

# Financial Returns to Industry from the Federal Aid in Wildlife Restoration Program

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by

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FISH AND WILDLIFE ECONOMICS AND STATISTICS

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## EXECUTIVE SUMMARY

Since 1932, firearms and ammunition manufacturers have paid a federal excise on the products they manufacture.

However, until 1937 these funds were deposited in the general treasury of the United States and did not directly benefit manufacturers. In that year, sportsmen and businesses teamed with conservation-minded policy makers to redirect these existing excise taxes to the new Pittman-Robertson Wildlife Restoration Program, which has continued ever since.

The concept of redirecting these taxes to benefit wildlife populations was simple: By investing in improvements to wildlife populations and public access, more people would go hunting and the sales of items that generated this tax would increase.

This partnership between the hunting and shooting-sports industries, hunters, and state and federal wildlife agencies has restored many wildlife populations to unimaginable numbers and provides an incredible array of hunting opportunities, as documented in this text.

Today, there are more than twice as many hunters than there were in 1937. Purchases of tax related items by hunters have increased by nearly 45% in constant dollars since 1970.

Fueling this growth, in part, has been the reliable funding that was provided by the excise tax. In 2009, excise taxes on hunting equipment totaled \$484,765,728 from sales of firearms, archery equipment and ammunition. These taxes are distributed to the states to invest in projects that improve wildlife populations, provide improved access to the huntable lands, or to develop shooting-sports facilities -- in short, to increase the number of recreational hunting and shooting opportunities.

However, as with any capital investment that a business makes, companies want to know the quantitative return received from this investment. To help answer this, an analysis was conducted at the national and local levels using actual data on excise taxes invested and hunter purchases of excise-tax related products. This analysis revealed the following long-term and short-term insights about the returns from the excise taxes paid by firearm and ammunition manufacturers:

### *Long Term Benefits:*

- In 1937, 11 states had no open seasons for deer and three others had only local seasons. Virtually all of the remaining states had far more restrictive seasons than enjoyed today. Examples of hunting then compared to now include:
  - ✓ Missouri's deer season was only three days long, and only 108 deer were harvested. In 2009, hunters in the Show Me state hunted deer for

more than 123 days – more than a 4,000% increase – and took more than 295,000 deer.

- ✓ In 1910, Colorado estimated there were approximately 1,000 elk in the state. In 1937, Colorado held a seven-day elk season. In 2008, elk hunters in Colorado could potentially hunt for 128 days, and 170,500 hunters harvested more than 45,200 elk.
- ✓ North Carolina historically had a long fall turkey season even during times when turkeys were scarce. The fall season was closed in 1971, and spring turkey hunting was not permitted. By 1977, 144 wild turkeys were reported taken in the state's spring season. By 2008, the spring harvest exploded and 10,404 birds were taken; an increase of 7,200%.
- ✓ Wisconsin grouse hunters would have had to travel out-of-state in 1937 to hunt ruffed grouse as their season was closed. Today, the Badger state is a destination for grouse hunters from around the country, where they enjoy a 136 day season.
- ✓ A pheasant hunter in South Dakota had only restrictive, local seasons to hunt in 1937. Today, pheasant hunters enjoy an 86-day, state-wide season.
- ✓ In 2010, 11 states provide more than five times as much waterfowl hunting opportunity (150 or more hunting days); 23 states provide more than four-times as much waterfowl hunting opportunity (120 or more hunting days); and 13 states provide more than three times as much waterfowl hunting opportunity (90 or more hunting days) compared to what was available in 1937 (30 days).
- Though common today, in 1937 no states had dedicated bow or muzzleloading seasons.
- With greater wildlife populations, the number of Americans hunting – the customer base for businesses paying the tax – increased nearly 2-1/2 times between 1937 and 1982. Even though the number of hunters has recently declined, there were still more than twice as many hunters in 2010 as there were in 1937, based on state license sales.
- Many more examples for additional states are included within the text.

*Nearer Term Benefits:*

- ◆ In constant dollars, the estimated return on investment to manufacturers who paid the excise tax (referred to as the “Excise Tax-Related ROI”) ranged between a low of 823% in 1976 to a high of 1,588% in 1997.
- ◆ Though it is not possible to determine the ROI for all individual projects funded by the Wildlife Restoration Program, ROIs ranged from 32% to 3,877% for the positive-ROI projects analyzed in this report.

