0.0646
LHUNTERSPOP	0.687411	0.109983	6.250128	0.0000
RHUNTPRICE	-0.028408	0.026457	-1.073750	0.2915
YEAR	-0.000387	0.000207	-1.868825	0.0714
LGHUNTCHNG	-0.006364	0.002692	-2.364215	0.0247
R-squared	0.964395	F-statistic	203.1422	
Adjusted R-squared	0.959647	Prob (F-statistic)	0.000000	

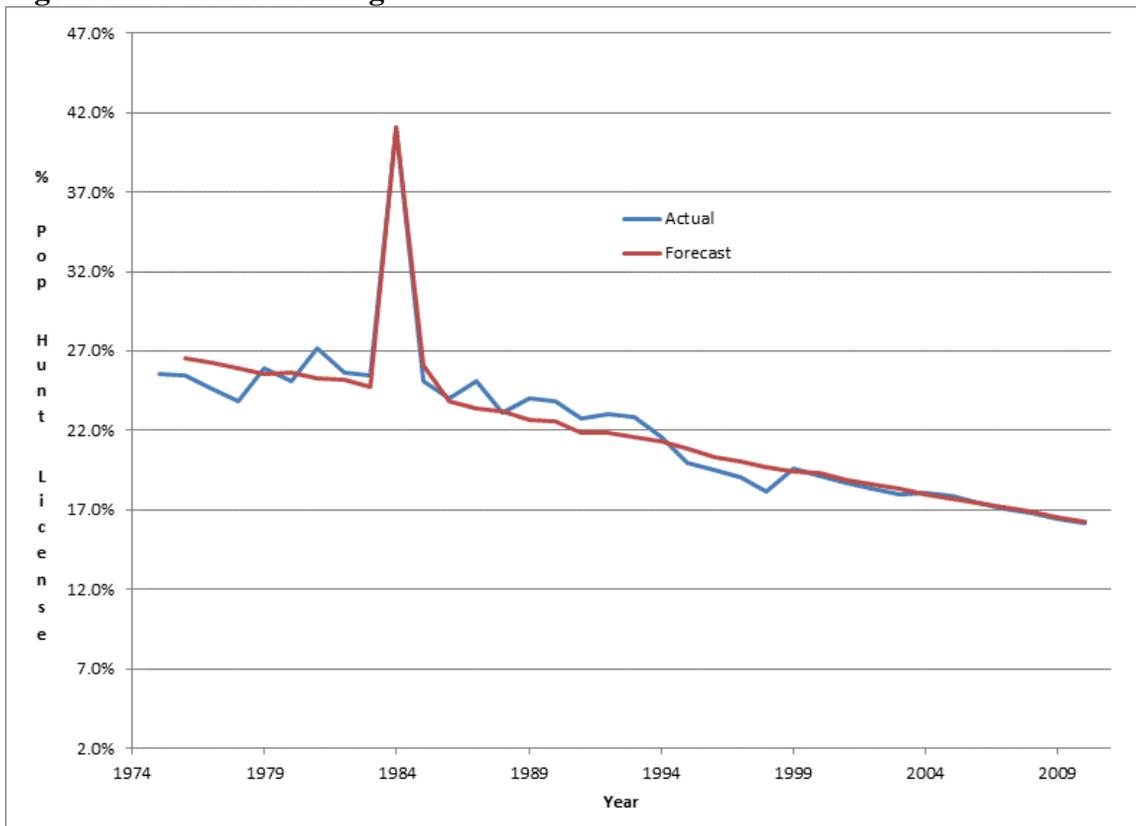
Figure 3.28. Mississippi Fishing



Dependent Variable: ANGLERSPOP				
Included observations: 31 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.590225	1.156266	1.375310	0.1812
LANGLERSPOP	0.460653	0.157235	2.929702	0.0071
RBF	0.002863	0.004439	0.645007	0.5248
RFISHPRICE	-0.534671	0.264209	-2.023666	0.0538
YEAR	-0.000763	0.000554	-1.376374	0.1809
YOUNGPOPCT	0.743997	0.885661	0.840047	0.4088
R-squared	0.931690	F-statistic		68.19596
Adjusted R-squared	0.918028	Prob (F-statistic)		0.000000

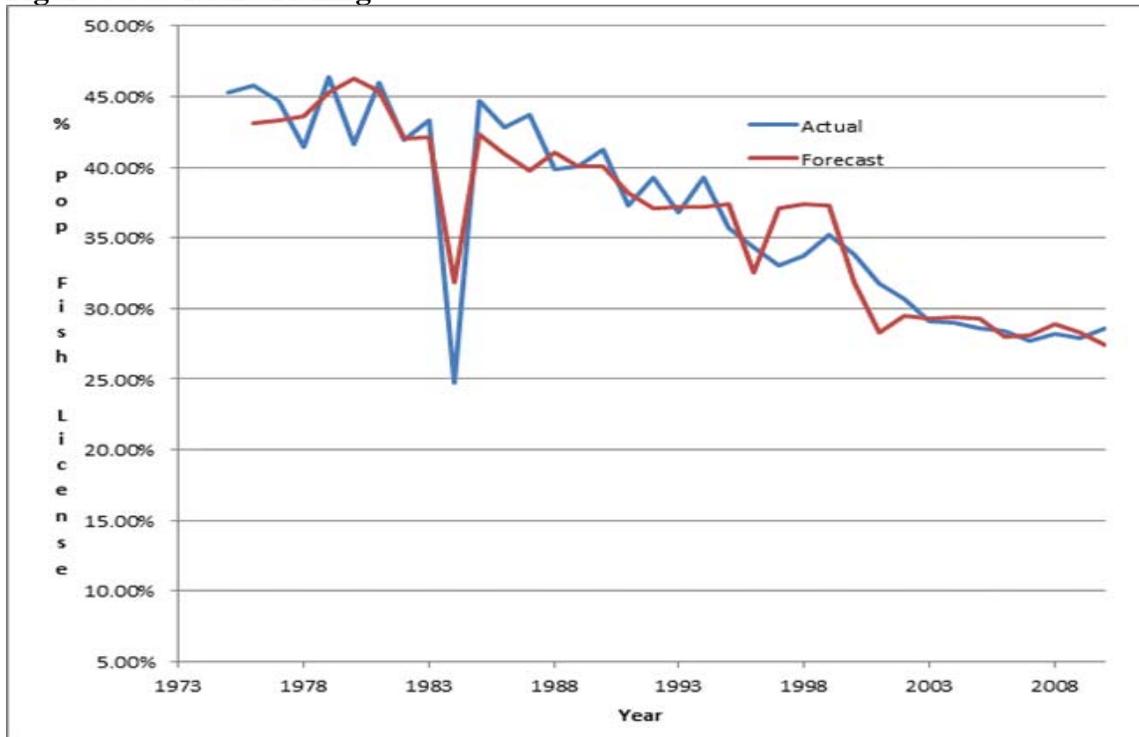
### State-by-State Results for the Western States

**Figure 3.29. Idaho Hunting**



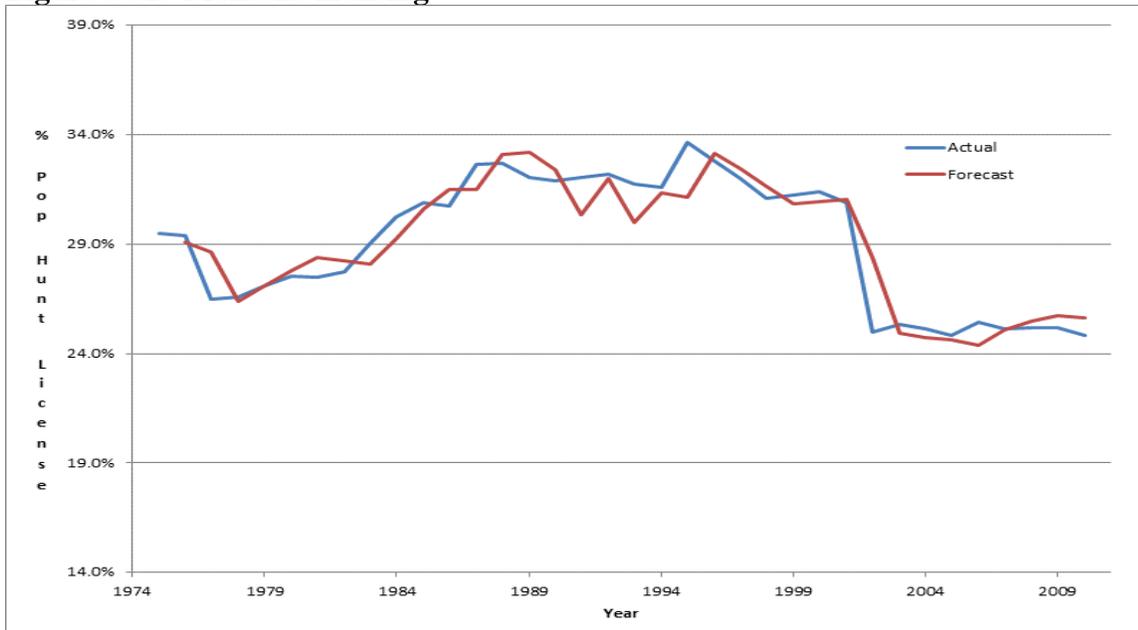
<b>Dependent Variable: HUNTERSPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	5.427777	0.634824	8.550052	0.0000
LHUNTERSPOP	0.127064	0.056247	2.259046	0.0313
RHUNTPRICE	-0.013634	0.028317	-0.481462	0.6337
YEAR	-0.002627	0.000318	-8.265958	0.0000
BIGPRICEDROP	0.164602	0.010936	15.05116	0.0000
R-squared	0.961623	F-statistic	187.9317	
Adjusted R-squared	0.956507	Prob (F-statistic)	0.000000	

Figure 3.30. Idaho Fishing



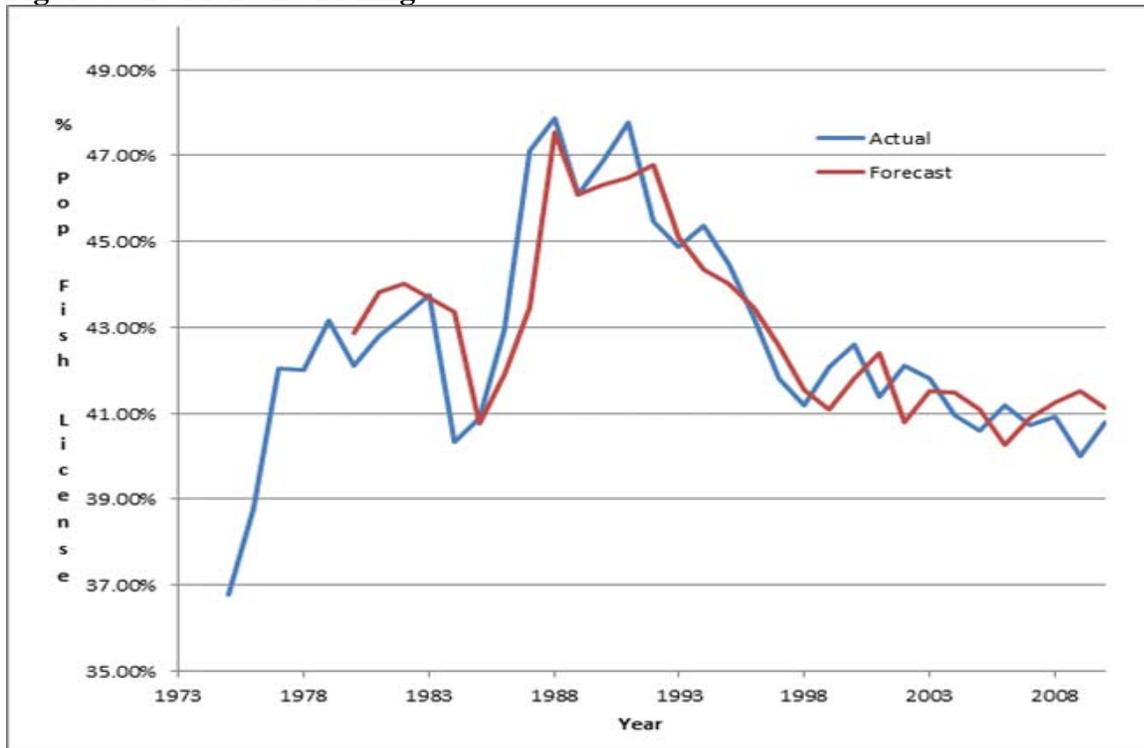
<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	8.938077	1.063811	8.401942	0.0000
RFISHPRICE	-1.585286	0.335678	-4.722639	0.0001
RBF	0.001025	0.017447	0.058748	0.9535
YEAR	-0.004221	0.000542	-7.794178	0.0000
LGFIHPCHNG	-0.012556	0.013486	-0.931040	0.3593
R-squared	0.869605	F-statistic		50.01771
Adjusted R-squared	0.852219	Prob (F-statistic)		0.000000

**Figure 3.31. Montana Hunting**



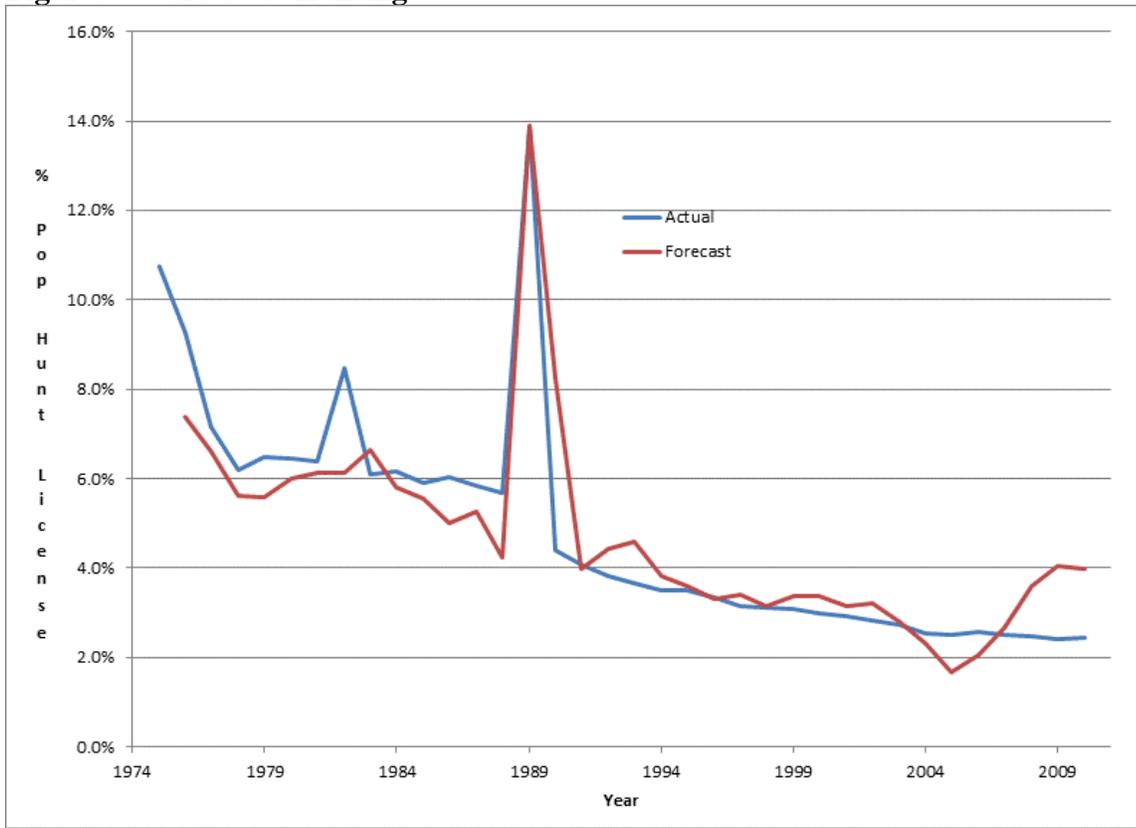
<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.478565	0.405120	1.181292	0.2468
LHUNTERSPOP	0.880036	0.081422	10.80832	0.0000
LGHUNTPCHNG	-0.017914	0.007231	-2.477591	0.0191
YEAR	-0.000217	0.000199	-1.088668	0.2850
BUILDUNITS	-3.82E-06	1.73E-06	-2.208747	0.0350
R-squared	0.873732	F-statistic		51.89770
Adjusted R-squared	0.856897	Prob (F-statistic)		0.000000

Figure 3.32. Montana Fishing



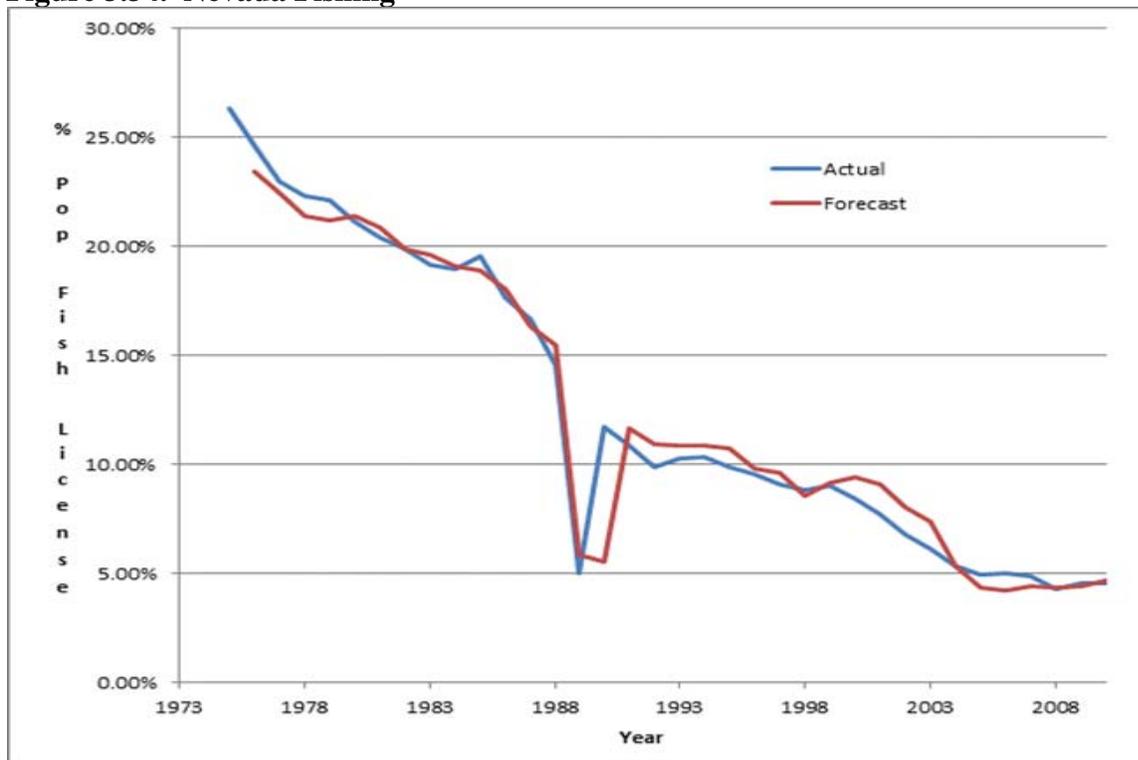
Dependent Variable: ANGLERSPOP				
Included observations: 31 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.714835	0.981605	2.765711	0.0105
LANGLERSPOP	0.613500	0.152272	4.028975	0.0005
RFISHPRICE	-0.487317	0.278175	-1.751836	0.0921
LGFISHPCHNG	-0.010896	0.014553	-0.748723	0.4610
YOUNGPOPCT	-1.463732	0.737692	-1.984204	0.0583
YEAR	-0.001199	0.000445	-2.693171	0.0125
R-squared	0.757153	F-statistic		15.58908
Adjusted R-squared	0.708583	Prob (F-statistic)		0.000001

**Figure 3.33. Nevada Hunting**



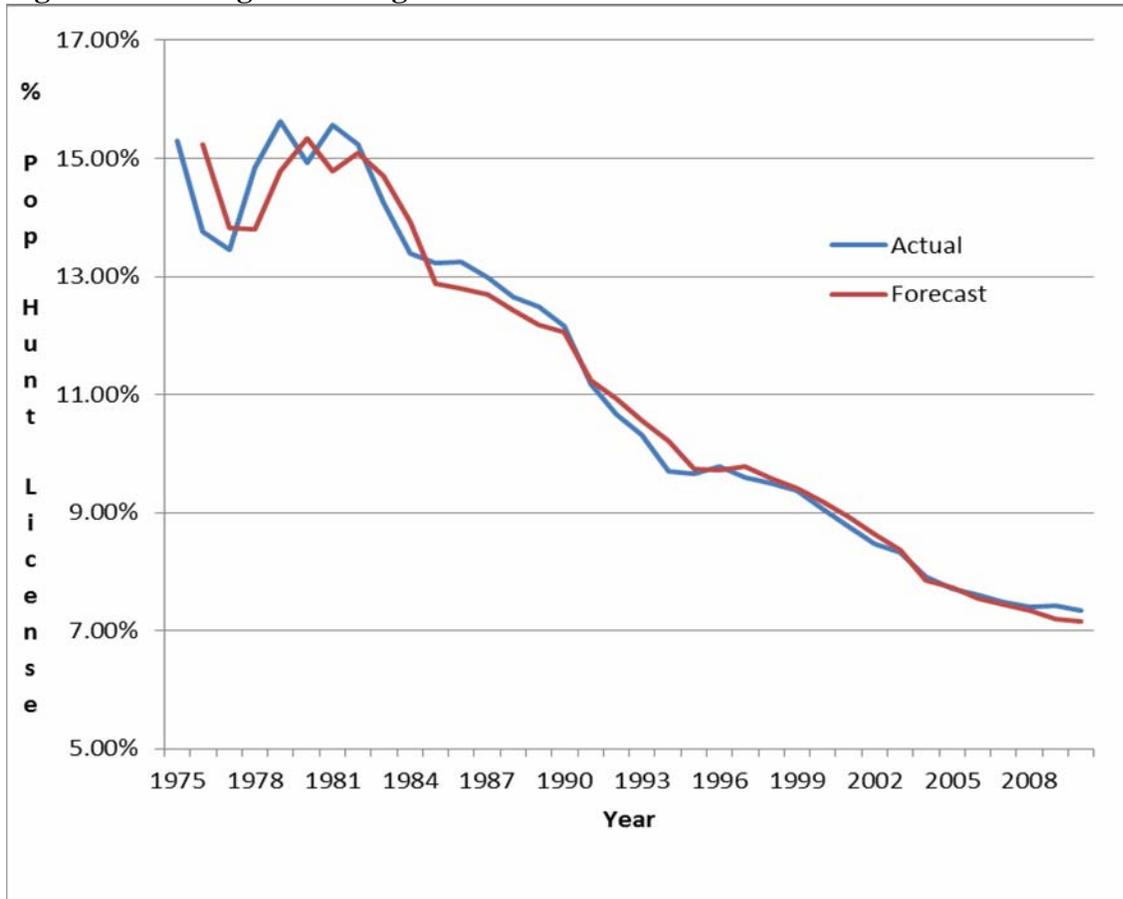
<b>Dependent Variable: HUNTPOP</b>				
<b>Included observations: 35 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.045397	0.010516	4.316830	0.0002
LHUNTERSPOP	0.431261	0.082250	5.243304	0.0000
RHUNTPRICE	-0.034532	0.023875	-1.446336	0.1585
BUILDUNITS	-4.57E-07	1.89E-07	-2.422716	0.0217
BIGHUNTPDROP	0.086814	0.012431	6.983770	0.0000
R-squared	0.814949	F-statistic		33.02945
Adjusted R-squared	0.790276	Prob (F-statistic)		0.000000