- ◆ Some projects may have a negative ROI to the industry, but a positive ROI to the economy and the sport in general. Such projects offer value by providing the knowledge needed to develop new hunting opportunities in the future, or access to new hunting lands. Efforts funded by the excise tax have helped defend our right to hunt by upholding modern scientific management of wildlife in the face of legal challenges seeking to end various hunts.

In constant (2009) dollar terms, consumer purchases of tax-related hunting and shooting equipment at the retail level over the period ranged between a low of \$2.8 billion in 1970 to \$5.2 billion in 1996 (in 2009 dollars), while excise tax collections ranged between a low of \$177 million in 1984 to a high of \$324 million in 1994 (in 2009 dollars).

Several important factors significantly leverage the power of excise-tax dollars paid by industry:

- ◆ By law, excise tax dollars spent by state wildlife agencies must be matched by at least 25% of outside funds; in reality this match is much greater because numerous other funding sources also contribute to wildlife restoration efforts. The impact of these funds is an inherent “return” to industry since many of these projects would not likely have been conducted without the core funding provided by excise taxes.
- ◆ Investment in conservation and access projects is long-term and builds off of investments by previous generations. For example, land and water access purchased now will benefit hunters and industry for generations to come. Thus, some of the financial returns attributable to any given year may have been sown through investments made in preceding years or decades.

While the financial attributes of the excise tax that were the focus of this analysis are paramount to individual companies, several other aspects of the Wildlife Restoration Program also have implications for a company’s long-term financial health, including:

- ◆ Prior to passage of the Wildlife Restoration Act, state license fees paid by hunters were often diverted for purposes not related to hunting, such as supporting public schools.
- ◆ Now, prior to receiving any excise tax dollars, states must certify that their hunter-license dollars are only used for administration of fish or wildlife programs, thus protecting those state-license revenues for programs benefiting hunting and their supporting industries.
- ◆ Every year since 1938, the amount of hunter-license dollars protected has exceeded the amount of excise taxes paid by manufacturers by as much as 1,000%, thus vastly increasing the purchasing power of industry’s investment.
- ◆ By federal law, hunting excise-tax monies must be appropriated by Congress for their intended use and cannot be diverted or held up for other purposes. An act of Congress and agreement by the President would be required to change this.

The investments made in conserving and developing hunting opportunities create additional benefits to other parts of the economy beyond hunting and shooting-sports manufacturers, which are further quantified in this report.

The federal excise tax on hunting and shooting-sports equipment has created the foundation for the most successful conservation and wildlife-restoration program in the world. Erosion of support for the program or diminishment of the payments made into the excise tax would have immediate impacts on the ability of state agencies to provide continued hunting opportunities.

The most dangerous implications for industry from eliminating the excise tax are long term. However, some impacts would be immediate. Under mounting state budget deficits, and without the protection afforded by the Wildlife Restoration Act, state license dollars would likely be diverted for other purposes. Subsequently, outside funding currently leveraged by excise tax dollars would likely be lost to other uses.

To recoup this loss and maintain the current level of wildlife management, hunting-license fees would likely have to be increased dramatically, causing hunting participation to decline. In addition, the reduced long-term investment into the foundation of the hunting and shooting-sports industries -- wildlife populations, public access, and the recruitment of future customers – would cause a continued downward spiral of hunter participation, which would further diminish hunter spending on the equipment produced by manufacturers. In short, the loss of excise-tax funding would result in a loss of hunters, a loss of hunter spending, a loss of wildlife, and a smaller political base willing to work on the conservation issues upon which the hunting and shooting-sports industries are built.

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## Introduction

Every three months, companies involved in the hunting, and shooting-sports industries write checks to the federal government. This excise tax -- 10% on most products -- is a large investment by companies into the future of their industry. However, just as with any investment, companies want to know the financial return they receive from the taxes paid. To the extent possible, this document evaluates the "return" this excise tax generates to the bottom line of those paying companies.

The original supporters of this tax in 1937 recognized the need for a stable funding source to bolster America's struggling wildlife populations. On the face of it, the formula for the program, termed the Wildlife Restoration Program, seems simple: abundant, sustainable wildlife populations yield abundant and diverse hunting opportunities leading to increased sales of shooting/archery equipment. However, like many apparently simple things, they get more complicated once you scratch the surface.

So, how do you obtain abundant sustainable wildlife populations? Again, the answer seems simple enough: make long term investments in scientific wildlife management, have a trained and dedicated staff to advocate for and implement innovative programs, protect wildlife populations and habitat, and enforce strict wildlife protection laws that also allow for regulated harvests that are available to the general public. In a word, this formula is called Conservation.

The system that has been developed and implemented in the United States is, arguably, the best system in the world for restoring and managing wildlife populations and sustaining hunting, and shooting-sports businesses. This system, known as the North American Model of Wildlife Conservation, has succeeded in restoring wildlife populations to abundance unimaginable by early conservationists. It is also a testament to those who have followed, have understood the value of this system, and have been willing to continue to make sacrifices and investments to strengthen Conservation programs.

### ***Conservation: A Capital Investment in Your Business***

None of this remarkable success could happen without a strong partnership among sportsmen, state and federal fish-and-wildlife agencies, and the shooting-sports and hunting industries. At its core this partnership supplies reliable funding for Conservation through the sale of hunting licenses combined with excise taxes on shooting sports equipment.

This funding is best viewed as a capital investment in Conservation, where the capital being generated is the wildlife populations themselves. The dividends paid from this capital investment are the innumerable hunting opportunities available today. Today's hunting and shooting sports industries can be viewed as positive by-products of abundant sustainable wildlife populations that result from investments in Conservation. However, it is important to note that numerous other programs contribute to this

success. These include, among others: federal and state funding for pollution prevention activities; passage of state bonds for game land purchase and protection and open space; funding for agricultural programs that provide habitat, protect wetlands, and conserve soil; federal funding for acquiring and managing public lands; private landowners; and numerous contributions made by national and local non-government organizations to support wildlife research and protect habitat.

Viewing wildlife populations as a capital investment is similar to viewing your manufacturing facility as a capital investment. Making long-term, continuous investments to maintain or improve these buildings is a wise strategy that will maintain their value and pay dividends over the long-term. It is important to note that most capital investments do not yield immediate returns on investments. However, over time, these investments pay huge dividends to the wise investor.

For industry, conservation isn't the only factor affecting business. Ensuring that hunters and shooting enthusiasts have access to facilities and the wildlife resources is also paramount. Wildlife Restoration excise taxes are used to acquire and develop lands and other infrastructure to ensure that your customers have access to game populations and hunting opportunities. Shooting ranges, hunter education classes, and educational facilities foster the participation of the next generation of customers who will keep your business running.

A great conservationist, Aldo Leopold, succinctly wrote about this partnership in A Sand County Almanac: "We fancy that industry supports us, forgetting what supports industry." There is no question, Conservation programs support the industry.

### ***More Than 70 Years Building Field-Sports Industries***

While it is hard to imagine the dire straights that wildlife was in prior to the Wildlife Restoration Program, it is equally hard to imagine what the hunting and shooting-sports industries would be like if these Conservation programs were not successful. The success of these programs has allowed millions of Americans to enjoy hunting in ways that were not possible even 50 years ago. The success of these Conservation programs also allowed the development of shooting-sports and hunting industries that are the envy of the rest of the world!

Keeping the partnership among sportsmen, state and federal wildlife agencies, and the shooting-sports industries strong is the only way to provide abundant, sustainable wildlife populations for the future. While the success of these programs is remarkable, the work is far from over. At a time when today's state agencies face a multitude of new issues and demands beyond traditional fish-and-game activities, continued excise-tax funding is critical to the continuing efforts to maintain and improve wildlife conservation, land acquisition and the development of effective recruitment and retention efforts that will continue to build the base on which our user-pays/user-benefits system depends.

Taken together, investing in Conservation, access to the resources, and recruitment of the next generation of sportsmen through your excise taxes has paid huge dividends for the hunting and shooting-sports industries for well over 70 years. Beyond simply highlighting the multitudes of good projects supported through the years, this report demonstrates the financial return that investment into the Wildlife Restoration excise taxes brings to your industry.