Figure 3.34. Nevada Fishing



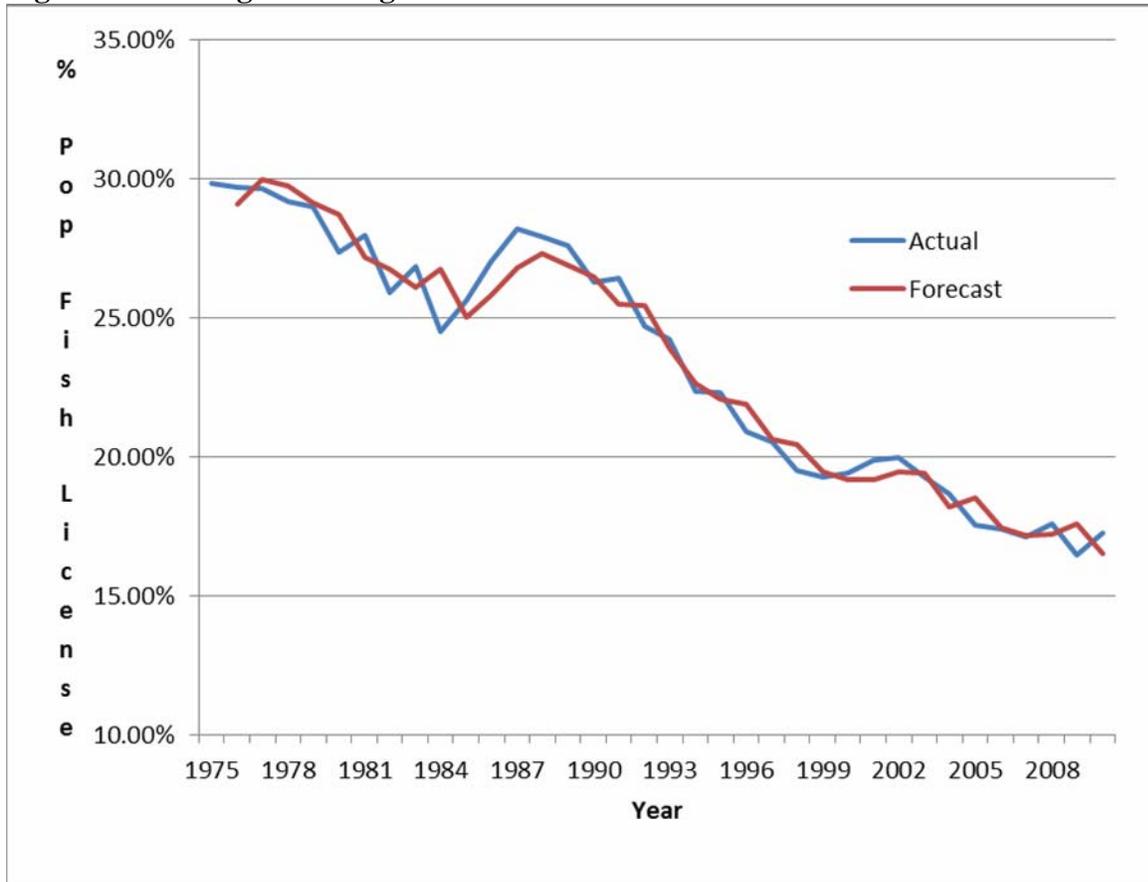
Dependent Variable: ANGLERSPOP				
Included observations: 35 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.054971	0.011021	4.987654	0.0000
LANGLERSPOP	0.877243	0.038669	22.68571	0.0000
RBF	0.004709	0.008939	0.526824	0.6022
RFISHPRICE	-0.369595	0.071440	-5.173482	0.0000
LGFISHPCHNG	-0.000356	0.009282	-0.038339	0.9697
R-squared	0.963018	F-statistic		195.2990
Adjusted R-squared	0.958087	Prob (F-statistic)		0.000000

**Figure 3.35. Oregon Hunting**



<b>Dependent Variable: HUNTERSPOP</b>				
<b>Included observations: 34 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	2.6279	1.1992	2.1915	0.0366
YEAR	-0.0013	0.0006	-2.1393	0.0410
RHUNTPRICE	-0.0001	0.0002	-0.6222	0.5387
LGHUNTPCHNG	-0.0020	0.0031	-0.6304	0.5334
LHUNTERSPOP	0.7031	0.1454	4.8368	0.0000
R-squared	0.9745	F-statistic		221.963
Adjusted R-squared	0.9701	Prob (F-statistic)		0.00000

**Figure 3.36. Oregon Fishing**



<b>Dependent Variable: ANGLERSPOP</b>				
<b>Included observations: 34 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	1.9200	1.1460	1.6754	0.1046
YEAR	-0.0010	0.0006	-1.7142	0.0972
RFISHPRICE	0.0007	0.0007	1.0049	0.3233
LGFISHPCHNG	-0.0106	0.0050	-2.1218	0.0425
LANGLERSPOP	0.8180	0.1416	5.7752	0.0000
R-squared	0.9669	F-statistic		169.651
Adjusted R-squared	0.9612	Prob (F-statistic)		0.00000

## CHAPTER 4. HUNTER / ANGLER SURVEY RESULTS

This chapter presents the results of surveys of hunters and anglers in some states that saw increases in the number of resident hunters or the number of resident anglers between the 2006 *National Survey* and the 2011 *National Survey*. The states were ranked by the greatest percentage increase in the number of resident license holders in the state reported by the two *National Surveys*; for both hunting and fishing, 7 of the top 12 states were chosen for the survey (Table 4.1).

**Table 4.1. States That Had Greater Numbers of Hunters or Anglers in 2011 Than in 2006 in the *National Surveys***

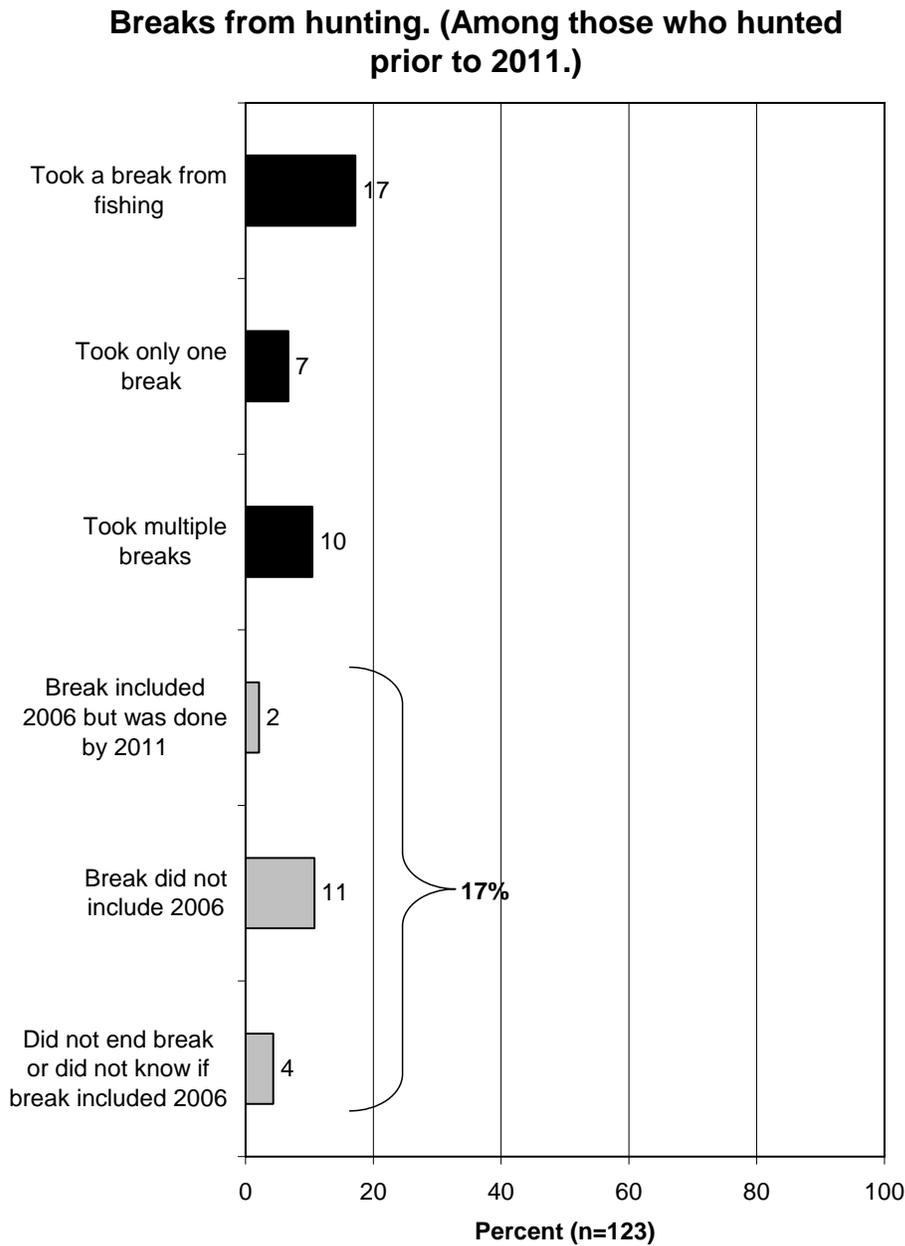
Hunting			Fishing		
State	Number of Resident Hunters in 2006 <i>National Survey</i> (in thousands)	Number of Resident Hunters in 2011 <i>National Survey</i> (in thousands)	State	Number of Resident Anglers in 2006 <i>National Survey</i> (in thousands)	Number of Resident Anglers in 2011 <i>National Survey</i> (in thousands)
Alabama	310	492	Alaska	137	211
Alaska	53	104	Idaho	206	238
Idaho	122	162	New York	932	1,585
Indiana	237	377	North Carolina	868	1,196
Mississippi	238	436	South Dakota	89	156
New York	491	739	Vermont	64	95
South Dakota	89	127	Washington	641	835

To be eligible for the survey, hunters and anglers must have been active—they must have done the activity at some time in the past 5 years (although hereinafter they are referred to simply as hunters and anglers). The analysis explores several issues: what is the percent of hunters and anglers who did not hunt or fish in 2006 but did so in 2011 (the dates of the *National Surveys* of interest to the study); what is the percent of hunters and anglers who took any breaks from the activities, regardless of whether that break included 2006; what is the percent of hunters and anglers who are new to the activities; what are the typical factors that led hunters and anglers to take a break; and what are the typical factors that prompted hunters and anglers to start back up in the activities.

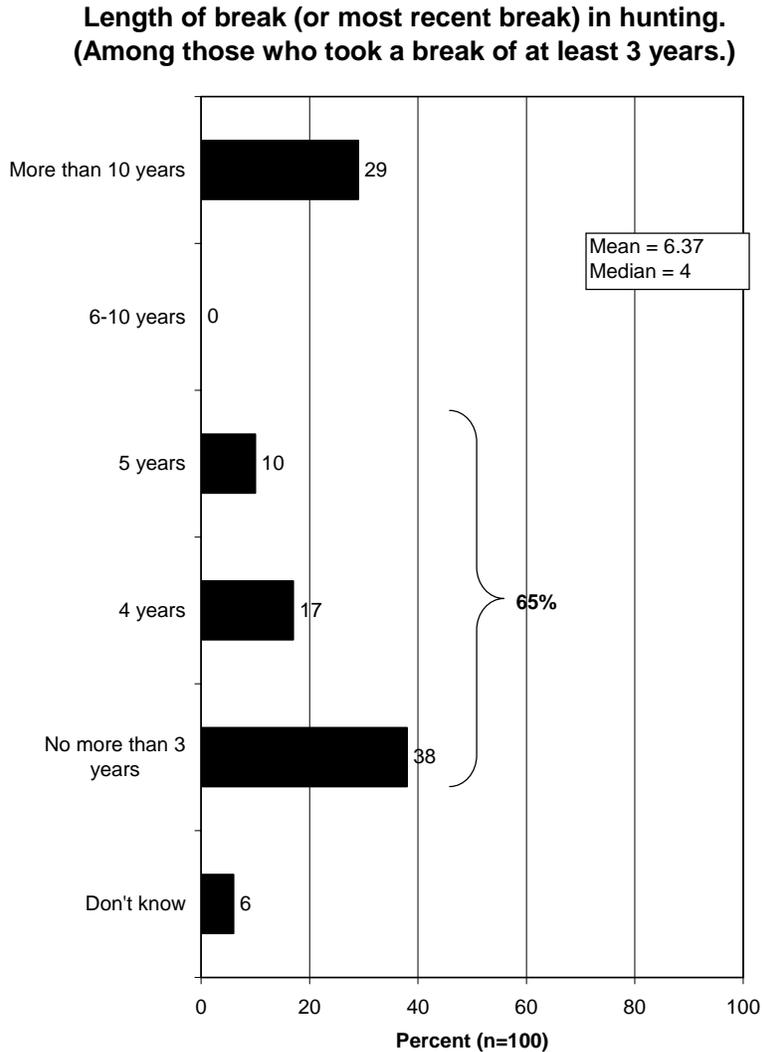
### HUNTERS WHO TOOK BREAKS FROM HUNTING

Just less than a fifth of hunters who are not new to hunting (17%) indicated that they had taken a break of at least 3 years from hunting at some time since they had first hunted (Figure 4.1). This includes 2% who specifically were on a break from hunting in 2006 but had come back to hunting by 2011.

**Figure 4.1. Percent of Hunters Who Took a Break From Hunting**



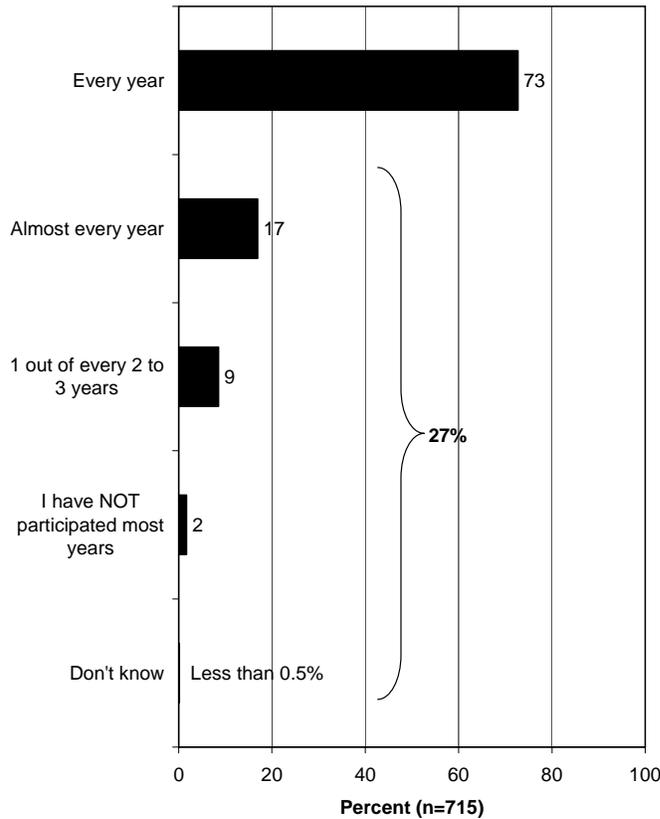
The survey examined the length of the break from hunting that the hunter had taken (of those who took more than one break, the survey asked about the most recent break). The majority of hunters who took a break from hunting at some time indicated that their break lasted no more than 5 years (Figure 4.2). Nonetheless, 29% of those who took a break said that the break lasted for more than 10 years.

**Figure 4.2. Length of Hunting Breaks**

A final word about taking breaks from hunting pertains to the “churn” rate—loosely defined as the amount of the hunting community that does not hunt every year. In other words, the pool of hunters is larger than the number of hunters who go in any given year, as some hunters do not hunt every year. Some of this churn rate consists of hunters who are taking breaks of less than 3 years, and they would not be included in the new/returning hunters group. Among hunters who had hunted at least once in the past 5 years (i.e., all hunters in the survey, because a condition of taking the survey was that the hunter had to have hunted at least once in the past 5 years), 73% indicate that they typically hunt every year; this means that the converse of this is that 27% do not hunt every year, or put simply, the churn rate is 27% (Figure 4.3).

**Figure 4.3. Churn Rate in Hunting**

**Q16. Which of the following best describes how often you have hunted in [STATE] since you first started hunting in [STATE] in [FIRST YEAR HUNTED IN STATE]? (Asked of those who hunted prior to 2011.)**



**NEW HUNTERS**

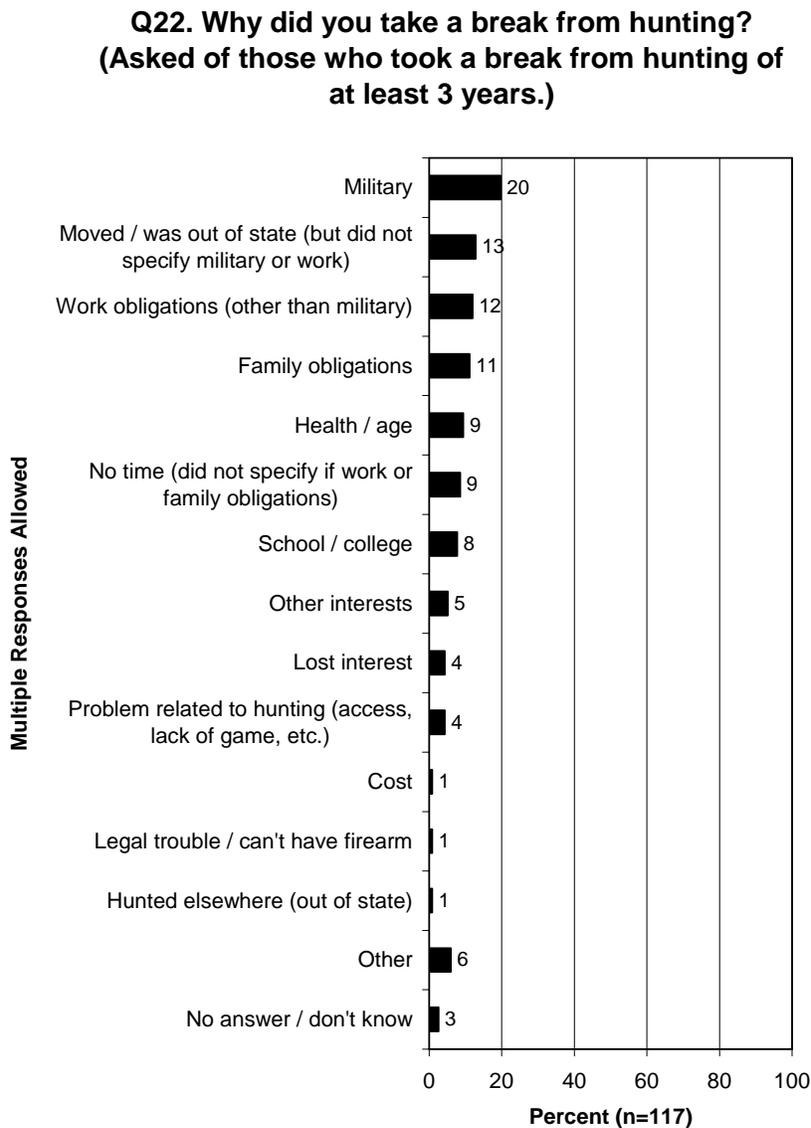
In addition to the 2% of hunters who took a break from hunting that included 2006 but was ended by 2011, the survey found that 1% of hunters are completely new to hunting (started 2011 or later) and therefore would not have been included in the 2006 *National Survey* number but would be included in the 2011 number. In total, then, 3% of hunters would have contributed to the greater number seen in the *National Survey* in 2011 compared to the 2006 *National Survey*.

**REASONS FOR TAKING BREAKS FROM HUNTING**

The survey explored reasons that hunters may have taken breaks from hunting, and most of them have little to do with the hunting itself but are social reasons (Figure 4.4). The top reasons for taking breaks from hunting include military obligations (20% of those who took a break), moving out of state, excluding military moves (13%), work obligations not including military (12%), family obligations (11%), health/age (9%), no time/other unspecified time obligations

(9%), and school/college obligations (8%). Conversely, the factors that pertain to hunting itself over which the hunting industry has influence have relatively low percentages naming them. These latter factors include: other interests (5%), a loss of interest in hunting (4%), other problems related to hunting such as access problems (4%), cost (1%), and legal trouble/being disallowed from possessing a firearm (1%).

**Figure 4.4. Reasons for Taking Breaks From Hunting**



A crosstabulation shows the reasons for taking a hunting break among those whose break included 2006 (Figure 4.5). The top reasons are family obligations (20% of these respondents) and health/age (20%). Be aware of the small number of people who got the question because it is a subset of a subset (only those who took a break were asked, and this includes only those whose break included 2006).

**Figure 4.5. Reasons for Taking Breaks From Hunting Among Those Whose Break Included 2006**



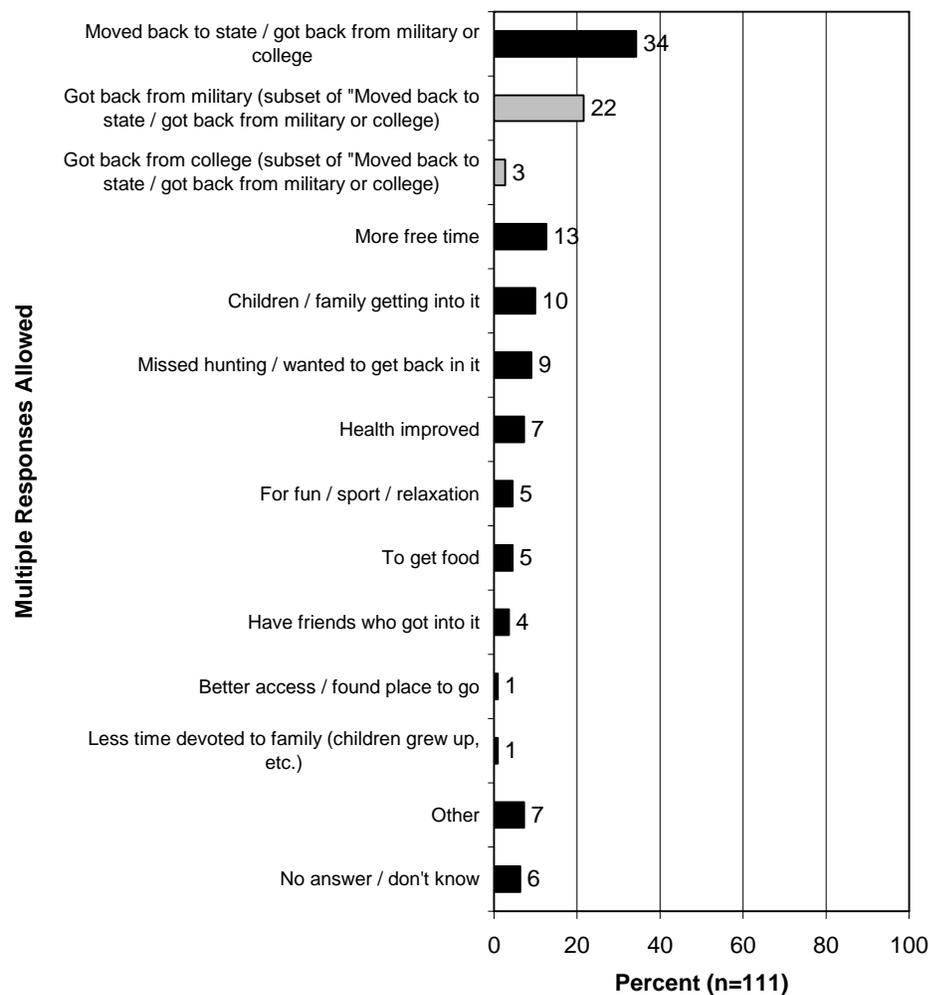
**FACTORS RELATED TO DECISIONS TO GO HUNTING**

Along with reasons that hunters had not hunted in some years, the survey explored factors that contribute to a hunter’s decision to go hunting. The first question to examine is the follow-up question about reasons for ending a break among those who had said that they had taken a break. The top reason that hunters ended that break and started hunting again is that they moved back to the state (34% of those who ended a break), including the subsets of those hunters who were finished with either military deployment (22%) or who finished college (3%) (Figure 4.6). Other

important reasons for ending that break from hunting include having more free time (13%), that they have family members who hunt, such as having children who are now old enough to hunt (10%), that they simply missed hunting/wanted to get back into it (9%), and that their health improved (7%).

**Figure 4.6. Reasons for Ending Breaks From Hunting**

**Q23. Why did you end the break and go hunting again? (Asked of those who took a break from hunting of at least 3 years and have ended that break.)**

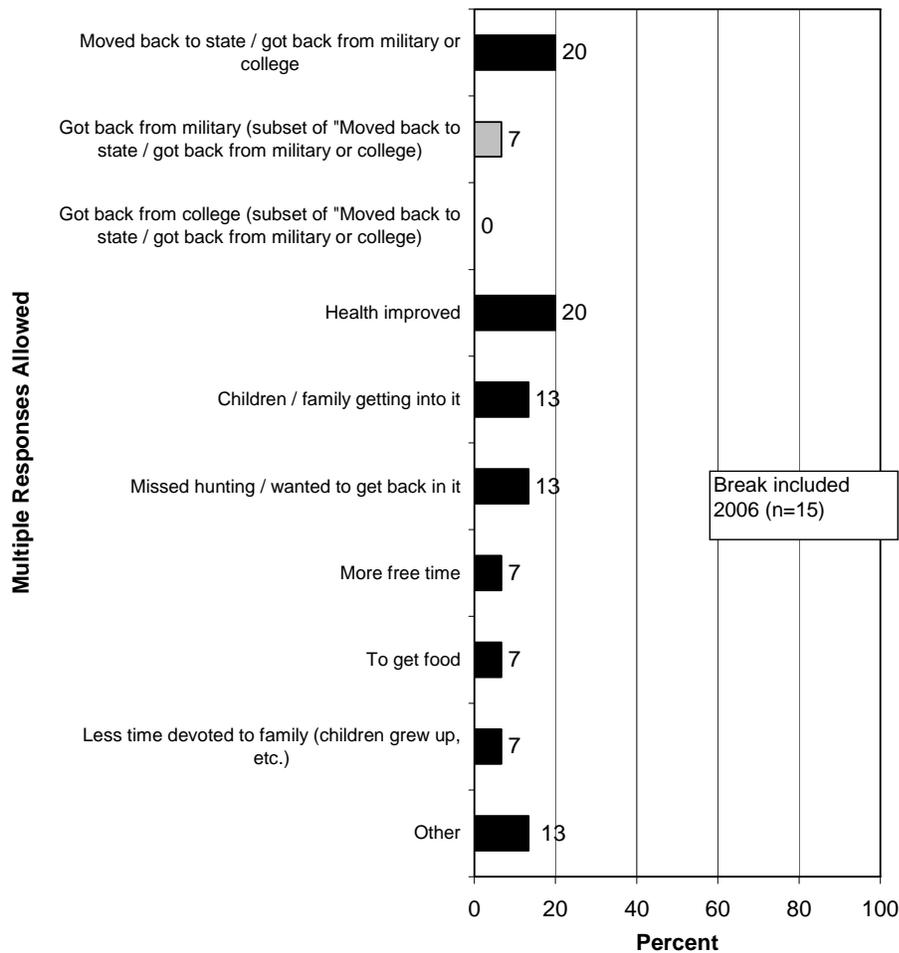


A crosstabulation explores this same question among the hunters whose break included 2006 (Figure 4.7). The top reasons are moving back to the state (20% of these respondents), which includes 7% who moved back from military duty, as well as improved health (also 20%). Note

that few people are included on the graph in Figure 4.7 because it is a subset of a subset (only those who took a break were asked, and this includes only those whose break included 2006).

**Figure 4.7. Reasons for Ending Breaks From Hunting Among Those Whose Break Included 2006**

**Q23. Why did you end the break and go hunting again? (Asked of those who took a break from hunting of at least 3 years and have ended that break.)**

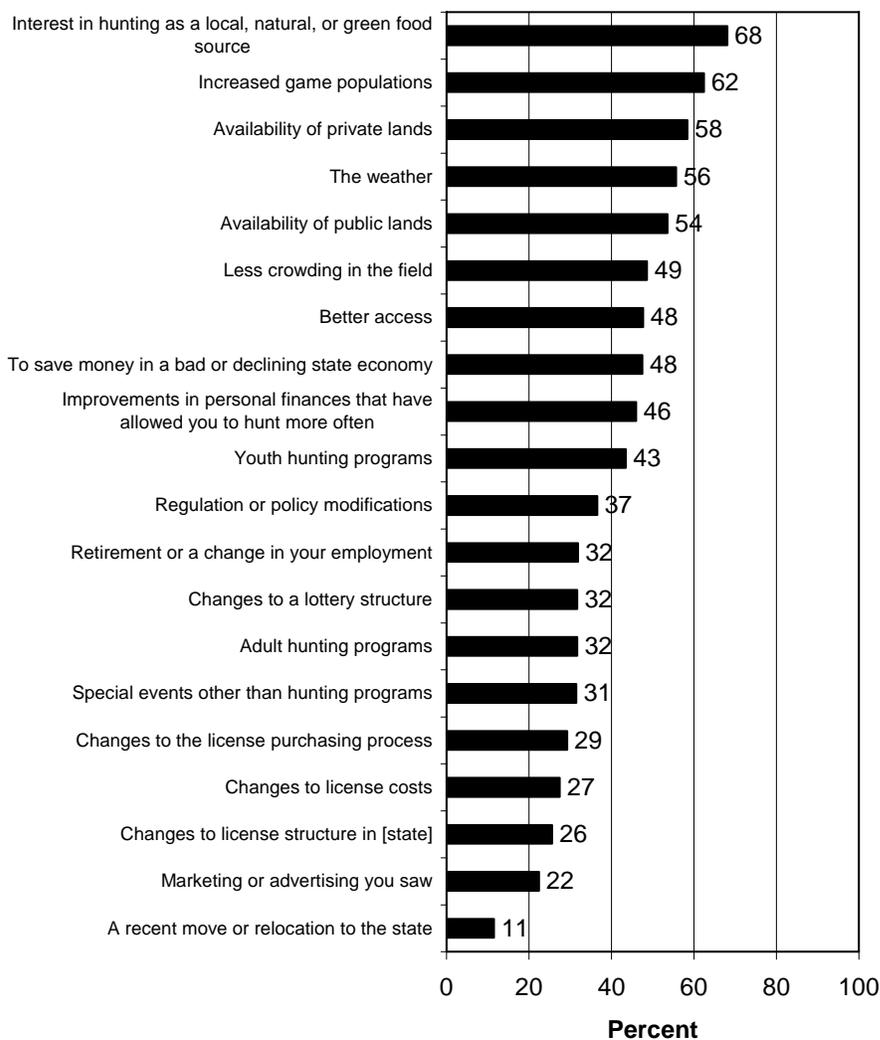


The survey also examined factors involved in hunters’ decisions to go hunting. In this line of questioning, the survey had a list of 20 possible factors that may have affected decisions to go hunting. Hunters were asked to indicate if each influence was a major influence, a minor influence, or not an influence in their decision to go hunting (Figures 4.8 and 4.9). The top influence was interest in hunting as a natural or “green” food source—with 68% saying it was a major or minor influence. This was followed by a perception of increased game populations

(62%), availability of private lands (58%), the weather (56%), and availability of public lands (54%). Obviously, the weather is beyond the influence of the hunting industry and hunting agencies; however, the other items could be either directly (e.g., regulatory changes) or indirectly (e.g., advertising) influenced by the hunting industry and agencies. One graph shows the percent who said the factor was a *major* or *minor* influence (Figure 4.8); another graph includes only the percent who said it was a *major* influence (Figure 4.9).

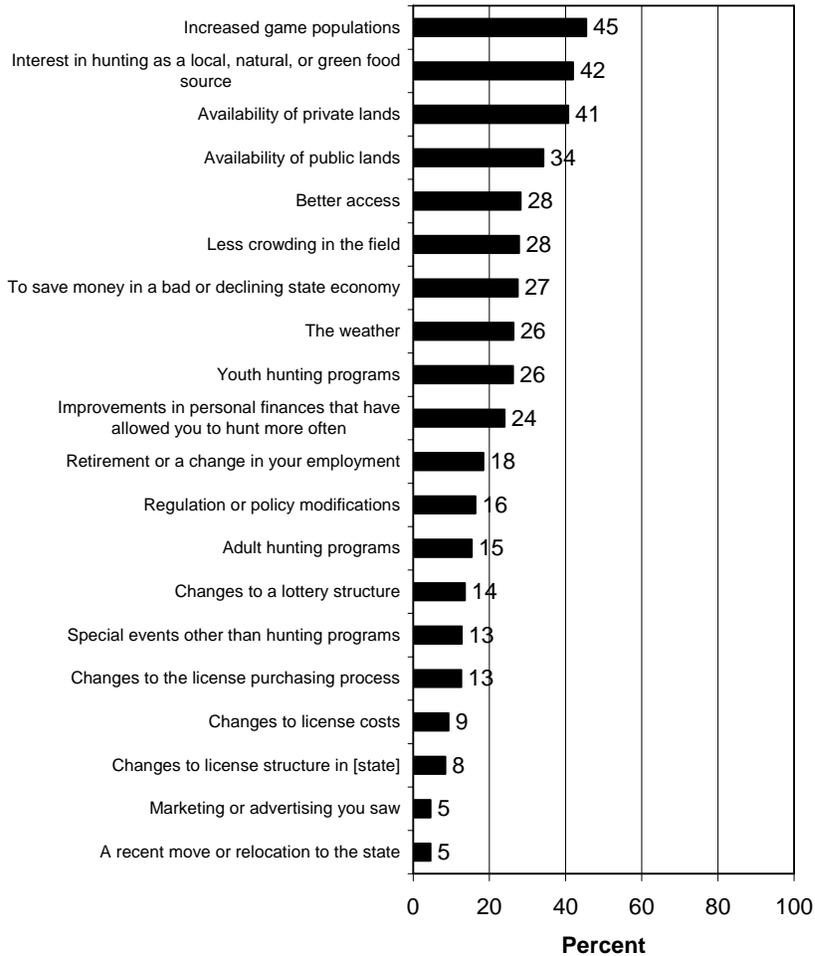
**Figure 4.8. Factors That Were a Major or Minor Influence in Decisions to Go Hunting**

**Q37-56. Percent of respondents who indicated that each of the following was a major or a minor influence on their decision to go hunting, in the years that they went hunting:**

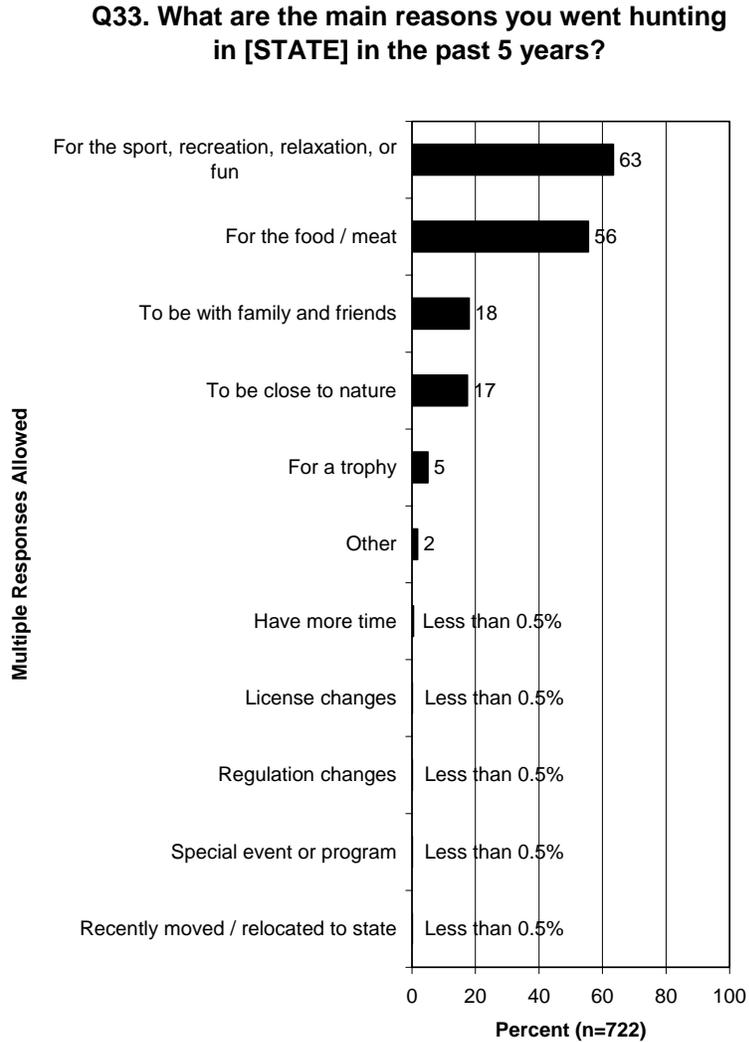


**Figure 4.9. Factors That Were a Major Influence in Decisions to Go Hunting**

**Q37-56. Percent of respondents who indicated that each of the following was a major influence on their decision to go hunting, in the years that they went hunting:**



The survey examined another aspect of hunting that is of interest in this section of the report. The survey asked hunters to indicate in an open-ended question (open-ended means that no answer set was read to respondents; instead, they could say anything that came to mind) the main reasons that they went hunting, which may help explain the recent apparent increase in hunting participation. While the top reason is for the sport/recreation/relaxation/fun (63% gave a reason related to this), the second category of responses relates to hunting for food (56%), the top two reasons by far (Figure 4.10). It may be that the recent downturn in the economy that started in 2008 and is continuing to some extent (although not as severe as it was) prompted some hunters to supplement their food budget by hunting for food.

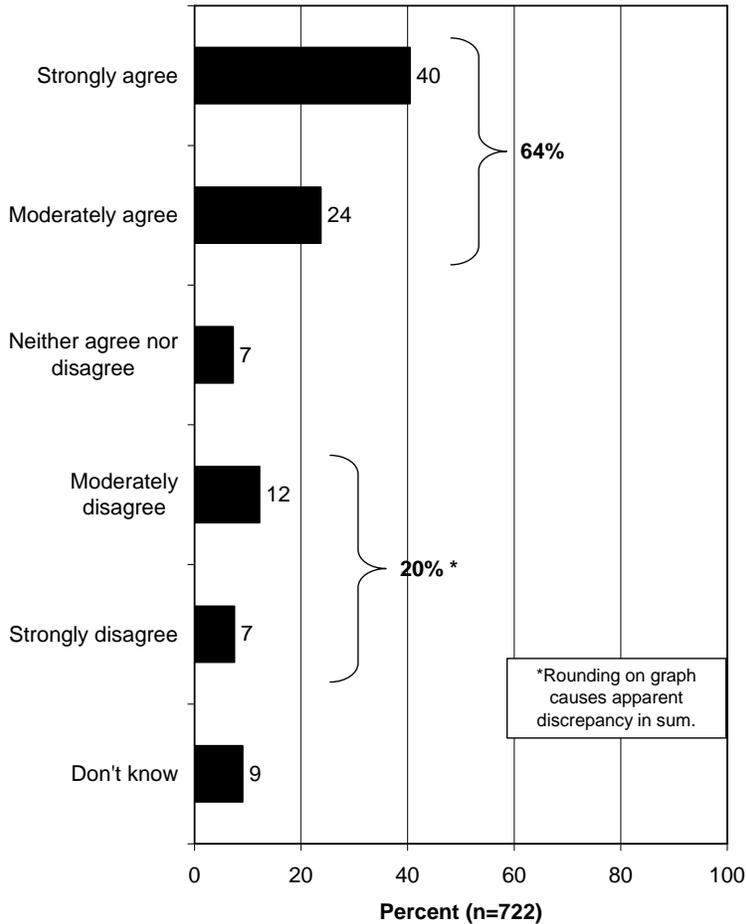
**Figure 4.10. Main Reasons for Going Hunting in the Past 5 Years**

### REALITY CHECK REGARDING INCREASES IN HUNTING PARTICIPATION

While the following results are not exactly scientific, they qualitatively analyze the recent increase in hunting. The survey asked hunters whether, based on their knowledge, they would agree or disagree that hunting in general had increased in their state in the past 5 years. One would expect more agreement than disagreement based on previous findings in this project that hunting numbers had increased in the states in which the survey was administered. Indeed, there is more agreement (64%) than disagreement (20%) that hunting has increased in their state, supporting the conjecture that hunting has actually increased in the state (Figure 4.11).

**Figure 4.11. Agreement or Disagreement That Hunting Has Increased in the State**

**Q62. Based on your knowledge of and experiences hunting, do you agree or disagree that hunting in [STATE] in general has increased in the past 5 years or that there are more hunters in [STATE]?**



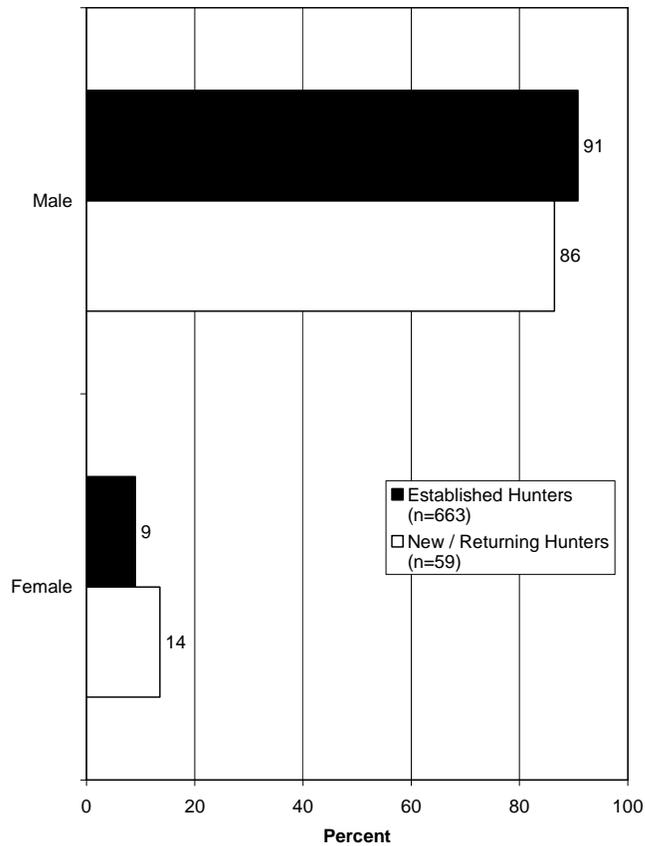
**CHARACTERISTICS OF ESTABLISHED HUNTERS VERSUS NEW / RETURNING HUNTERS**

One aspect of the analysis was to categorize all hunters in the survey as either established hunters (those who first hunted in 2006 or earlier and did not take a break that included 2006) or new/returning hunters (those who first hunted in 2007 or later as well as those who first hunted in 2006 or earlier but who took a break from hunting that included 2006). It is this latter group that may have contributed to the difference in hunter numbers in the 2006 and 2011 *National Surveys*. By crosstabulating these groups by demographic and other questions, the analysis reveals a little about this latter group.

A most basic demographic characteristic is gender, but there is only a small difference in the groups based on gender: Among established hunters, 9% are female; among new/returning hunters, 14% are female (Figure 4.12).