### ***Then and Now***

The “Then and Now” section of this report illustrates how dire wildlife conservation was a mere 100 years ago. It further shows the success of programs that are currently in place across the nation. The “Now” portion of that section reflects these dividends. The hunting and shooting-sports industries, and the hunting opportunities, are the by-products of abundant, sustainable wildlife populations that result from long-term investments in Conservation.

## **Overview of the Wildlife Restoration Program**

The Wildlife Restoration Program is often called one of the most successful user-pays/user-benefits programs in the world. Industry, through its payment of dedicated excise taxes, provides the foundation for wildlife management programs, which in turn benefit hunters who purchase equipment from those same manufacturers. In 2009, wildlife-related companies provided \$484,765,728 for the Pittman-Robertson Wildlife Restoration fund from the sale of firearms, archery equipment and ammunition.

### ***What Items Are Taxed?***

A complete list of items currently subject to the manufacturer’s excise tax is found in Appendix A. In general, these items are used predominately by hunters, and shooting enthusiasts. While numerous changes have been made to the items taxed and the various tax rates on specific items, for the most part the core list of items taxed has not changed substantially since originally being implemented.

### ***Restoration Programs: Unique, Protected and Strong***

The Wildlife Restoration Program contains several ingenious provisions that are rarely found in federal legislation. For example, the act establishing this program captures an excise tax that *was already* being paid by manufacturers and applies it directly to programs that benefit recreational hunting and shooting activities and industries. In addition, two other provisions deserve mention.

The “permanent appropriation” language, now incorporated into the act, is also unique. This concept, originally included in Wildlife Restoration’s sister program, the Sport Fish Restoration Program, was so objectionable to politicians that they convinced then-

President Truman to veto the first Sport Fish Restoration bill because of it. This provision now mandates Congress to allocate the funds collected from the excise tax to the Wildlife Restoration Program. It would take another act of Congress and agreement by the President to redirect these funds for something other than supporting wildlife conservation. In addition, the provision that all funds must “remain available until expended” also is a rarity in a political system that is well known for budget maneuvering by the powers of the day.

Another uniquely significant provision of the Wildlife Restoration Program is a condition that requires states to enact a prohibition against the diversion of the license fees paid by anglers and hunters for any purpose other than the administration of state fish and game departments. Prior to enactment of this federal legislation, license dollars from sportsmen were often viewed by state governments as simply another source of general fund revenue to build roads, schools, prisons etc. Because of this provision, the Wildlife Restoration Act protects hunters’ dollars that likely would not be applied to enhancing wildlife populations. Over the years this provision has paid huge dividends; in every year the amount of funding made available through hunter licenses outstrips the funds made available through Wildlife Restoration Program funds. In 2010 this provision ensured that \$776,886,267 in hunting license revenue went toward state wildlife conservation efforts<sup>1</sup>. These funds were matched by \$472,719,710 from the Wildlife Restoration tax<sup>2</sup>. As a result, industry’s investment is more than doubled even before the funding hits the ground.

## **Methods, Definitions and Contents**

Developing a standard Return-On-Investment (ROI) relationship for a program where money flows between private industry, the federal government, more than 50 state/territorial governments, hunters, and back to industry is very complex. Different accounting systems at each level complicate calculations.

Furthermore, both Wildlife Restoration program requires that states contribute additional funds to match the industry’s contribution into specific projects. While the minimum “standard” match is 25%, most projects utilize the Wildlife Restoration funds as core funding that is often leveraged with additional funds. States commonly build significantly greater project budgets by leveraging other state, federal, and private funding sources. Despite this, the Wildlife Restoration funds are often irreplaceable catalysts for these projects, even though the final contribution to the budget may be only a fraction of the total project costs.

In addition, calculations are complicated because of inherent time lags between the time a product is manufactured, the time of first sale and tax collection, the time when the tax

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<sup>1</sup> Source: U.S. Fish and Wildlife Service, Wildlife and Sport Fish Restoration Program, license certification for 2010.

<sup>2</sup> Source; Final apportionment figures from U.S. Fish and Wildlife Service, Wildlife and Sport Fish Restoration Program.

is appropriated to the state agencies, when the funds are budgeted for a project, and when a project is fully implemented. As a result, it can be years between the manufacture of a product and the implementation of a new conservation project.