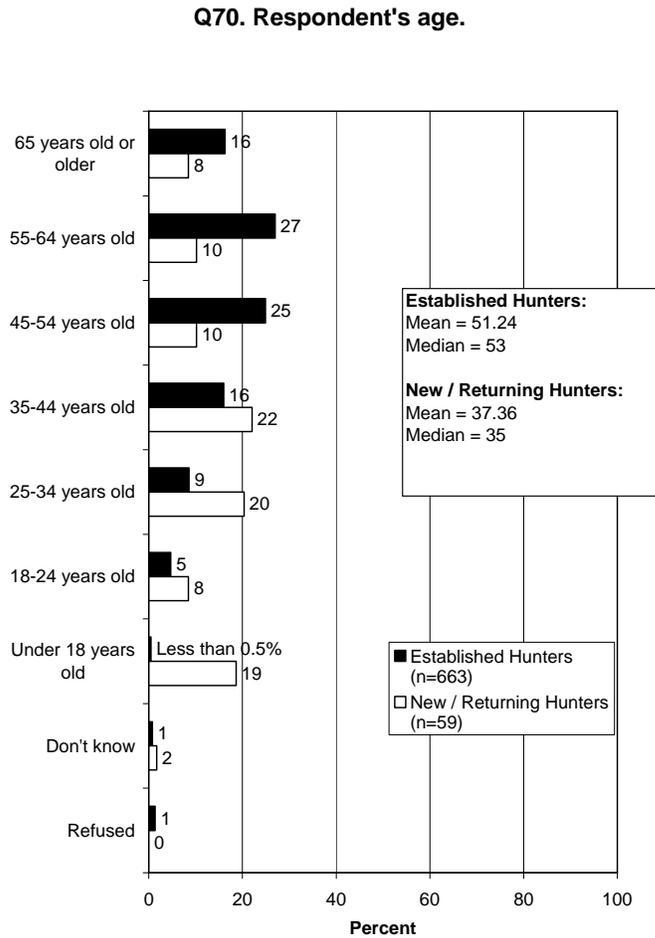
**Figure 4.12. Gender Breakdown of Hunter Groups**

**Q76. Respondent's gender (not asked; observed by interviewer).**

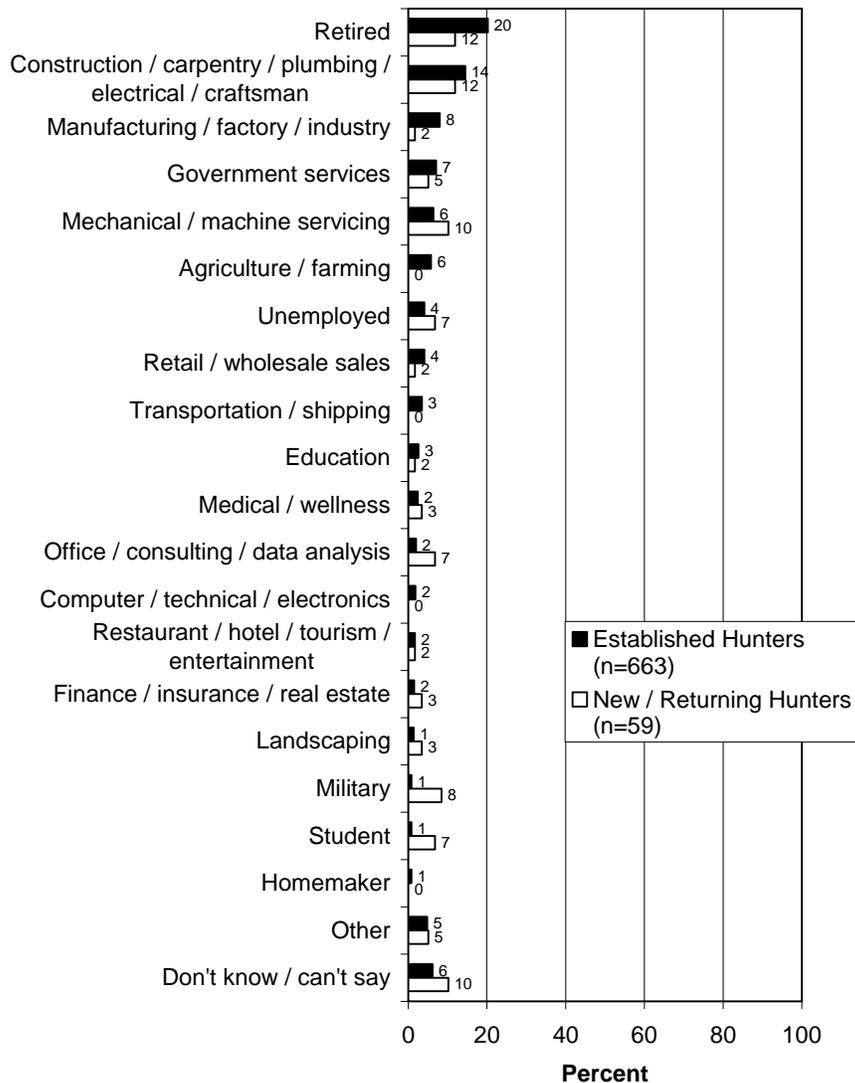


The age crosstabulation shows that new/returning hunters are markedly younger than established hunters. The median age is particularly indicative of this: new/returning hunters have a median age of 35 years; established hunters have a median age of 53 years (Figure 4.13).

Figure 4.13. Age Breakdown of Hunter Groups



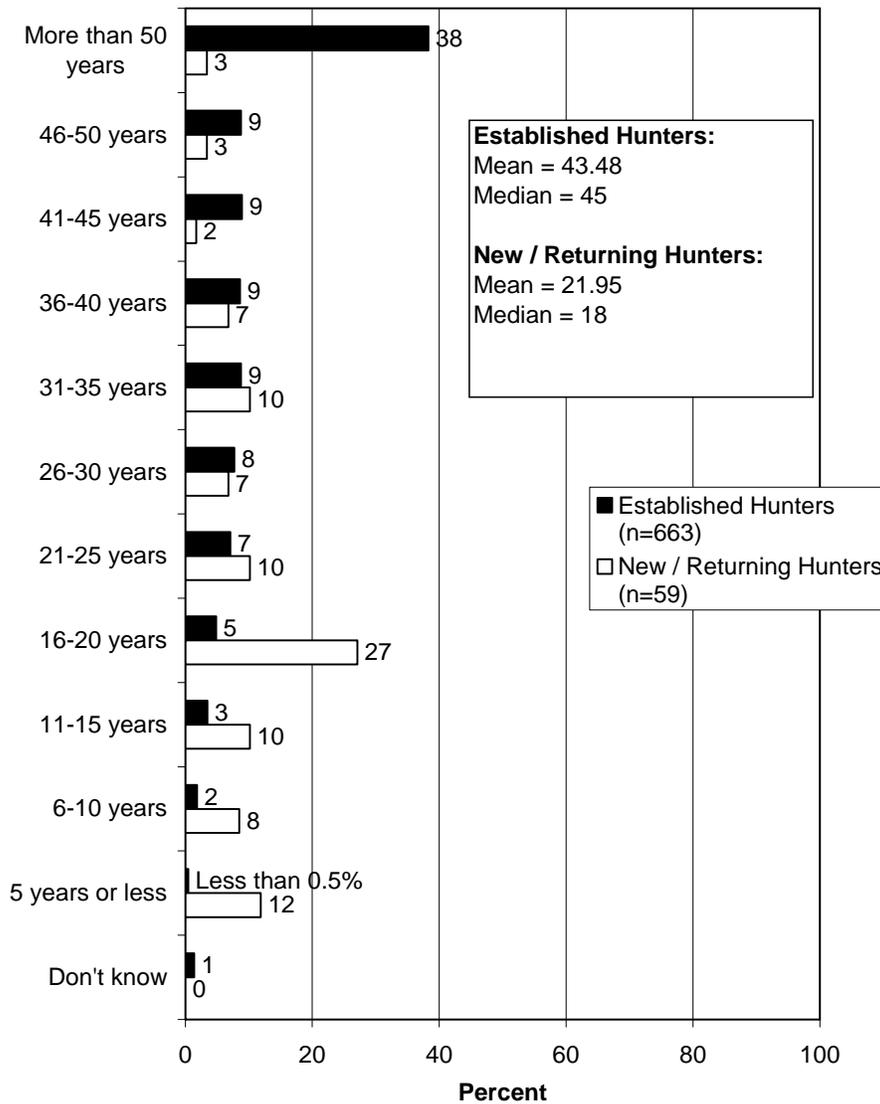
The question regarding the occupation of hunters was also crosstabulated, with only slight differences. There was some conjecture that new/returning hunters might include many retired people who now have more free time than they did; however, a higher percentage of established hunters were retired compared to new/returning hunters (Figure 4.14). On the other hand, compared to established hunters, more new/returning hunters indicated being in the military or being students, some of whom may have made recent moves back into their state and were, therefore, able to get back into hunting.

**Figure 4.14. Occupation Breakdown of Hunter Groups****Q68. What's your current occupation?**

On the question on the length of time living in the same state, there are differences in the two groups of hunters. Established hunters have lived in their state a greater length of time, in general, than do new/returning hunters (Figure 4.15). It may be that the new/returning hunters are “new” to the state rather than being new to hunting. But it also may be that moving may have disrupted hunting participation and led to breaks in the activity.

Figure 4.15. Breakdown of Hunter Groups by Length of Residency

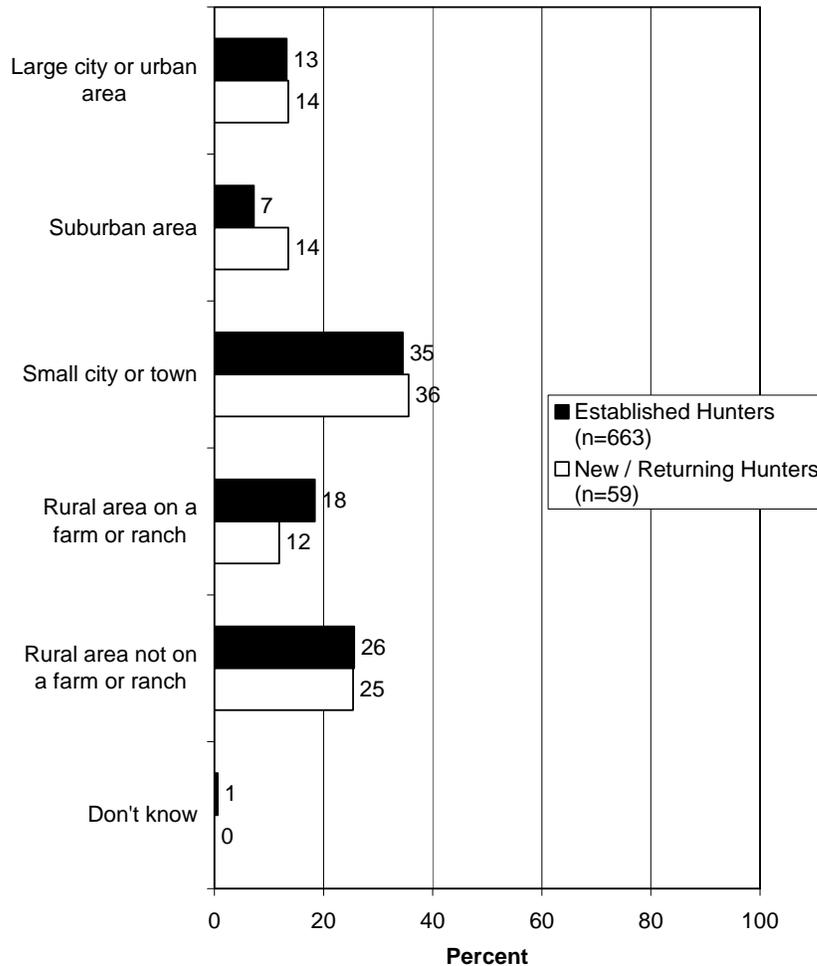
**Q66. How many years [have you lived / did you live] in [STATE]?**



The results on the type of residential area crosstabulated by the two hunter groups show only slight differences, with a just slightly greater percentage of established hunters living on a ranch or farm, compared to new/returning hunters (Figure 4.16). The latter group has a greater proportion living in a suburban area, compared to established hunters.

**Figure 4.16. Breakdown of Hunter Groups by Type of Residential Area**

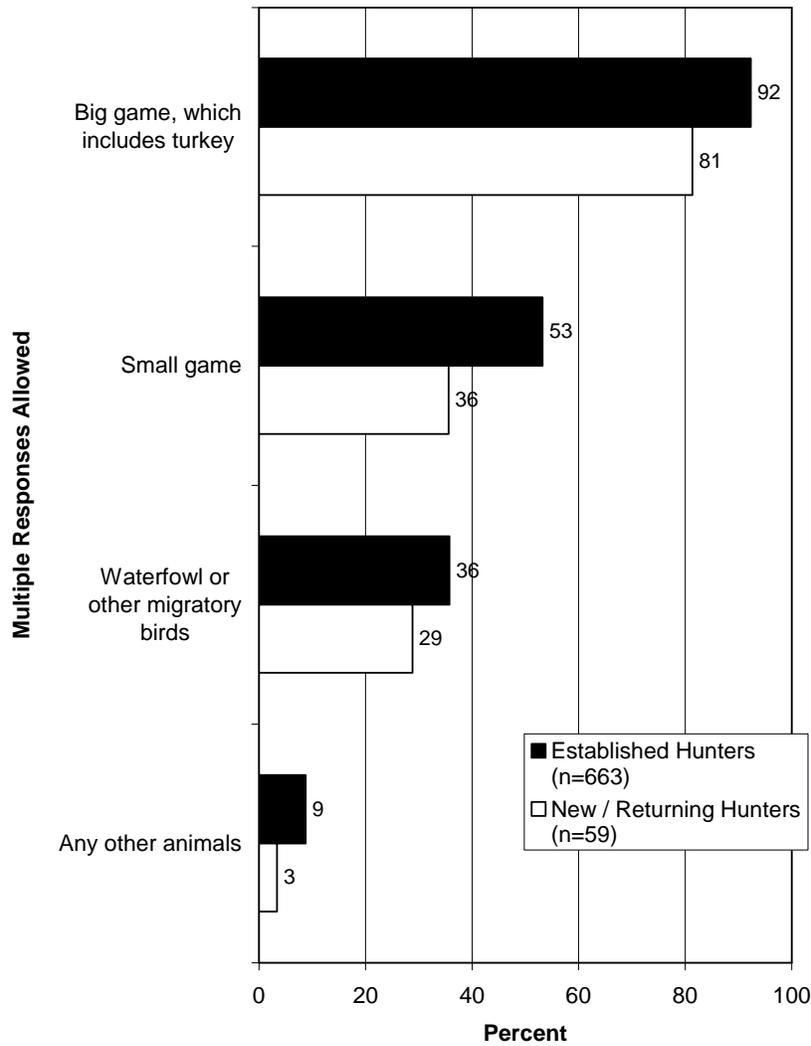
**Q67. Do you consider your place of residence to be a large city or urban area, a suburban area, a small city or town, a rural area on a farm or ranch, or a rural area not on a farm or ranch?**



The hunter groups were also crosstabulated by some questions out of the demographic realm, such as the type of game hunted. The crosstabulation found that established hunters had a greater percentage hunting each of the categories of game, compared to new/returning hunters, suggesting that established hunters were more likely to hunt multiple types of game (Figure 4.17).

**Figure 4.17. Breakdown of Hunter Groups by Type of Hunting**

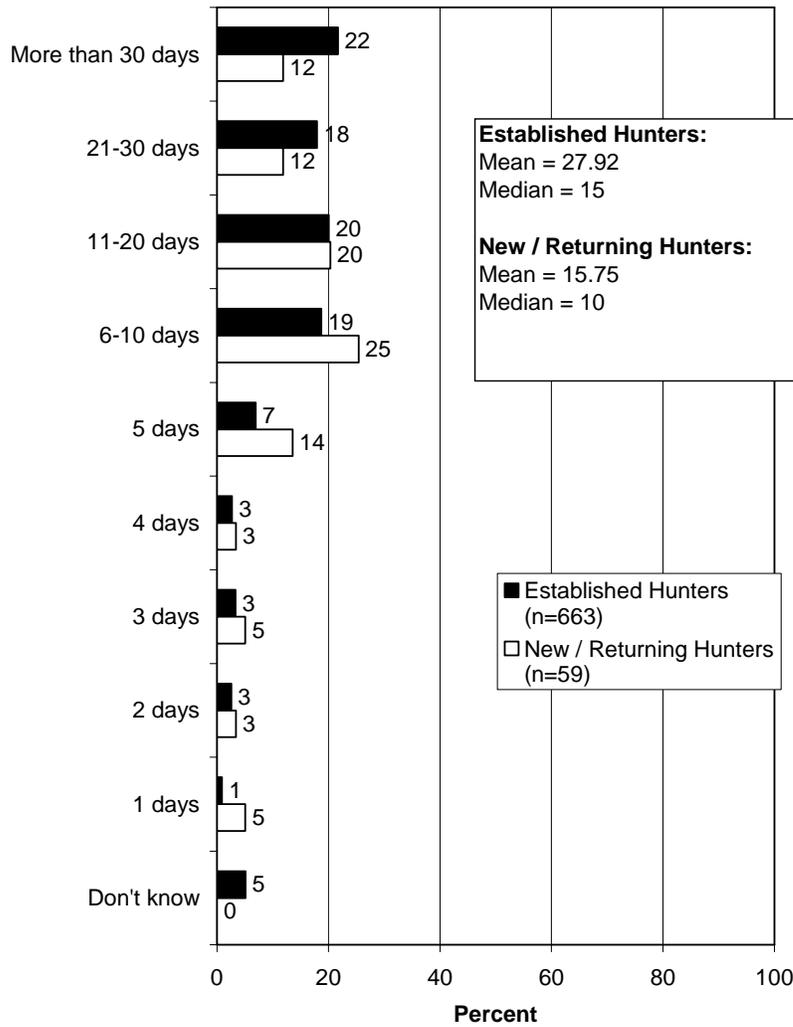
**Q30. Which of the following did you hunt in [STATE] in the past 5 years?**



In a comparison of hunting avidity, new/returning hunters in general hunted for fewer days per year (median of 10 days), compared to established hunters (median of 15 days) (Figure 4.18).

**Figure 4.18. Breakdown of Hunter Groups by Hunting Avidity**

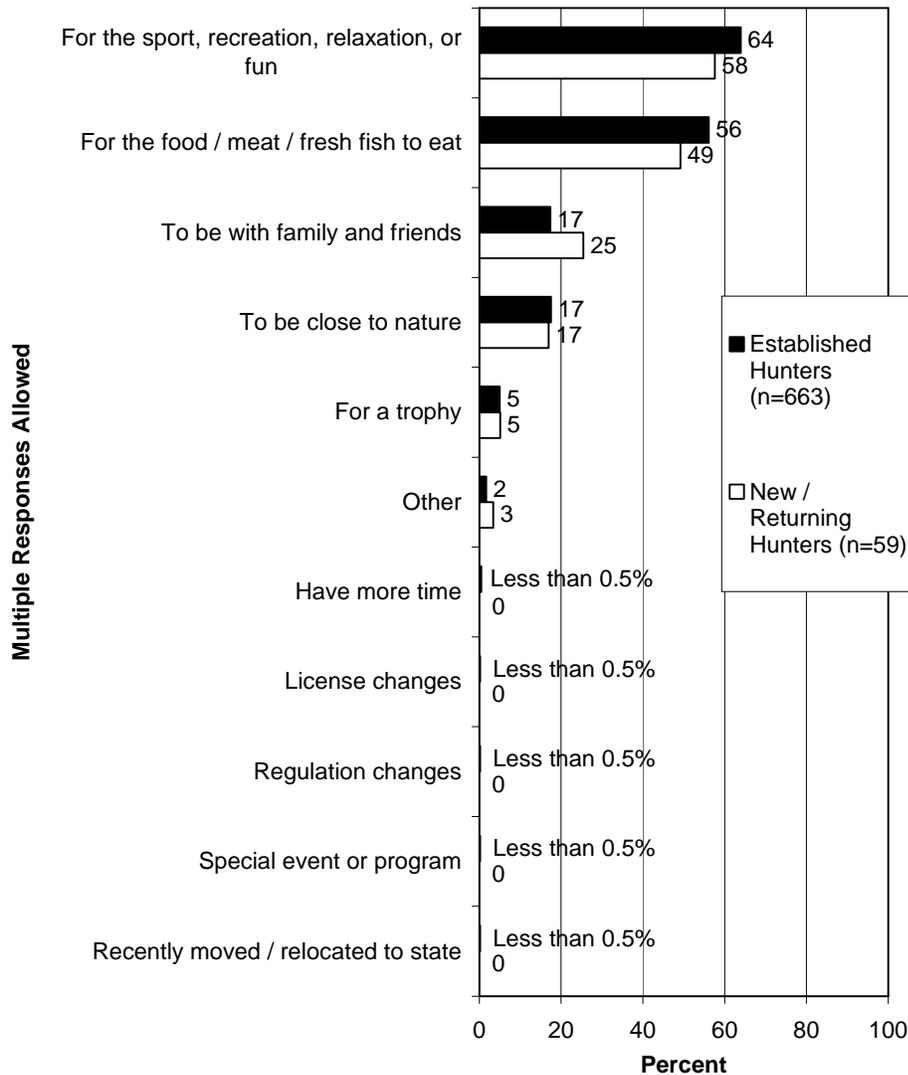
**Q25. How many days did you typically hunt each year that you hunted in [STATE] in the past 5 years?**



The crosstabulation on the reasons for hunting show only small differences in the two groups (Figure 4.19). Hunting for food was more often done by established hunters than by new/returning hunters; conversely, to be with family or friends was more often done by new/returning hunters. Other differences are less pronounced.

Figure 4.19. Breakdown of Hunter Groups by Reasons for Hunting

**Q33. What are the main reasons you went hunting in [STATE] in the past 5 years?**

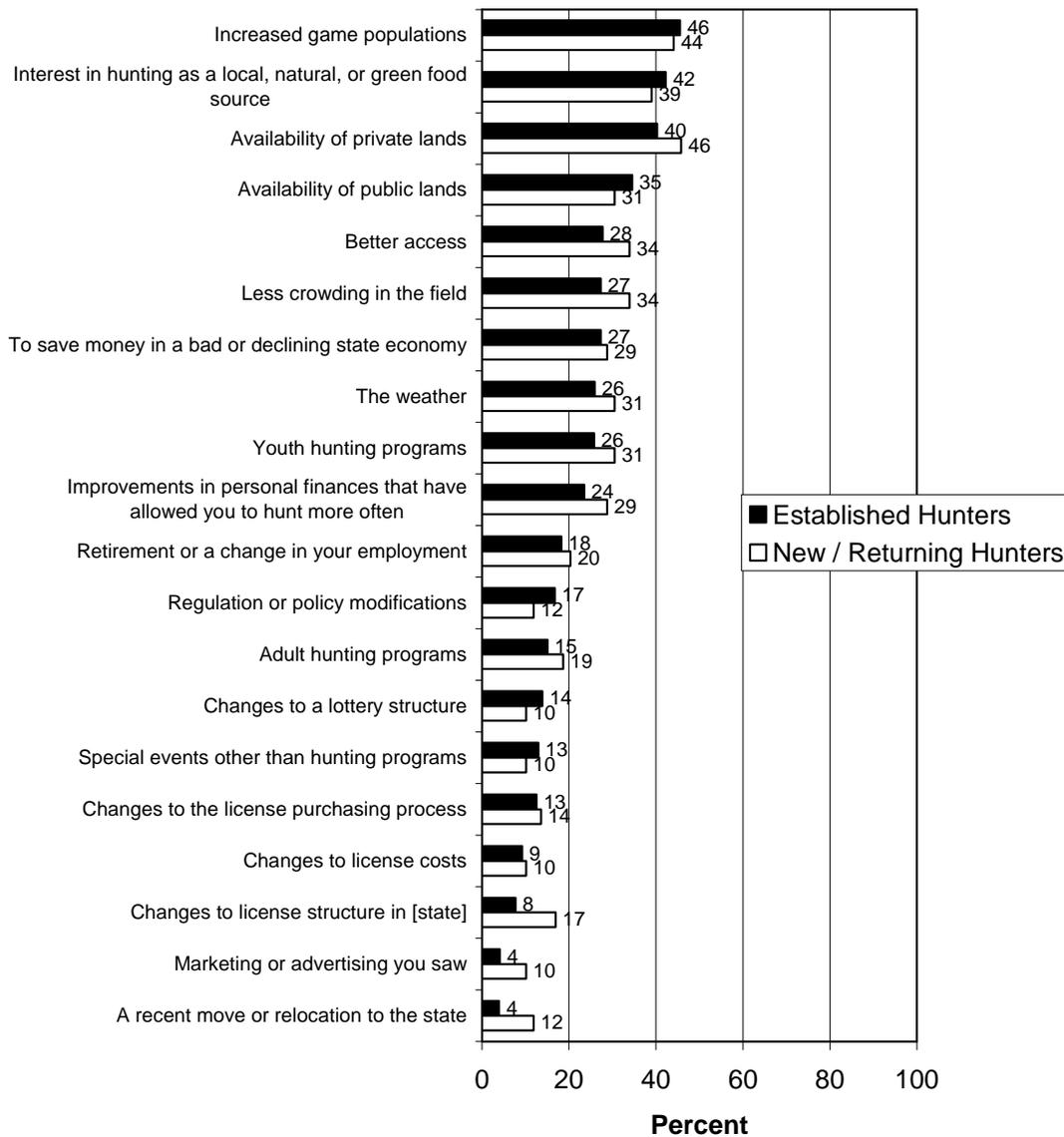


The series of questions in the survey about factors that influenced the hunter to go hunting in those years he/she participated was crosstabulated by the two hunter groups (Figures 4.20 and 4.21). In general, all factors had a greater percentage of new/returning hunters saying it had a major or minor influence, compared to the established hunters, but a few had relatively large differences: the weather, less crowding in the field, better access, improved personal finances, changes to the license structure, and a recent move to the state (for all of these, new/returning hunters more often were influenced by this compared to established hunters). Regarding access, it may be that established hunters, who would presumably have better knowledge of where to go

hunting, would be less affected by a sudden “discovery” of where to go hunting, compared to new/returning hunters.

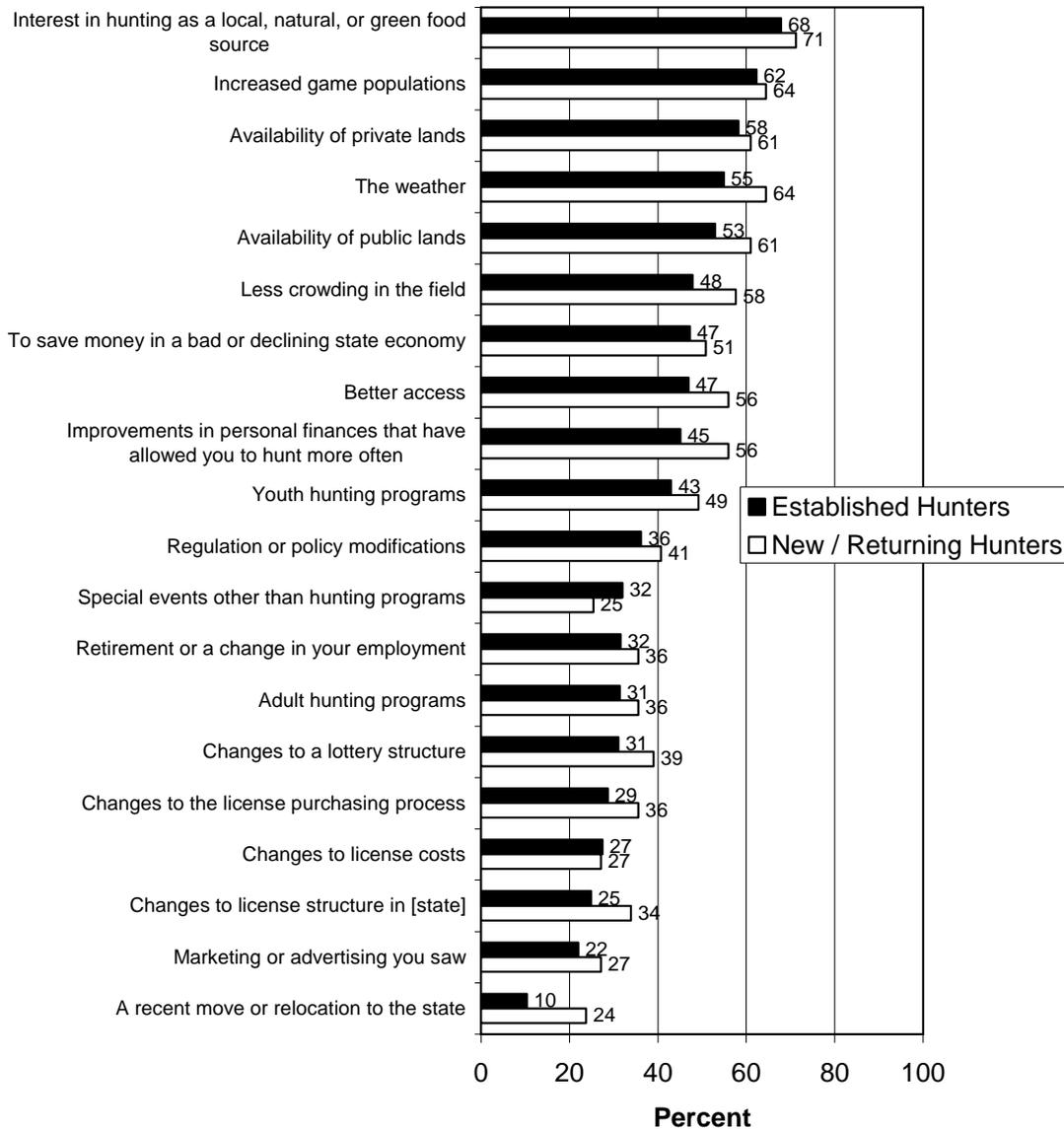
**Figure 4.20. Crosstabulation by Thinking Various Factors Were a Major Influence in Hunters’ Decisions to Go Hunting**

**Percent of respondents who indicated that each of the following was a major influence on their decision to go hunting, in the years that they went hunting:**



**Figure 4.21. Crosstabulation by Thinking Various Factors Were a Major or Minor Influence in Hunters’ Decisions to Go Hunting**

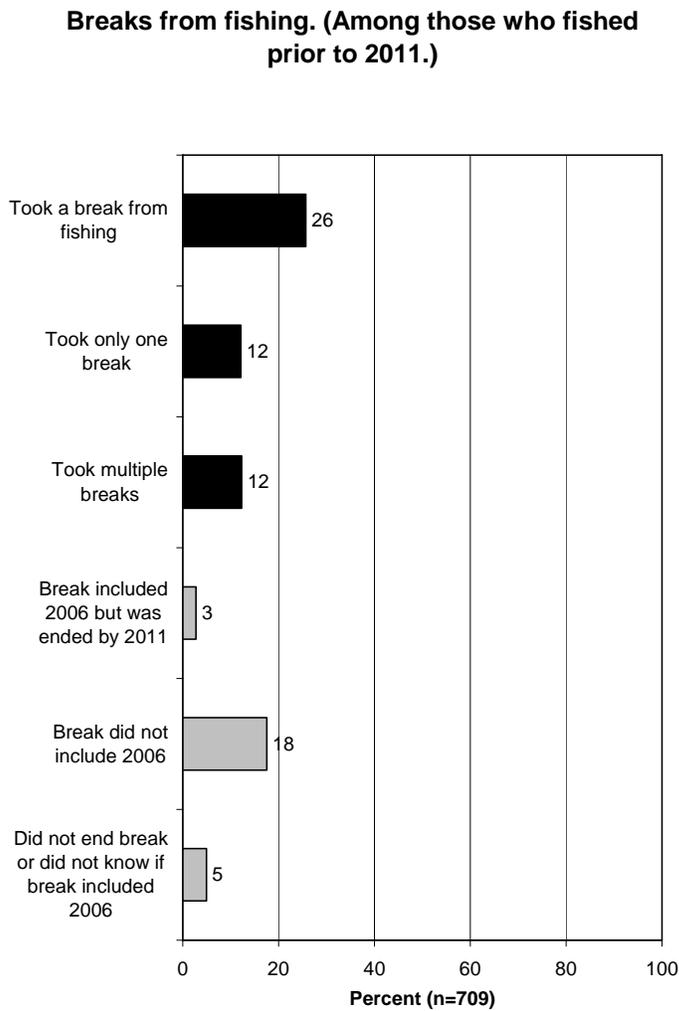
**Percent of respondents who indicated that each of the following was a major or a minor influence on their decision to go hunting, in the years that they went hunting:**



## ANGLERS WHO TOOK BREAKS FROM FISHING

A little more than a quarter of anglers who are not new to fishing (26%) indicated that they had taken a break of at least 3 years from fishing at some time since they had first fished (Figure 4.22). This includes 3% who specifically were on a break from fishing in 2006 but had come back to fishing by 2011. While this latter group may have contributed to the increase in number of anglers between the *National Survey* years of 2006 and 2011, they do not fully explain the greater number.

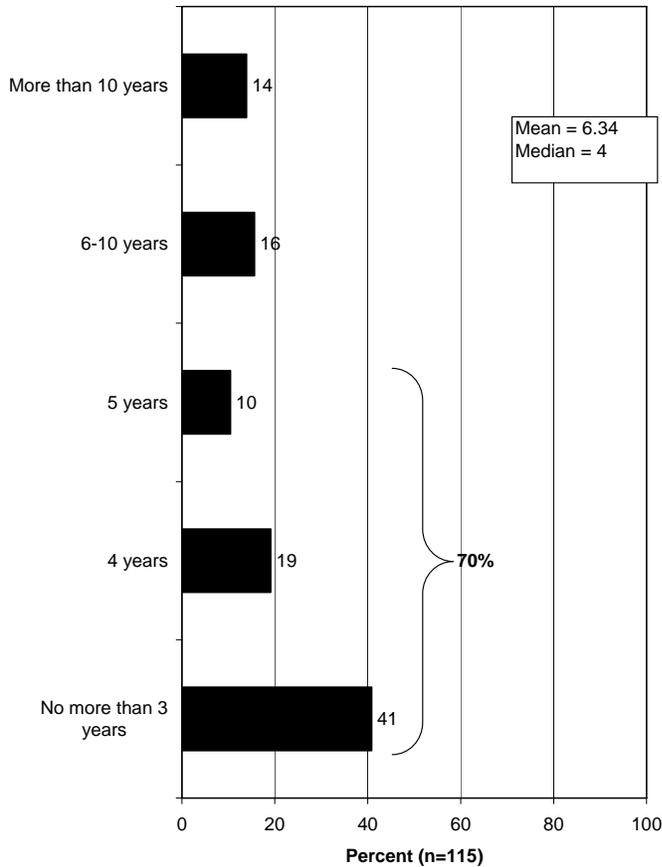
**Figure 4.22. Percent of Anglers Who Took a Break From Fishing**



It is interesting to note that the large majority of anglers who took a break from fishing at some time (and who may have taken more than one break) indicated that their break (or most recent break) was no more than 5 years in duration (Figure 4.23). Nonetheless, 14% of those who took a break said that the break lasted for more than 10 years.

**Figure 4.23. Length of Fishing Breaks**

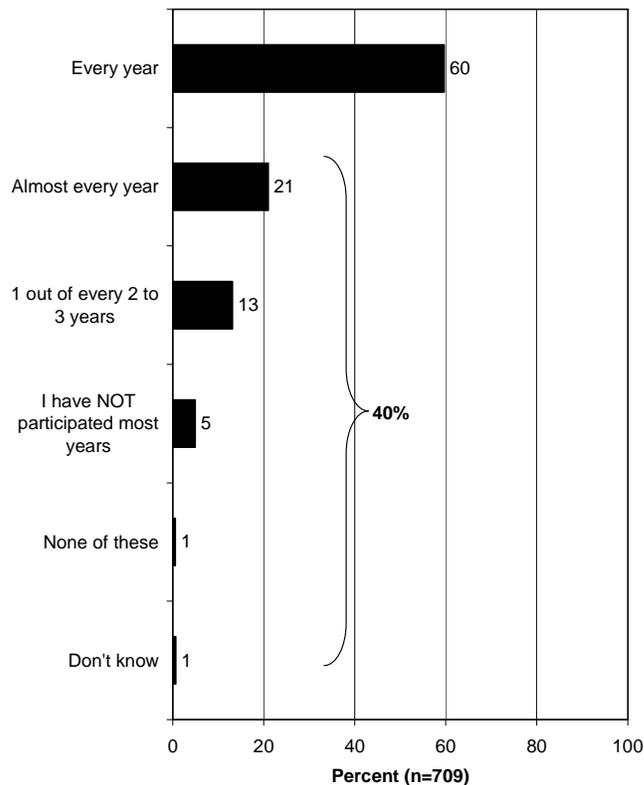
**Length of break (or most recent break) in fishing.  
(Among those who took a break of at least 3 years.)**



As was done in the section about hunting, the analysis explored the churn rate in fishing (or the amount of the fishing community that does not fish every year). Some of this churn rate is made up of anglers who are taking breaks of less than 3 years and would, therefore, not be included in the returning anglers group. Among anglers who had fished at least once in the past 5 years, 60% indicate that they typically fish every year, giving a churn rate of 40% (Figure 4.24).

**Figure 4.24. Churn Rate in Fishing**

**Q16. Which of the following best describes how often you have fished in [STATE] since you first started fishing in [STATE] in [FIRST YEAR FISHED IN STATE]? (Asked of those who fished prior to 2011.)**



## NEW ANGLERS

Likewise, in addition to the 3% of anglers who had a break from fishing that included 2006 but was ended by 2011, 2% of anglers are new to fishing (started in 2011 or later), and these anglers therefore would not have been included in the 2006 *National Survey* number but would be included in the 2011 number. This sums to 5% of anglers would have contributed to the greater number seen in the *National Survey* in 2011 compared to the 2006 *National Survey*.

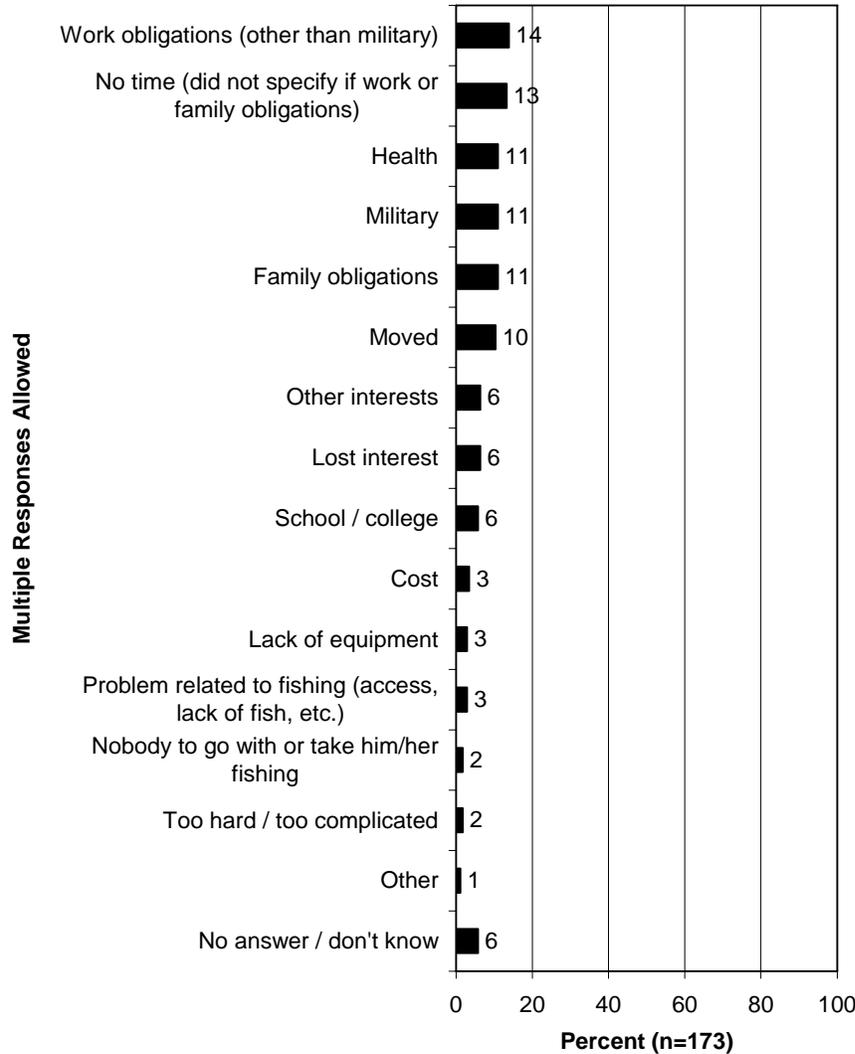
## REASONS FOR TAKING BREAKS FROM FISHING

The survey found that most reasons for taking breaks from fishing have almost nothing to do with the fishing itself; rather, people take breaks for reasons out of the realm of fishing (Figure 4.25). The top reasons for taking breaks from fishing include work obligations not including military (14% of those who took a break), other unspecified time obligations (13%), health problems (11%), military obligations (11%), and family obligations (11%). On the other hand, there are several factors that pertain to fishing itself and could possibly be influenced by

the fishing industry, albeit at lower percentages than the factors named above, and they include: other interests (6%), a loss of interest in fishing (6%), cost (3%), lack of equipment (3%), and other problems related to fishing such as access problems (3%).

**Figure 4.25. Reasons for Taking Breaks From Fishing**

**Q22. Why did you take a break from fishing?  
(Asked of those who took a break from fishing of at least 3 years.)**

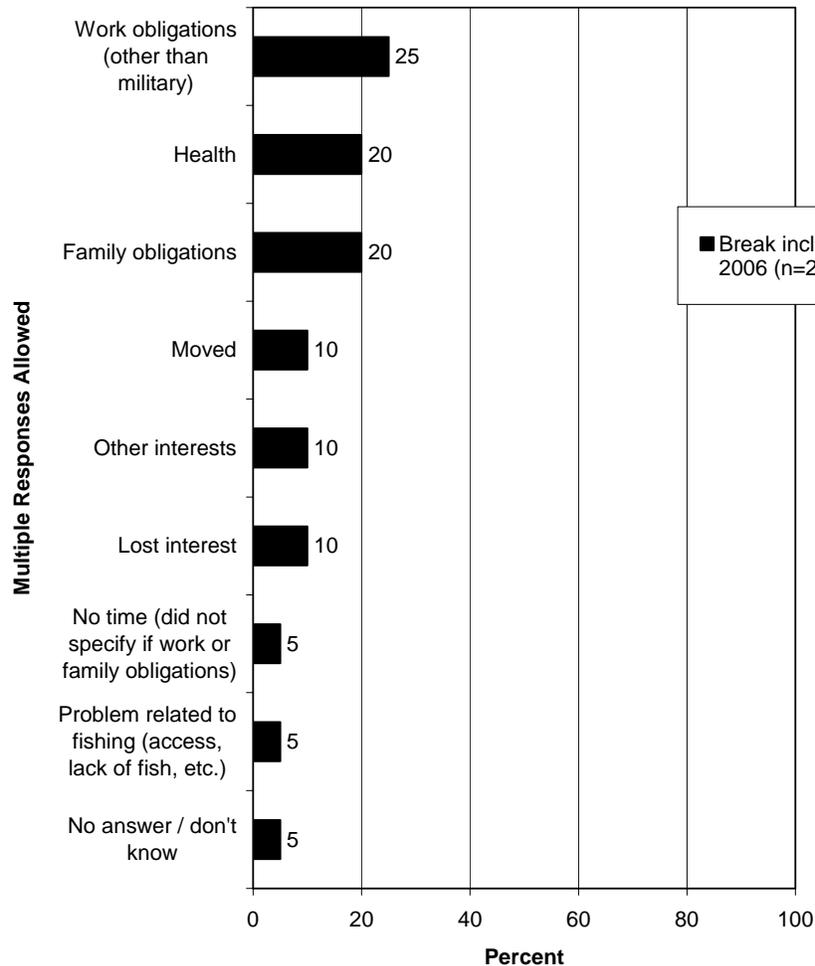


Also of interest are the reasons for taking a break among those whose break included 2006 (Figure 4.26). Again, work obligations top the list, along with health and family obligations. Interestingly, none of these respondents in the survey (although a low number are being examined here, as this is a subset of a subset) missed 2006 because of military obligations. As was discussed previously in the hunting section of this report analogous to this section, this is not

to say, however, that military deployments did not effect fishing participation in 2006 and 2011; rather, this survey did not encounter any respondents who met these criteria.

**Figure 4.26. Reasons for Taking Breaks From Fishing Among Those Whose Break Included 2006**

**Q22. Why did you take a break from fishing?  
(Asked of those who took a break from fishing of at  
least 3 years.)**

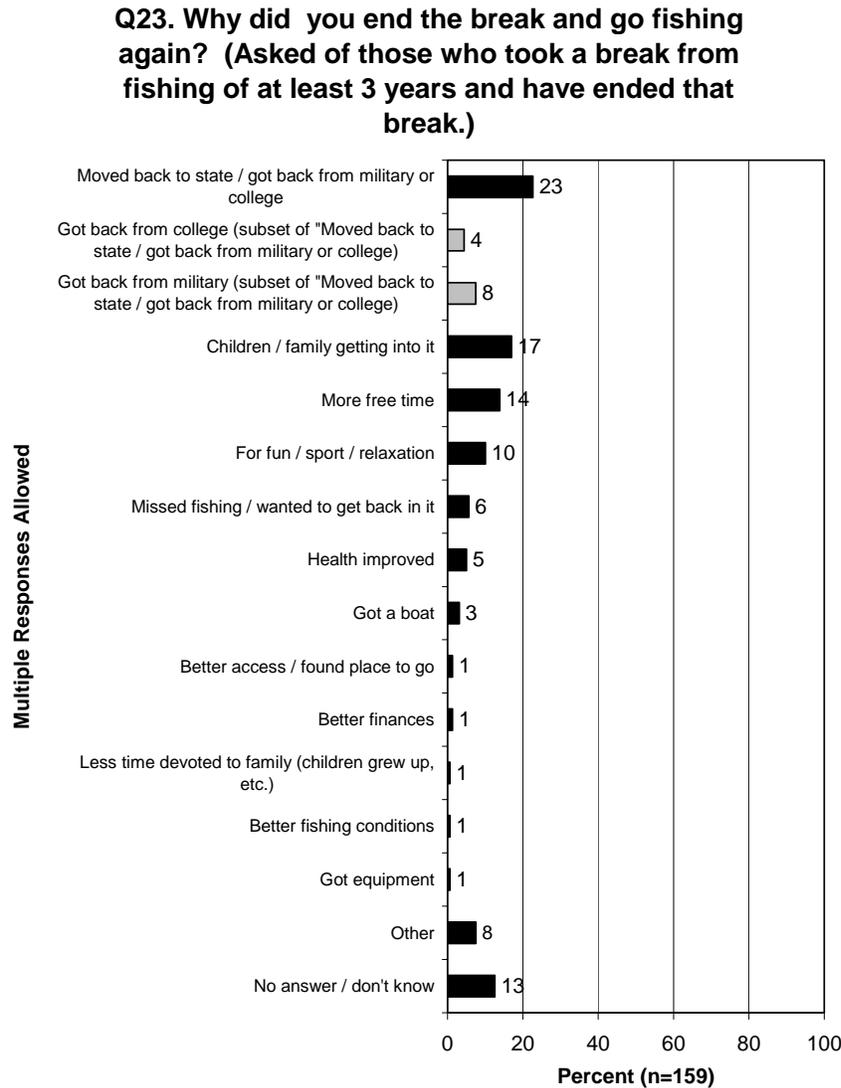


## FACTORS RELATED TO DECISIONS TO GO FISHING

The report explored reasons that anglers had not fished in some years. Also of interest are factors that contribute to an angler's decision to go fishing—including those who ended a break from fishing. This report first explores those reasons for ending a break—it followed up the question about why the angler took a break. Among those who took a break from fishing, the top reason that they ended that break and started fishing again is that they moved back to the state (23% of those who ended a break), including the subsets of those anglers who were finished with

either military deployment (8%) or who finished college (4%) (Figure 4.27). Other important reasons for ending that break from fishing include that they have family members who fish, such as having children who are now old enough to fish (17%), that they have more free time (14%), and simply for the fun/sport/relaxation (10%).