Perhaps most importantly, investments into conservation projects are often long-term investments and difficult to assess. Rebuilding depleted wildlife populations or conducting comprehensive habitat improvements can take years or decades to pay dividends in the form of improved wildlife populations and increased hunting activity which generates sales of products.

Despite these complexities, a multi-tiered approach has been developed to assess returns to industry. This approach relies on several levels of data analysis:

- A macro-level analysis of the growth of the hunting and shooting-sports industries since the initiation of the Wildlife Restoration Programs.
- A fine-scale review of selected case studies (specific projects) that have utilized Wildlife Restoration funding.
- A vision of the implications to hunting in the absence of the Wildlife Restoration Program.

Although the benefits of a project may be a result of investments from a variety of funding sources, it is assumed in each case that the Wildlife Restoration funding was vital to the conduct of the projects.

### ***Estimating Return On Investment***

The “return on investment measure” compares net benefits from the investment to the costs of the investment. The metric is very flexible and can be modified by adjusting the definition of benefits and costs. This approach applies the measure at two scales. The smaller scale, which is the return to the tax-paying companies from their investment of the excise tax, is represented by the following equation:

$$\text{Excise-Tax-Related ROI} = \frac{[(\text{Wholesale adjusted spending by hunters on tax-related equipment items}) - (\text{Excise-tax-related investments})]}{(\text{Excise-tax-related investments})}$$

The benefit to industry is defined as the retail on tax-related equipment items by hunters and shooting sports enthusiasts, adjusted to account for the amount of each sale passed from retailers and wholesalers to manufacturers who pay the tax. An average mark-up of 30 percent is assumed.<sup>3</sup> Investments are defined as the amount of excise tax collected (macro analysis) or invested into a specific project (micro analysis). An Excise Tax-Related ROI is estimated for the nation as whole and for each individual case study.

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<sup>3</sup> *National Sports Shooting Foundation: Annual Retail Survey*. Southwick Associates. 2009.

The larger scale ROI is the return to the overall economy from all investments made into a project and is represented by the following equation:

$$\text{Total Project ROI} = \frac{[(\text{Total trip and equipment spending on hunting/shooting related recreation}) - (\text{Total project investments})]}{(\text{Total project investments})}$$

Benefits (or “return”) are defined as total purchases by hunters and shooting sports enthusiasts across both trip and equipment categories (lodging, food, transportation, equipment, etc.). Investments are defined as the total dollar value of investments contributed to cover project costs. This calculation shows the return from all investments, including additional funds leveraged by excise tax dollars, and is meant to help communicate benefits from the program to communities and others besides companies who pay the tax. Adjustments are not made for manufacturing-to-retail price mark-ups.

In either case, the estimated ratio can be either positive or negative. A negative ROI indicates that the project generated benefits less than the funds invested. A positive ROI indicates that the project generated net benefits greater than those fund invested. It is important to note that positive ROI estimates are expressed in terms reflecting that the initial investment, at a minimum, is returned. Using the Excise Tax-Related ROI as an example, a ROI of 95% can be interpreted the following way:

Invested Funds: \$100,000  
Wholesale adjusted sales in tax-related equipment items: \$195,000  
Net Benefit: \$95,000  
Excise Tax-Related ROI: 95%

In this case, industry received, in taxable equipment-related sales, the amount of the initial investment plus an additional amount that was equal to 95% of the initial investment.

Typical hunter tax-related purchases, per day and annual, were derived from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (“National Survey”). All purchase data reflect only those associated with hunting-related recreation. Tax-related purchases reflect only those items that are taxed. These surveys are conducted on a five-to-six year basis, yet many of the case studies presented here span multiple years and in some cases multiple decades. As a result, hunter purchases were interpolated, when necessary, to estimate spending during intervening years. A simple linear interpolation method was applied. An equivalent technique was utilized for the macro-level analysis. A second approach, linear regression, was also incorporated at the national level, and the methodology is discussed in greater depth in the following subsection.