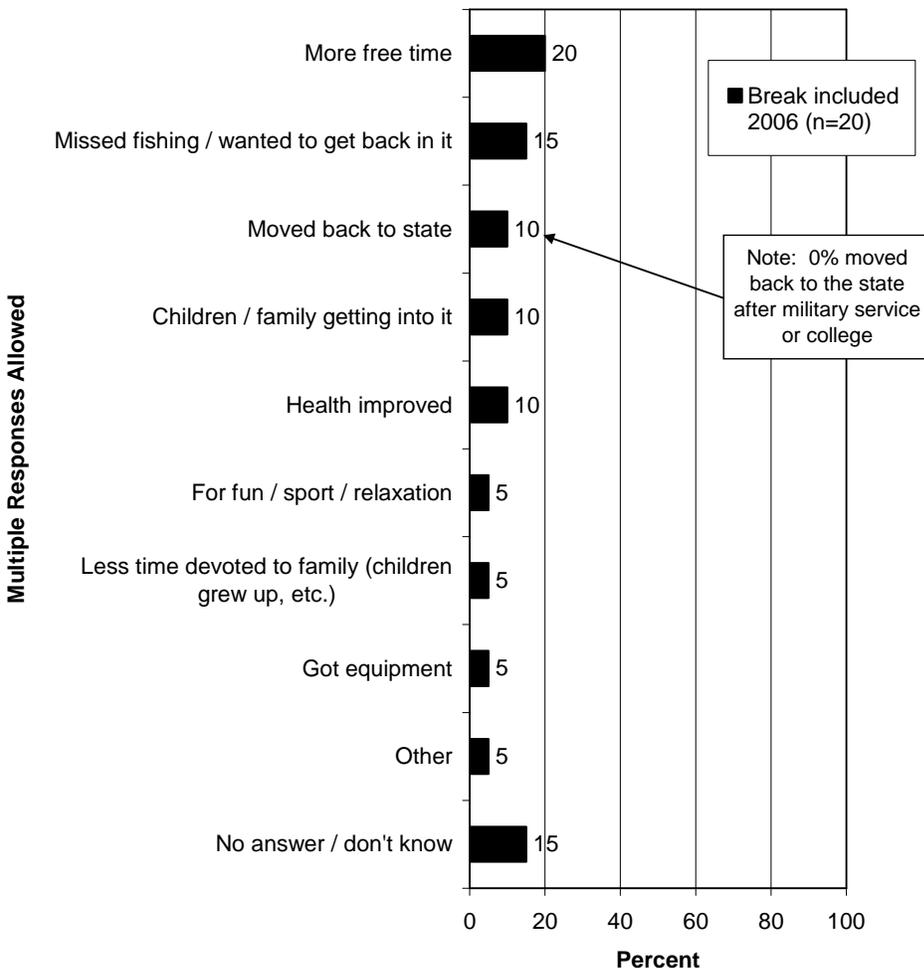
**Figure 4.27. Reasons for Ending Breaks From Fishing**



The report also explores this same question among the anglers whose break included 2006. Among these anglers, more free time and simply the desire to get back into fishing were the top reasons (Figure 4.28). This analysis found that none of these respondents ended their break from fishing because their military deployment had ended or because they had finished college.

**Figure 4.28. Reasons for Ending Breaks From Fishing Among Those Whose Break Included 2006**

**Q23. Why did you end the break and go fishing again? (Asked of those who took a break from fishing of at least 3 years and have ended that break.)**

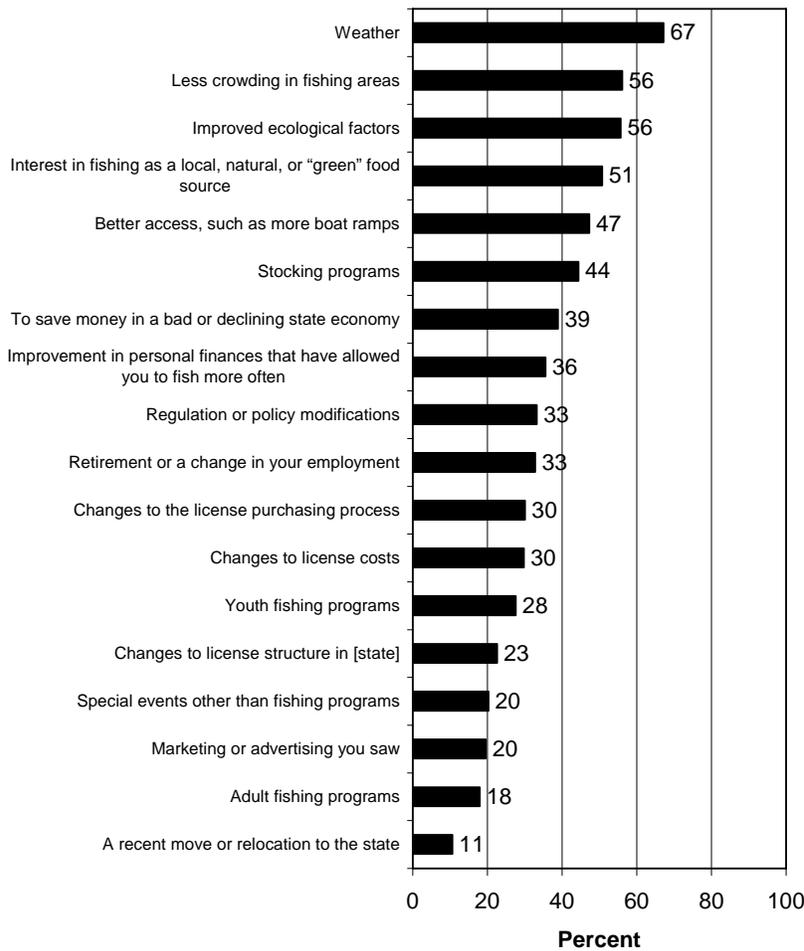


Another aspect of the survey explored factors involved in anglers' decisions to go fishing. The survey had a list of 18 possible factors that may have affected decisions to go fishing. For each factor, anglers were asked to indicate if it was a major influence, a minor influence, or not an influence in their decision to go fishing (Figures 4.29 and 4.30). The top influence was one over which the fishing industry and agencies have no control—the weather—with 67% saying it was a major or minor influence. However, that top influence was followed by some over which the fishing industry and agencies have direct influence (e.g., through regulatory changes) or a less direct influence (e.g., advertising). These include less crowding in fishing areas (56%), improved ecological factors (also 56%), interest in fishing to provide a “green” source of food

(51%), better access (47%), and stocking programs (44%). The first graph in this section shows the percent who said the factor was a *major* or *minor* influence (Figure 4.29); the second graph includes only the percent who said it was a *major* influence (Figure 4.30).

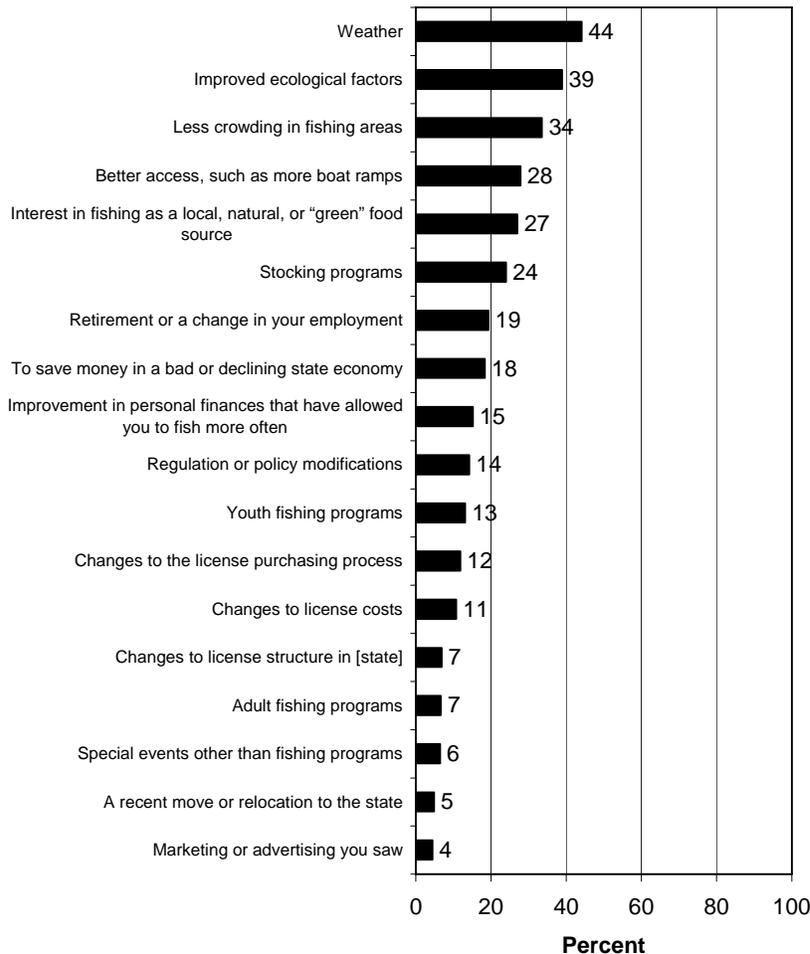
**Figure 4.29. Factors That Were a Major or Minor Influence in Decisions to Go Fishing**

**Q35-Q52. Percent of respondents who indicated that each of the following was a major or a minor influence on their decision to go fishing, in the years that they went fishing:**



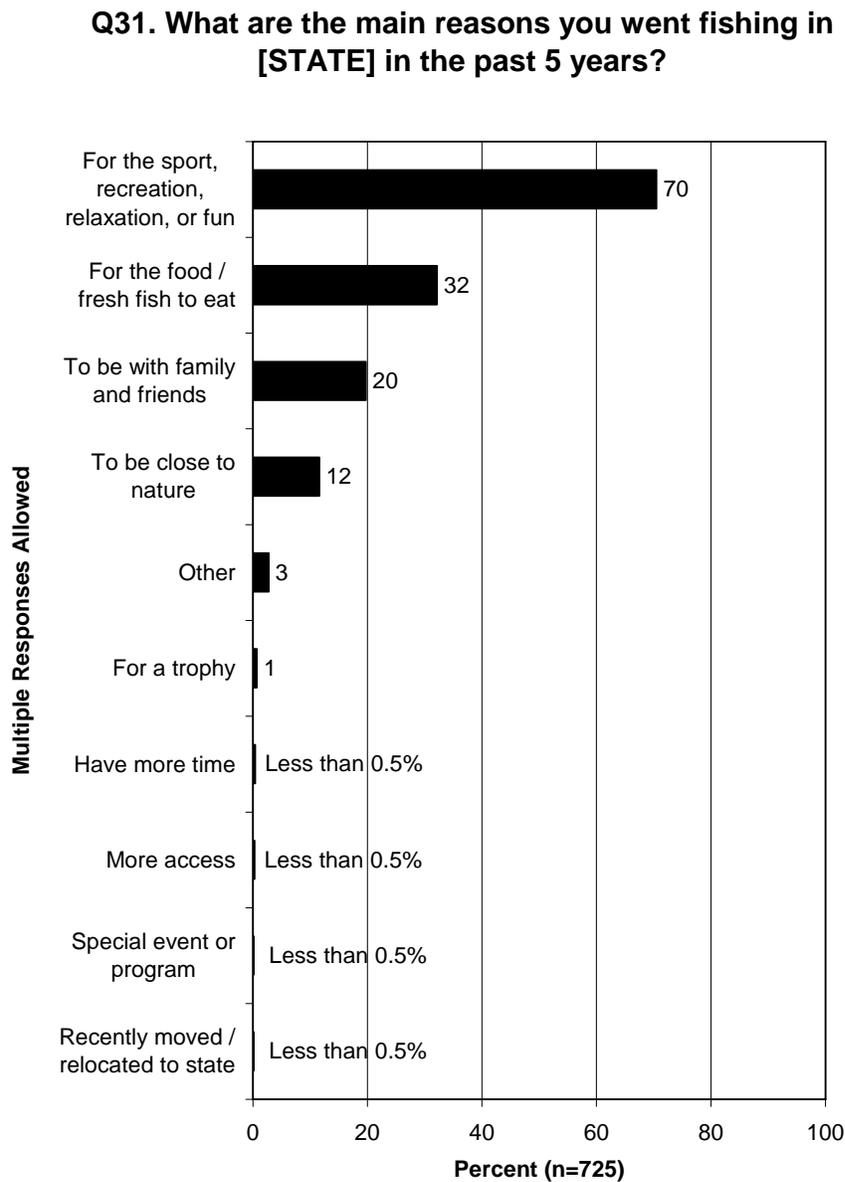
**Figure 4.30. Factors That Were a Major Influence in Decisions to Go Fishing**

**Q35-Q52. Percent of respondents who indicated that each of the following was a major influence on their decision to go fishing, in the years that they went fishing:**



Another aspect of fishing that the survey explored that pertains to this section was a question asking anglers to indicate in an open-ended question the main reasons that they went fishing. This look at motivations may shed light on the recent apparent increase in fishing participation. While the top reason is for the sport/recreation/relaxation/fun (70% gave a reason related to this), the second category of responses relates to fishing for food (32%) (Figure 4.31). It may be that the recent downturn in the economy prompted some anglers to supplement their food budget by catching fish to eat.

Figure 4.31. Main Reasons for Going Fishing in the Past 5 Years

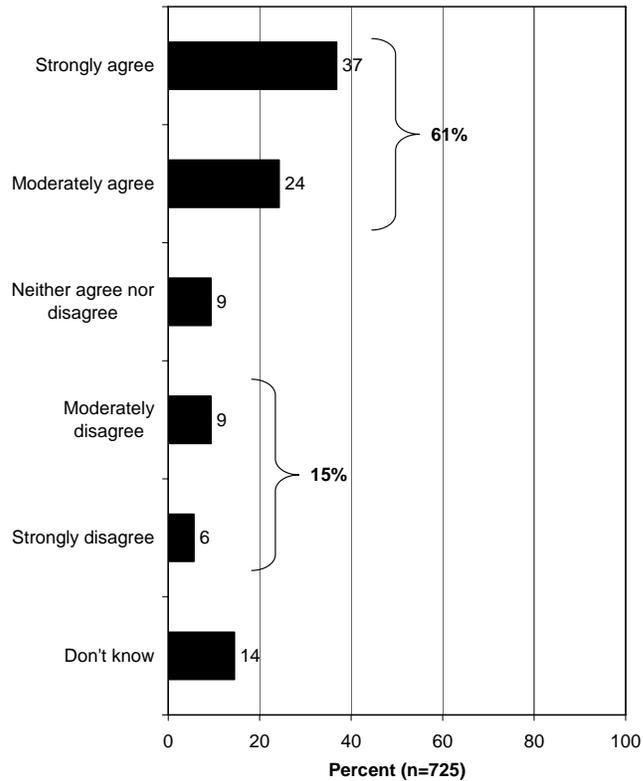


**REALITY CHECK REGARDING INCREASES IN FISHING PARTICIPATION**

As was done in the survey of hunters, the survey of anglers asked them whether they would agree or disagree that fishing in general had increased in their state in the past 5 years. It was conjectured that there would be more agreement than disagreement, since other evidence suggests that there was an actual increase in the numbers of anglers in the states in which the survey was administered. The survey results back this up, as agreement (61%) far exceeds disagreement (15%) (Figure 4.32).

**Figure 4.32. Agreement or Disagreement That Hunting Has Increased in the State**

**Q58. Based on your knowledge of and experiences fishing, do you agree or disagree that fishing in [STATE] in general has increased in the past 5 years or that there are more anglers fishing in [STATE]?**



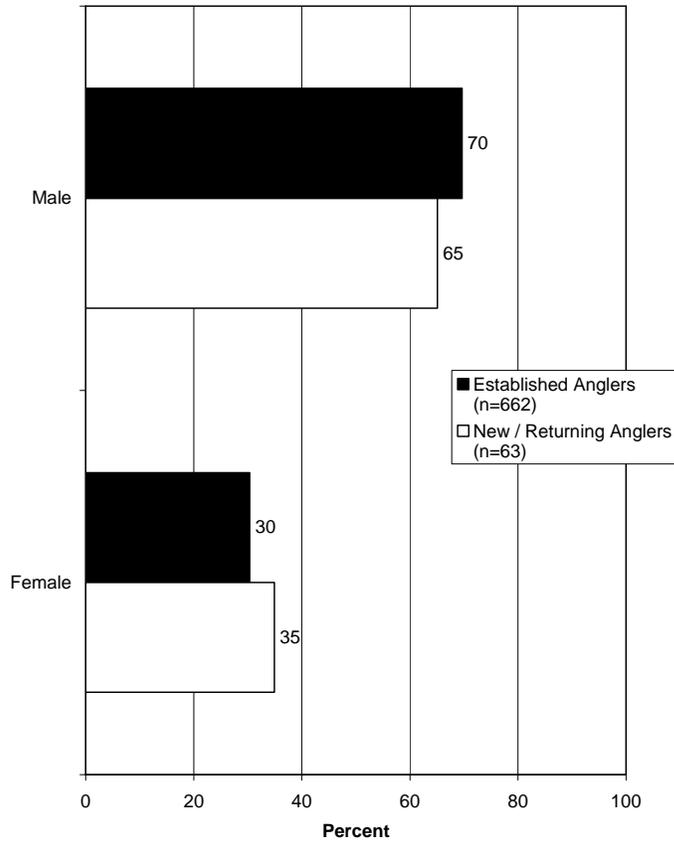
### **CHARACTERISTICS OF ESTABLISHED ANGLERS VERSUS NEW / RETURNING ANGLERS**

As was done in the hunting section, the analysis categorized all anglers in the survey as either established anglers (those who first fished in 2006 or earlier and did not take a break that included 2006) or new/returning anglers (those who first fished in 2007 or later as well as those who first fished in 2006 or earlier but who took a break from fishing that included 2006). This latter group is conjectured to have contributed to the difference in *National Survey* angler numbers in 2006 and 2011. Crosstabulations of these groups by demographic and other questions sheds light on the groups.

A most basic demographic characteristic is gender, but there is little difference in the groups based on gender, with a 70%-30% breakdown among established anglers and a 65%-35% breakdown among new/returning anglers (Figure 4.33). In short, new/returning anglers are just slightly more female than established anglers, but not by much.

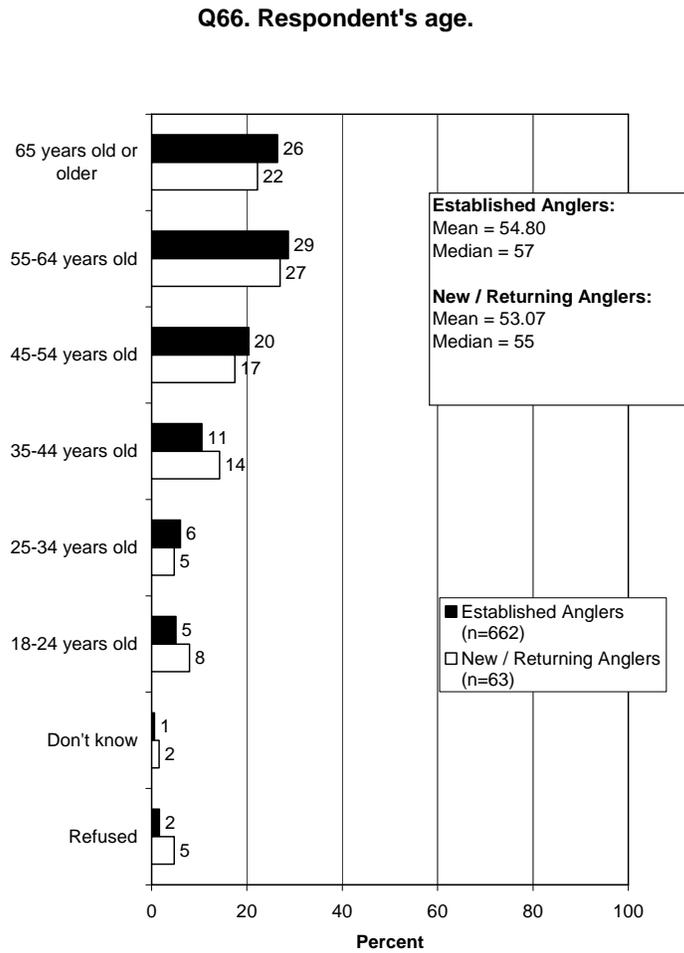
**Figure 4.33. Gender Breakdown of Angler Groups**

**Q72. Respondent's gender (not asked; observed by interviewer).**



The results on age show that new/returning anglers are just slightly younger than established anglers (as would be expected, since the “new” portion of new/returning anglers would obviously be young), but the difference is, again, slight (Figure 4.34).

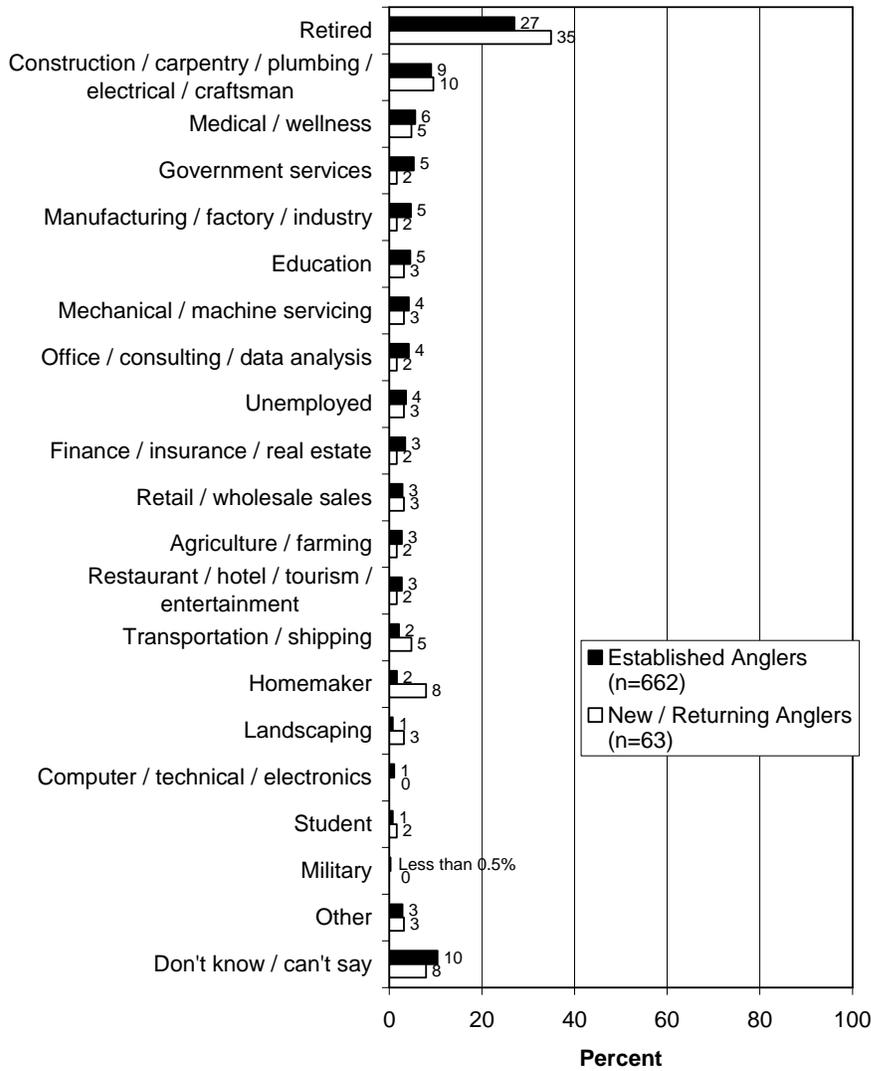
**Figure 4.34. Age Breakdown of Angler Groups**



The crosstabulation of the occupation question by the two groups has some interesting findings. In particular, the new/returning angler group has a higher percentage in the retired category, compared to the established angler group (Figure 4.35). Another category that has a marked difference is the unemployed category, again with the new/returning angler group being slightly higher in this category. For both these “occupations,” the anglers would have more time to fish.

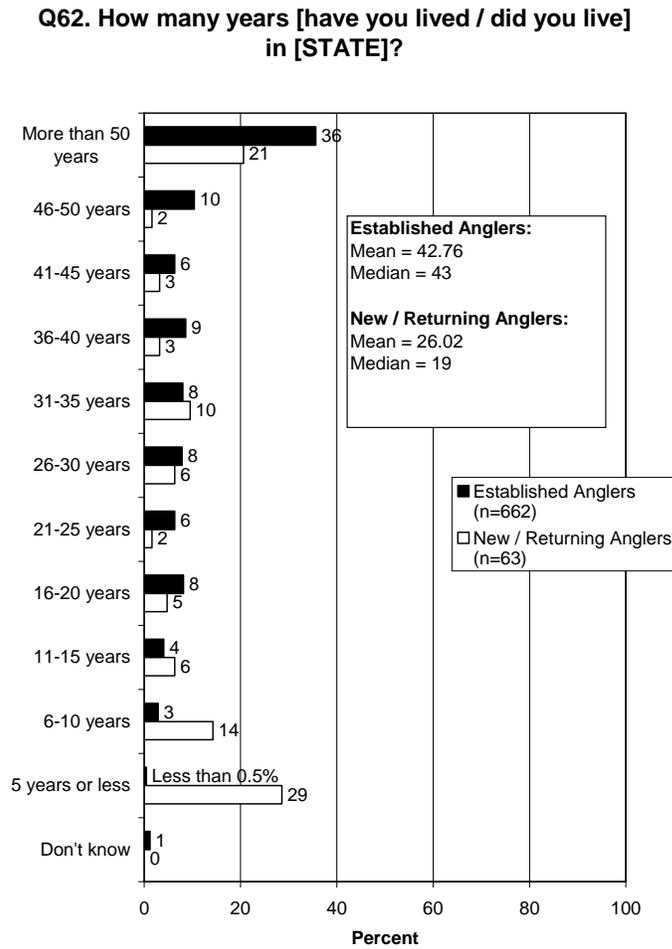
Figure 4.35. Occupation Breakdown of Angler Groups

Q64. What's your current occupation?



The length of time living in the same state shows some marked differences in the two groups of anglers. Established anglers have a greater length of time living in their state, compared to new/returning anglers (Figure 4.36). One implication is that the new/returning angler may be “new” to that state rather than new to fishing. Nonetheless, the results suggest that moving may disrupt fishing participation, leading to breaks in the activity.

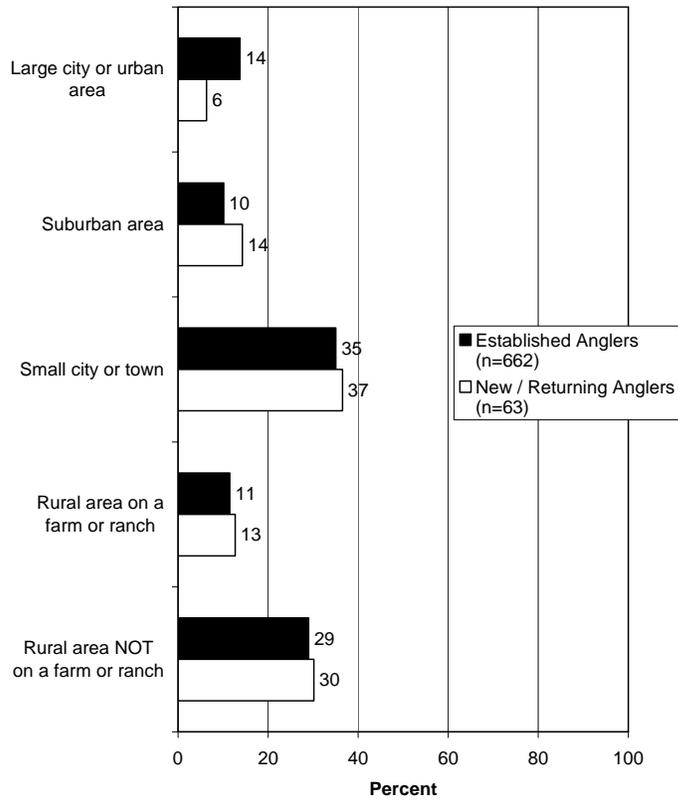
**Figure 4.36. Breakdown of Angler Groups by Length of Residency**



The results show only slight differences in the type of residential area in which the anglers live, with new/returning anglers being slightly less urban but more suburban than their established angler counterparts (Figure 4.37). However, the differences are much less in the other categories: small city or town and the rural area categories.

**Figure 4.37. Breakdown of Angler Groups by Type of Residential Area**

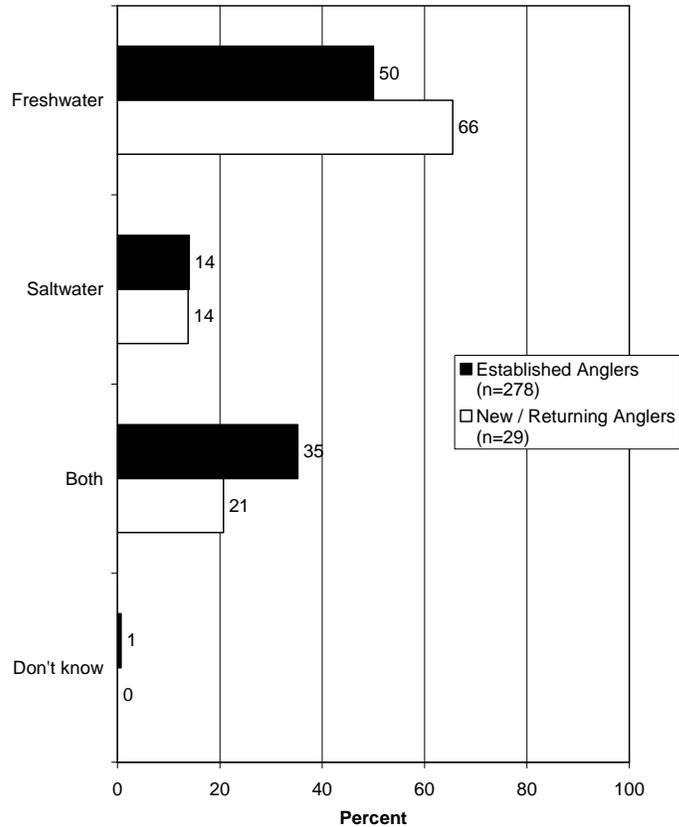
**Q63. Do you consider your place of residence to be a large city or urban area, a suburban area, a small city or town, a rural area on a farm or ranch, or a rural area not on a farm or ranch?**



The crosstabulations by the two angler groups were also run on non-demographic questions. One question that was crosstabulated was the type of fishing that anglers did. The crosstabulation found that new/returning anglers are less likely to fish in saltwater, with 34% of new/returning anglers fishing in saltwater at least some of the time, compared to 49% of established anglers (Figure 4.38). It needs to be noted that of the seven states in which the angler survey was administered, four of them offer saltwater angling.

**Figure 4.38. Breakdown of Angler Groups by Type of Fishing**

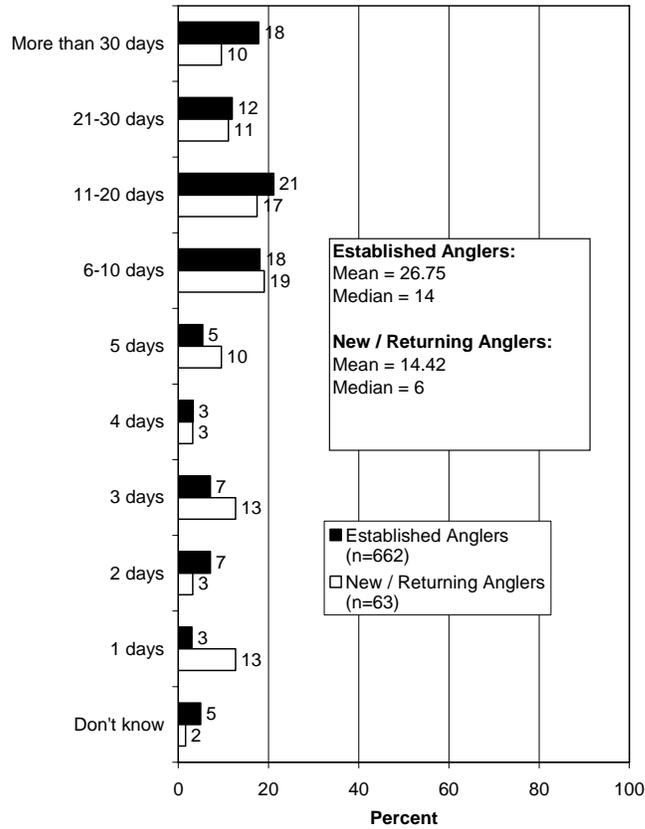
**Q28. Did you participate in freshwater fishing, saltwater fishing, or both in [STATE] the past 5 years?**



When comparing fishing avidity, new/returning anglers typically fished for fewer days in the years that they went fishing among the past 5 years than did established anglers: the median number of days is 6 among new/returning, compared to 14 days among established anglers (Figure 4.39).

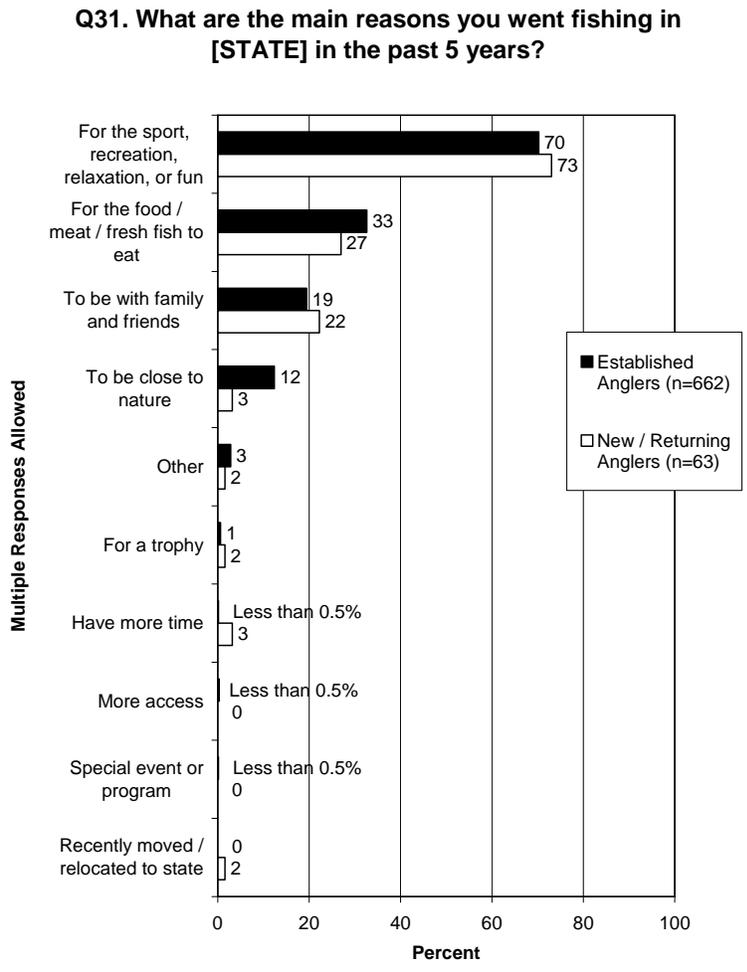
**Figure 4.39. Breakdown of Angler Groups by Fishing Avidity**

**Q25. How many days did you typically fish each year that you fished in [STATE] in the past 5 years?**



Another crosstabulation is the reasons for fishing. As shown in Figure 4.40, there are small differences in reasons for fishing among the two groups.

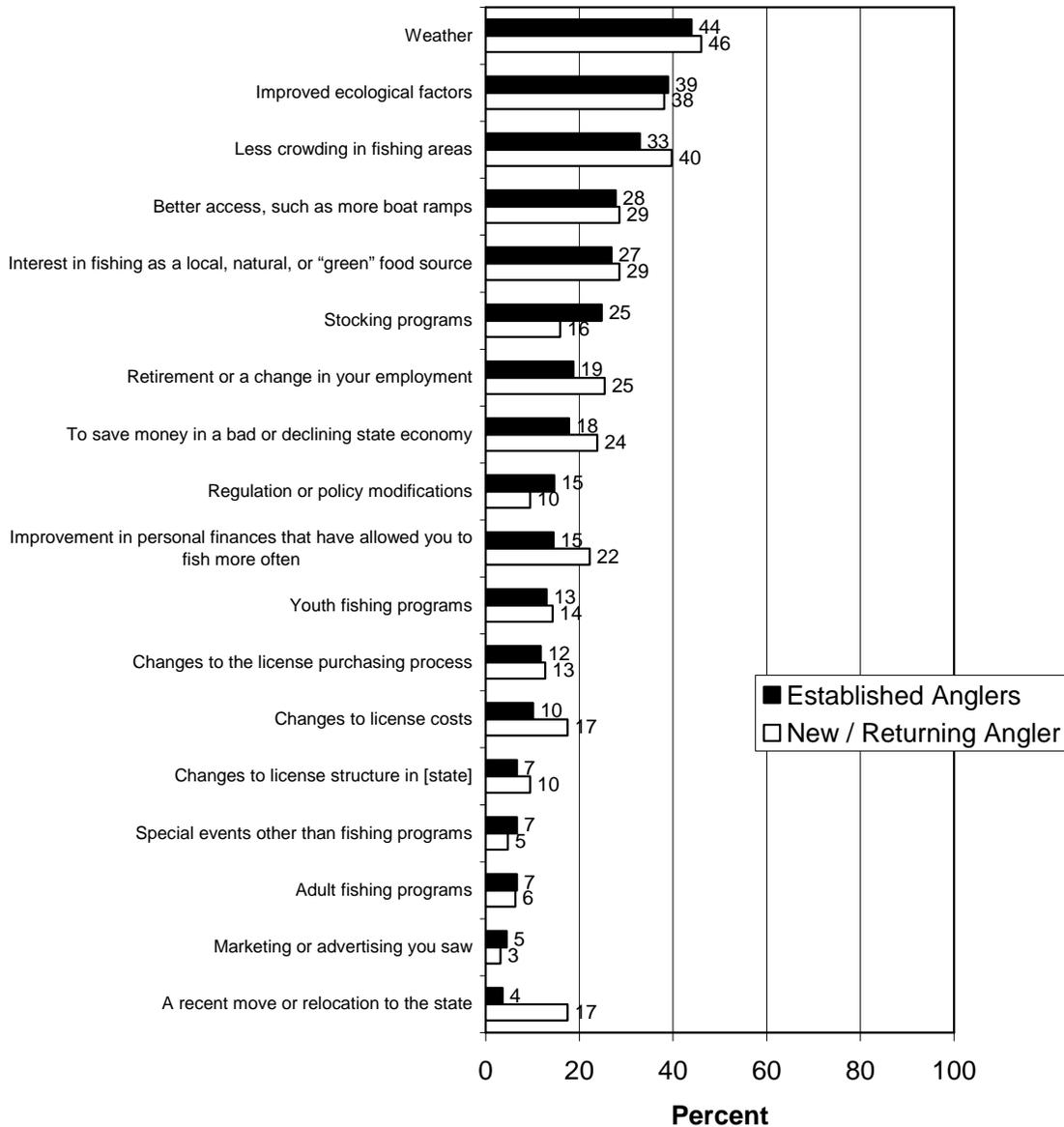
**Figure 4.40. Breakdown of Angler Groups by Reasons for Fishing**



The final crosstabulation to be examined in this section shows the series of questions about factors that influenced the angler to go fishing in those years that he/she did go fishing (Figures 4.41 and 4.42). Compared to the established angler group, new/returning anglers have a slightly greater percent who indicate that better access was an influence (perhaps established anglers know more about where to go so would have been less affected by any changes to access or would be less likely to newly discover a place to go), who indicate that retirement or change in employment was an influence (they have more time), and that they have made a move or relocation to the state.

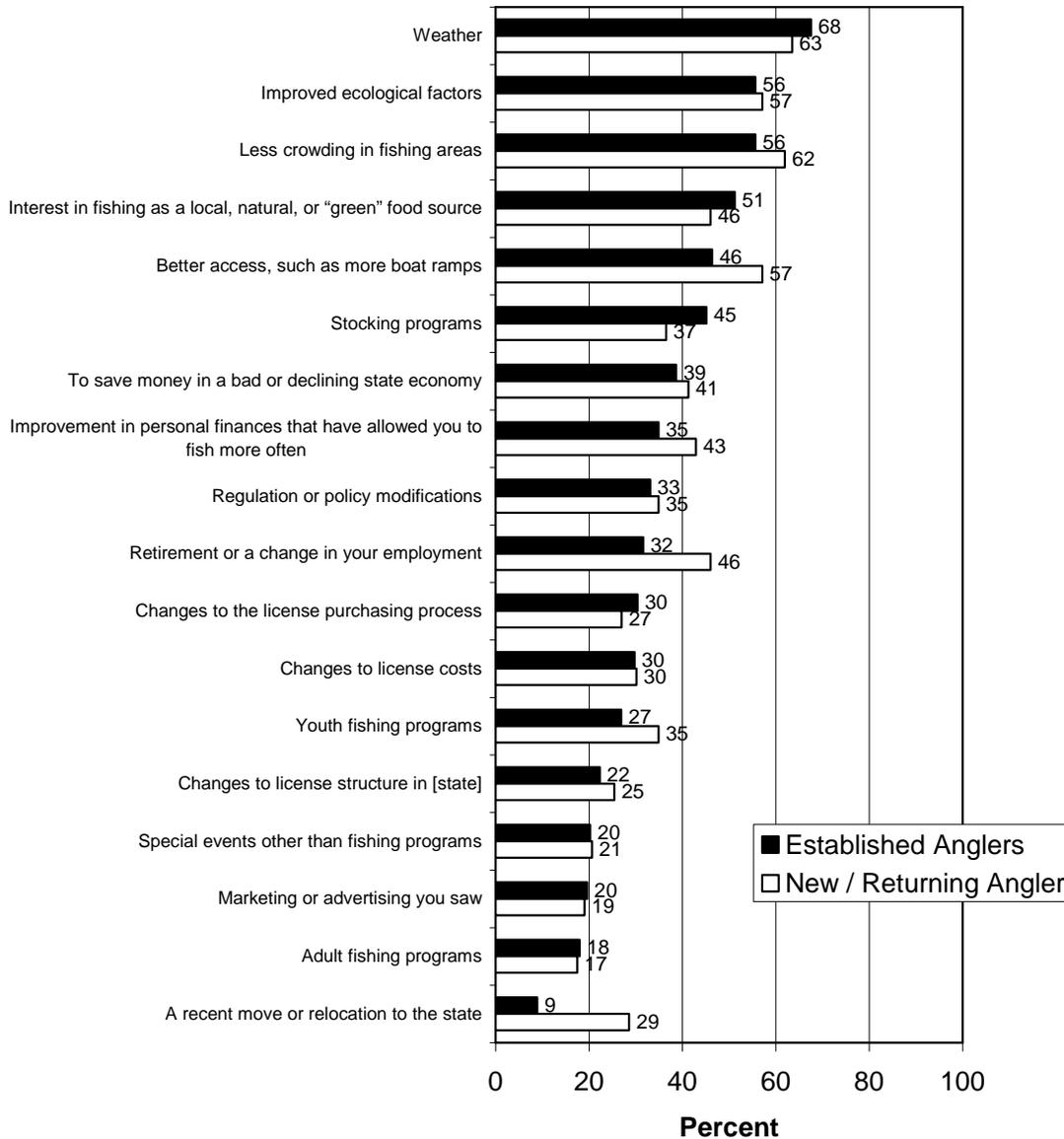
**Figure 4.41. Crosstabulation by Thinking Various Factors Were a Major Influence in Anglers' Decisions to Go Fishing**

**Q35-Q52. Percent of respondents who indicated that each of the following was a major influence on their decision to go fishing, in the years that they went fishing:**



**Figure 4.42. Crosstabulation by Thinking Various Factors Were a Major or Minor Influence in Anglers' Decisions to Go Fishing**

**Q35-Q52. Percent of respondents who indicated that each of the following was a major or a minor influence on their decision to go fishing, in the years that they went fishing:**



## CHAPTER 5. MAJOR FINDINGS AND CONCLUSIONS

Perhaps one of the most important findings of this study is that there is no single reason that hunting and fishing participation shows an increase between the 2006 and 2011 *National Surveys*. It is surely a combination of factors—economic factors and the building industry, the desire to hunt and fish to obtain a natural or “green” food as well as to supplement food budgets, and even the weather. The recent increases in participation are also driven by various types of people. There are new people becoming interested in these activities, older participants who are coming back to the activities after taking a break, and simply established hunters and anglers who are becoming more active.

### DATA INDICATE THAT THERE HAS BEEN AN INCREASE IN HUNTING AND FISHING

Perhaps the best starting place is to examine whether there has indeed been an increase in hunting and fishing participation. As discussed in Chapter 1, both Federal Aid data over the past few years and the *National Surveys* for 2006 and 2011 found greater numbers of hunters and anglers in recent years than in a few years past. Additionally, the surveys of hunters and anglers conducted specifically for this project found that both hunters and anglers perceive that there are greater numbers of hunters and anglers in their states. It also worth noting that a Responsive Management study of outdoor recreation in Washington State that compared a ranking of activities by the most popular to the least in 2006 and 2012 found that both hunting/shooting (not separated in the analysis) and various fishing activities all rose in the ranking of activities by popularity (unfortunately, due to differences in the survey methodology between the two studies, a direct comparison of numbers of participants could not be made; thus a ranking was compared) (Table 5.1).

**Table 5.1. Comparison of Rankings of Outdoor Activities in Washington State 2006 to 2012**

Activity	2006 Rank	2012 Rank
Fishing from a Bank, Dock, or Jetty	31	19
Firearms (Hunting or Shooting)	41	21
Fishing from Private Boat	30	22
Fishing for Shellfish	48	29
Fishing with Guide or Charter	67	57

Certainly, then, it appears that there has been an increase in participation in both hunting and fishing. It remains to be seen if the apparent increase is simply a function of the year-to-year fluctuations in participation or if the participation levels reach a slightly higher plateau over the next decade.

### THE PEOPLE WHO ARE DRIVING THE INCREASE

Whether temporary or not, there appears to have been an increase in participation. The analysis of the hunter and angler surveys conducted for this project examines who might be driving this increase. In hunting, a small, but perhaps not insubstantial, percentage of hunters were either

returning to hunting in recent years after taking a break or were new to the sport: 17% of hunters indicated that they have taken a break from hunting at some time, with 2% of hunters having specifically taken a break that included the year 2006 (when the previous *National Survey* was conducted), and 1% of nascent hunters having taken up hunting since 2011. In fishing, the percentages are slightly higher: 26% indicated having taken a break from fishing, with 3% of anglers specifically having a break that included 2006 but had come back to the sport in recent years, and 2% being new to fishing. This can partly account for the greater numbers of hunters and anglers seen in both Federal Aid data and the *National Surveys*.

The project examined the characteristics of these new and returning hunters and anglers. Crosstabulations of established hunters and new/returning hunters highlighted some differences that help reveal who the new/returning hunters are. Compared to established hunters, these new/returning hunters are slightly more often female, somewhat younger, more often in the military or college, slightly more suburban, have not been living in the same state for as long, and are more often hunting to be with friends (invited, perhaps?).

Likewise, compared to established anglers, the group of new/returning anglers are again slightly more often female, are markedly more often retired with new free time, are slightly more often identifying themselves as homemakers, slightly more suburban, have not been living in the same state for as long, and are more devoted to fishing in freshwater (i.e., did not fish in saltwater as much as established anglers—because anglers could fish in both types of waters, established anglers fished in freshwater about as much as new/returning anglers, but they fished in saltwater much more often than did new/returning anglers).

Another interesting finding of the regression analyses in Chapter 3 is that there is an apparent correlation between increases in hunting and fishing activity and *decreases* in the issuance of building permits. This finding corroborates another study done by Responsive Management discussed in Chapter 1 that also found such an inverse correlation. Additionally, studies cited in Chapter 1 found that the occupation category related to construction is one of the top for both hunters and anglers. The conjecture is that perhaps a slowdown in the economy, such as we saw recently, can lead to many hunters and anglers to both have more time (i.e., less work) to do the activities as well as more incentive to obtain meat and fish to supplement their food budgets. Certainly, a substantial percentage of hunters and anglers in the surveys were hunting or fishing for food, and food as a motivation for hunting and fishing may be on the rise.

Concurrent with people hunting and fishing for food to supplement their food budgets, there has also been a rise in people searching for natural or “green” food sources, as well as some looking for “locavore” opportunities (getting their food from local sources rather than having it shipped into their area). Both hunting and fishing interest these people because the food so obtained is more natural and local.

Another possible source of the apparent increases in hunting and fishing are military personnel returning from deployments overseas (or even domestically away from their home state). Of those hunters who had taken a break from hunting of at least 3 years at some point in their life, 20% did so because of military deployment (this includes in the survey breaks for World War II and Vietnam, as well as for more recent military actions). Among anglers, 11% of those who had

taken a break had done so for military deployments. In the follow-up question that asked why hunters and anglers (those who had taken a break) had ended their break from the activities, 22% of those hunters and 8% of those anglers ended their break because they had ended a military deployment. Certainly with the huge numbers of military personnel who have ended deployments in recent years, participation in hunting and fishing would be affected as these people return to the activities that they love.

## **FACTORS DRIVING THE INCREASES IN HUNTING AND FISHING**

Some of the factors driving the increases were examined by asking agency personnel to indicate factors that they saw as driving the increases as well as asking hunters and anglers to indicate the factors that prompted them to hunt and fish, as well as asking hunters and anglers in an open-ended question why they hunted and fished. Additionally, some past research sheds light on this, too.

As covered in Chapter 1 and as briefly alluded to above, a study using Federal Aid data from 3 years—1992, 1999, and 2004—in which hunting license sales increased against 13 other years of license sale declines between 1990 and 2005, found a negative correlation to increases in housing starts. Additionally, the regression analyses in Chapter 3 found the same negative correlation. These, along with other aforementioned studies that found that the top occupational category for employed hunters was the category that encompassed construction, carpentry, plumbing, electrical, and craftsman, suggests that, in times of decreased housing starts, a substantial number of hunters (and presumably anglers, too) will have more free time to go hunting (and fishing) because of lower work obligations.

Additionally, the previously mentioned study used a qualitative analysis of a survey that asked state wildlife professionals to suggest and assess factors that might have affected license sales in their state. The study found that an important factor that may have increased license sales is changing types of licenses (e.g., creation of new licenses, re-packaging or renaming licenses). This, in combination with hunting and fishing promotion programs (to be discussed in more detail further on in this section), may have helped to boost participation—particularly in getting hunters and anglers who are not new but who have taken breaks to come back into the activities.

Results of surveys discussed in Chapter 1 suggest that recruitment and retention programs are generally more effective at retaining those already initiated into hunting and fishing than they are at recruiting true newcomers to these activities. Nonetheless, such effects may still have boosted participation by getting people to return to these activities, particularly when the ancillary effects of those programs make for more satisfied hunters and anglers: participants in these programs reported increased approval of and interest in hunting and fishing, as well as increased knowledge of and participation in hunting and fishing. In short, by slowing attrition to a rate less than the rate of getting new members into the sports, the overall numbers of hunters and anglers would be increased.

The surveys and analyses conducted specifically for this project also produced interesting findings regarding the factors that have perhaps driven recent increases in hunting and fishing. The agency surveys asked wildlife and fish agency personnel—the people on the ground, so to

speak, and who are intimately involved in hunting and fishing—to name the factors that they felt had contributed to an increase in hunting and fishing participation. Their top-named factors that they felt were important for hunting are youth recruitment and retention programs, marketing efforts, adult retention programs, and land access programs. The top-named factors for freshwater fishing include marketing, youth recruitment and retention programs, stocking programs (which can emulate marketing, in a way, when they promote that fish are available), access programs, and adult retention programs. Finally, the top factors named by agency personnel that helped boost saltwater fishing are access programs and marketing.

Hunters and anglers were also asked about factors that prompted them to hunt and fish. Among hunters, 22% said that marketing efforts collectively had been an influence in their decision to go hunting. Among anglers, 20% said that marketing had been an influence in their decision to go fishing. While these percentages are well less than a majority, they are not insubstantial, being about a fifth of hunters and anglers.

The marketing aspect of efforts to increase sales of hunting and fishing licenses may dovetail with other research that was previously mentioned that found a factor that was correlated to increases in sales was a *change in license structure*. Such changes, which can include repackaging of licenses or recombination of various privileges, can have the effect of marketing because the hunter and/or angler may perceive that a better deal is available, or he/she may simply be reminded of the opportunities to hunt and fish.

Access programs may also have had an important effect on increasing hunting and fishing participation. Access problems are consistently named as a constraint to participation and as a reason for attrition, as discussed previously in this report. Therefore, it seems reasonable to posit that better access and more efforts devoted to access would have a beneficial effect on participation. It is certainly worth noting that both new/returning hunters and anglers, compared to established hunters and anglers, more often indicated that better access, availability of lands, and less crowding were factors prompting them to hunt and fish.

Another factor alluded to above is the natural, “green,” or locavore food movement. This movement has been gaining adherents over the past few years, and hunting and fishing are seen as sources of such foods—particularly hunting, which has less problems with contaminated meat than does fishing with contaminated fish. The surveys of hunters and anglers conducted specifically for this project found that obtaining good food is an important motivator for hunting and fishing. Among hunters who were ending a break from hunting, 5% said that one of their reasons was to obtain food (7% of those whose break included 2006, the date of the previous *National Survey*). Also among hunters, when read the list of factors that may have influenced them to go hunting, the top factor that was a major or minor influence was interest in hunting as a source of natural or “green” food, with 68% of hunters naming this as an influence. When a similar list was read to anglers, 51% said that fishing as a natural or “green” food sources was an influence in their decision to go fishing. Finally, in an open-ended question (where no answer set is read, but respondents can simply name anything that comes to mind), 56% of hunters said that they hunt for food, and 32% of anglers fish for fresh fish to eat. Certainly, then, the desire for good food plays a part in hunting and fishing participation.

**IN SUMMARY**

As noted, there appear to be many inter-related factors that have driven the apparent increase in hunting and fishing participation. No one factor can be pointed to as the key that drives the increases, and some factors are not even in anybody's control—good weather, for instance, was commonly named as something that prompted hunters to hunt and anglers to fish. Nonetheless, agencies and the hunting and fishing industries can take concrete steps based on the results of this study to help maintain and perhaps increase hunting and fishing participation.

- Use this report as a continuing resource for information that can inform agency and industry efforts to recruit and retain hunters and anglers as well as to prompt them to participate more avidly.
- While recruitment and retention programs appear to be important, they should not only pursue new participants but also prompt people to return to hunting and fishing if they have taken a break. This project found more people returning to the activities than being actually new to the activities. Nonetheless, both components are important.
- Take advantage of an apparent increase in interest in hunting and fishing among females (not, obviously, at the expense of males, who still make up the majority of hunters and anglers), young people, and suburban dwellers. The analysis that compared established hunters and anglers to new/returning hunters and anglers found that the latter group—new/returning participants—had those characteristics more often than did established participants.
- Try to reconnect with those returning from the military. An important reason for taking a break from hunting and fishing is because of deployment. Likewise, an important reason for ending such a break is a return from deployment. This return is an opportunity to re-engage hunters and anglers in those activities.
- Similar to the above, many respondents took breaks from hunting or fishing because they left home to go to school. At school, they may be away from their hunting and fishing partners, and they may not be familiar with where they can participate in those activities near school. It is important to re-engage them upon their completion of school.
- An ancillary effort related to the above is to promote hunting and fishing opportunities to people who have moved to go to school. As discussed above, they may be away from their usual hunting and shooting buddies, and they may also be away from familiar locations to do these activities. They should be provided with reminders of these activities while at school, along with information about where they can go. After all, a lack of knowledge regarding where to go is as effective as actual lack of places to go in limiting hunting and fishing participation.
- Marketing and access programs continue to be important. About a fifth of hunters and anglers indicated that marketing programs had helped influence them to hunt and fish. And access programs are important simply to slow the attrition rate in these activities.

- Marketing and access information needs to be aimed at people new to a state. These are the people (analogous to the students mentioned above) who may have had their usual hunting and fishing groups disrupted by a move, and they might be unknowledgeable about where they can do those activities near their new homes.
- Marketing efforts should take advantage of the surge in interest in the United States in the natural food and locavore movement. Hunting and fishing can both provide natural, local food, and those opportunities should be marketed to those interested in natural, local foods.
- Finally, mention should be made of the correlation to increases in license sales and the repackaging and recombination of licenses. While agencies would not want to discontinue popular license types, there may be opportunities to recombine or repackage some license types that may prompt sales.

## SOURCES

In addition to the sources cited below, the report makes extensive use of two data sources, and these are not cited in the text but are mentioned in each instance and described in Chapter 1.

These are:

- License sales data collected by the individual states and compiled by the U.S. Fish and Wildlife Service, which are known as Federal Aid data because the data are used to allocate funding under the Federal Aid in Sport Fish and Wildlife Restoration Programs. Complete data are available starting in 1958 for hunting and 1961 for fishing.
- The *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*, conducted every 5 years\* since 1955 by the U.S. Fish and Wildlife Service and the U.S. Bureau of the Census. Data are comparable from one *National Survey* to the next starting in 1991; methodological differences in how the data were collected prior to 1991 do not allow previous *National Surveys* to be compared to those starting in 1991. (\*There was a one-time 6-year interval from 1985 to 1991 so that the survey dates now fall on years ending in 1 and 6 rather than 5 and 0. The last *National Survey* was for 2011; the next one is scheduled for 2016. Note that the data for the given year are always collected in the following year; for instance, the data for the 2011 *National Survey* were collected in 2012.)

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## **APPENDIX: STUDY METHODOLOGY**

This project was designed to explore the full range of specific internal and external factors that led to increased sales of hunting and/or fishing licenses in the last few years. Internal factors refer to the efforts of state fish and wildlife agencies (e.g., outreach programs, marketing initiatives). External factors refer to elements beyond the control of agencies, including the economy, development and urban sprawl, weather, fluctuations in fish populations unrelated to stocking and hatcheries, and various aspects related to the personal experiences of anglers themselves, such as health, amount of free time, and interest.

This section provides a detailed explanation of the project methodology. The research conducted for this project combines qualitative and quantitative approaches to determine factors contributing to the increase in hunting and fishing license sales. As mentioned, the project data collection included personal interviews with state fish and wildlife agency personnel, a web-based survey of state fish and wildlife agencies, and a telephone survey of hunters and anglers. Specific aspects of the research methodology are discussed below.

### **PERSONAL INTERVIEWS**

Personal interviews are an excellent research method when there are highly knowledgeable individuals whose expertise is needed for the understanding of an issue. Personal interviews can also be used prior to survey design or as a method of understanding the specific technical nature of a project. They allow for extensive probing, follow-up questions, discussion, and observation of emotional reaction not possible in a quantitative study such as a telephone or mail survey. Personal interviews allow analyses of thoughts, attitudes, behaviors, and opinions that have a high level of content validity (Babbie, 2006).

Personal interviews allow participants to share qualitative information in a manner that allows freer expression of ideas and opinions. To determine internal factors related to hunting and fishing license sales increases, Responsive Management contacted fish and wildlife agencies for each state that saw increases in hunting and/or fishing license sales to solicit input on factors that may have contributed to the upturn in sales. Agency personnel were asked to consider such aspects as marketing/outreach campaigns, changes in license costs and types, and promotional efforts or programs, among other factors, to assess whether these factors may have affected license sales in these states.

### **LITERATURE REVIEW**

The purpose of the literature review was to contextualize study results within a framework of relevant research. Multiple researchers worked both independently and in concert to perform targeted searches on specific identified data sources and databases. For this project, the research team reviewed state reports, agency websites, and numerous data sources pertaining to hunting and fishing license sales, motivations for purchasing licenses, agency efforts to increase license sales, and marketing and outreach initiatives. The research team also consulted the USFWS National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (the National Survey)

and license data compiled as part of the Wildlife and Sport Fish Restoration Program (known as Federal Aid data). Additionally, the researchers examined in-house reports previously prepared by Responsive Management pertaining to hunting and fishing, including extensive research conducted for various federal and state agencies and many not-for-profit organizations.

## WEB-BASED SURVEYS

A web-based survey is used for a known group of potential respondents, and their responses are submitted electronically by means of the Internet. Web-based surveys can be used when the sample consists of known respondents with Web access, as was the case of this survey of fish and wildlife agency personnel.

Responsive Management conducted web-based surveys of all 50 state fish and wildlife agencies. The web-based surveys were developed to provide quantitative data to help determine the internal factors affecting license sales. Three separate surveys were developed and administered: (1) a survey of wildlife division directors, (2) a survey of freshwater fishing division directors, and (3) a survey of saltwater fishing division directors (or analogous positions and divisions within agencies—note that 16 states have separate freshwater and saltwater divisions).

Responsive Management worked collaboratively with the American Sportfishing Association to develop the surveys of fish and wildlife agency personnel. The surveys asked about a series of specific factors that may have affected hunting and/or fishing license sales in the state. The purpose of the surveys were to obtain quantitative baseline information (as well as qualitative data) on factors affecting hunting and fishing participation and license sales in each state.

A multiple-contact strategy was used to conduct the web-based surveys, with respondents being contacted by email and follow-up telephone calls. The surveys of agency personnel were conducted from December 2012 to March 2013, and Responsive Management obtained 74 completed questionnaires overall.

## TELEPHONE SURVEYS

As part of this project, Responsive Management conducted surveys of hunters and anglers from states that had greater numbers of resident hunters and anglers in the 2011 *National Survey* compared to the 2006 *National Survey*. The survey assessed their participation in hunting and fishing activities, examined their license purchasing motivations and behaviors, and sought to identify constraints or barriers to hunting and fishing license purchases and participation.

### Sample Selection

States were selected for participation based on greater numbers of hunters and/or anglers in the 2011 National Survey compared to the 2006 National Survey (i.e., they had apparent increases in numbers of hunters and/or anglers). An additional consideration in choosing which states to examine in the survey was the quality of the sample that would be available for that state.

Responsive Management explored the top 12 states experiencing apparent increases in resident hunting participation and the top 12 states experiencing apparent increases in resident fishing

participation and then selected the states for which a good sample was available. The states that were included in the survey of hunters and anglers are as follows:

**Hunting**

- Alabama
- Alaska
- Indiana
- Idaho
- Mississippi
- New York
- South Dakota

**Fishing**

- Alaska
- Idaho
- New York
- North Carolina
- South Dakota
- Vermont
- Washington

**Data Collection**

For this survey, telephones were selected as the preferred sampling medium because of the near-universality of telephone ownership among hunters and anglers. In addition, a central polling site at the Responsive Management office allowed for rigorous quality control over the interviews and data collection.

The software used for data collection was Questionnaire Programming Language (QPL). QPL is a comprehensive system for computer-assisted telephone interviewing that provides complete capabilities for designing, administering, and managing telephone-based research operations. The survey data were entered into the computer as each interview was being conducted, eliminating manual data entry after the completion of the survey and the concomitant data entry errors that may occur with manual data entry. The survey instrument was programmed so that QPL branched, coded, and substituted phrases in the survey based on previous responses to ensure the integrity and consistency of the data collection.

The Survey Center Managers and statisticians monitored the data collection, including monitoring of the actual telephone interviews without the interviewers' knowledge, to evaluate the performance of each interviewer and ensure the integrity of the data. The survey questionnaire itself contained error checkers and computation statements to ensure quality and consistent data. After the surveys were obtained by the interviewers, the Survey Center Managers and/or statisticians checked each completed survey to check for clarity and completeness.

To ensure the integrity of the telephone survey data, Responsive Management has interviewers who have been trained according to the standards established by the Council of American Survey Research Organizations. Methods of instruction included lecture and role-playing. The Survey Center Managers and other professional staff conducted project briefings with the interviewers prior to the administration of this survey. Interviewers were instructed on type of study, study goals and objectives, handling of survey questions, interview length, termination points and qualifiers for participation, interviewer instructions within the survey instrument, reading of the survey instrument, skip patterns, and probing and clarifying techniques necessary for specific questions on the survey instrument.

Interviews of hunters and anglers were conducted Monday through Friday from 9:00 a.m. to 9:00 p.m., Saturday from noon to 5:00 p.m., and Sunday from 5:00 p.m. to 9:00 p.m., local time. A five-callback design was used to maintain the representativeness of the sample, to avoid bias toward people easy to reach by telephone, and to provide an equal opportunity for all to participate. When a respondent could not be reached on the first call, subsequent calls were placed on different days of the week and at different times of the day. Responsive Management conducted at least 100 surveys of hunters in seven of the top hunting states and at least 100 surveys with anglers in seven of the top fishing states. Surveys of hunters and anglers were conducted in June 2013, and Responsive Management obtained 725 completed interviews with hunters and 722 completed interviews with anglers.

### **Data Analysis**

The analysis of data was performed using Statistical Package for the Social Sciences as well as proprietary software developed by Responsive Management. Based on the survey results, hunters and anglers were stratified into two groups: established hunters/anglers and new or returning hunters/anglers. Established hunters/anglers included those who first hunted/fished in 2006 or earlier and did not take a break from the activity. New or returning hunters/anglers included those who first hunted/fished in 2007 or later and those who first hunted/fished in 2006 or earlier but took a break from the activity, if that break included 2006. Crosstabulations of the two groups allowed the researchers to explore the differences between the groups.

## **ABOUT RESPONSIVE MANAGEMENT**

Responsive Management is an internationally recognized public opinion and attitude survey research firm specializing in natural resource and outdoor recreation issues. Our mission is to help natural resource and outdoor recreation agencies and organizations better understand and work with their constituents, customers, and the public.

Utilizing our in-house, full-service telephone, mail, and web-based survey center with 50 professional interviewers, we have conducted more than 1,000 telephone surveys, mail surveys, personal interviews, and focus groups, as well as numerous marketing and communication plans, needs assessments, and program evaluations.

Clients include the federal natural resource and land management agencies, most state fish and wildlife agencies, state departments of natural resources, environmental protection agencies, state park agencies, tourism boards, most of the major conservation and sportsmen's organizations, and numerous private businesses. Responsive Management also collects attitude and opinion data for many of the nation's top universities.

Specializing in research on public attitudes toward natural resource and outdoor recreation issues, Responsive Management has completed a wide range of projects during the past 22 years, including dozens of studies of hunters, anglers, wildlife viewers, boaters, park visitors, historic site visitors, hikers, birdwatchers, campers, and rock climbers. Responsive Management has conducted studies on endangered species; waterfowl and wetlands; and the reintroduction of large predators such as wolves, grizzly bears, and the Florida panther.

Responsive Management has assisted with research on numerous natural resource ballot initiatives and referenda and has helped agencies and organizations find alternative funding and increase their membership and donations. Additionally, Responsive Management has conducted major organizational and programmatic needs assessments to assist natural resource agencies and organizations in developing more effective programs based on a solid foundation of fact.

Responsive Management has conducted research on public attitudes toward natural resources and outdoor recreation in almost every state in the United States, as well as in Canada, Australia, the United Kingdom, France, Germany, and Japan. Responsive Management has also conducted focus groups and personal interviews with residents of the African countries of Algeria, Cameroon, Mauritius, Namibia, South Africa, Tanzania, Zambia, and Zimbabwe.

Responsive Management routinely conducts surveys in Spanish and has conducted surveys in Chinese, Korean, Japanese and Vietnamese and has completed numerous studies with specific target audiences, including Hispanics, African-Americans, Asians, women, children, senior citizens, urban, suburban and rural residents, large landowners, and farmers.

Responsive Management's research has been upheld in U.S. District Courts; used in peer-reviewed journals; and presented at major natural resource, fish and wildlife, and outdoor recreation conferences across the world. Company research has been featured in most of the nation's major media, including CNN, The New York Times, The Wall Street Journal, and on the front pages of USA Today and The Washington Post. Responsive Management's research has also been highlighted in Newsweek magazine.

Visit the Responsive Management website at:

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