National Survey data are reported at both the national and state level as well as three sub-categories based upon game pursued (big game, small game, and migratory bird). Whenever possible, estimates are most closely related to the data for a particular region or state and type of game animal pursued. However, the state-level data for a particular quarry (big game, migratory bird) lists only “equipment” which includes items outside of the tax related list. On the other hand, the national level report itemizes the equipment categories according to quarry and breaks out a specific “hunting equipment” category. Therefore, the national level data allows the determination of exactly which items are tax-related and the amount spent by hunters across the nation. To accommodate these differences and add specificity to the state level analysis for individual case studies, the proportion of total purchases attributable only to tax related items at the national level was applied to total purchases at the state level to estimate purchases for tax related items at the state level. For example, to determine the dollars spent by big game hunters in Montana on taxable items, if big game hunting represents 16.7 percent of national purchases made by hunters for taxable items, then this same percentage, 16.7 percent, is applied to the total purchases by hunters in Montana.<sup>4</sup>

Wildlife Restoration funds work to improve game-species habitat and populations directly. Many indirect effects also accrue as a result of those efforts, such as land preservation and species biodiversity. These benefits go well beyond retail sales generated on tax-related items, but are outside of the realm of this investigation.

The investment portion of the estimated return, again, is defined as either the actual Wildlife Restoration funds (for Excise Tax-Related ROI ) or total funds invested by all project partners (Total Project ROI) to cover project costs. Overhead costs are not included at the case study level. Recording and accounting practices in place do not enable us to accurately capture project-related overhead costs at the case study level. At the national or macro-level, overhead costs are implicitly included in the Excise Tax-Related ROI estimation. With the exception of the macro-level analysis, all project investments, including Wildlife Restoration tax-related investment funds, are reported directly from the states in which the project exists.

All costs and purchases are inflated to current-day (2009) purchasing power using an appropriate CPI provided by the Bureau of Labor Statistics.

It is important to note two caveats with respect to interpretation of the return-on-investment measure. First, the Excise-Tax-Related ROI excludes leveraged dollars from the definition of investments and therefore from the calculation. The result is that, in most but not all instances, some may consider the estimated return upwardly biased from the industry perspective. However, this is a valid approach since, without the investment of excise-tax dollars as a base, most projects would not be able to leverage

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<sup>4</sup> This approach was ground-truthed using detailed National Survey estimates available for each state for 2006 only. The proportionally adjusted tax-related item purchases for 2006 did indeed align with the tax-related equipment item purchases calculated from the itemized state-level budgets. As a result, it is reasonable to utilize the proportional adjustment approach using state-level data in the case study analysis.”

additional matching contributions and therefore would not be conducted. Thus the impact of the leveraged dollars is an implicit “return” to the industry on their excise-tax investments. Second, return-on-investment estimates can, and will, change during the life of a project, and different types of projects will likely have different ratio estimates. The case studies selected represent a cross section of types of projects supported by excise-tax funds.

### ***Estimating Annual Hunter/Angler Spending at the National Level***

Wildlife Restoration investments at the national level reflect gross receipts received from the sale of tax-related hunting equipment and is obtained directly from the U.S. Fish and Wildlife Service. Hunter tax-related equipment purchases are derived from National Survey data and reflect only those associated with hunting –related recreation. Bearing in mind that surveys are only conducted every five to six years, two approaches are applied to estimate hunter spending during non-survey years at the national level. The first approach involved simple linear interpolation. In other words, the difference between two consecutive survey years is divided equally over the number of intervening years and added to the total tax-related equipment item purchases of the previous year. The second approach involved linear regression. There is a strong linear relationship between gross excise-tax receipts and tax-related item purchases, which allows a simple regression. .

The following model was estimated:

$$\text{Purchases}_t = f ( \text{collections}_{(t-3)}, \text{lic\_hold}_t ).$$

Purchases are defined as hunter purchases of tax-related equipment as reported in the eight previous National Surveys. Collections are defined as gross excise-tax receipts three years prior to the survey years. This time lag was employed to accommodate the time lag between point of first sale at the manufacturer level (when excise tax is paid) and retail sale. A time lag of one, two, three, and four years was investigated and the three-year time lag reflects the highest level of correlation between receipts and purchases as well as the best estimator for known purchase values. The “lic\_hold” variable reflects certified license holders and incorporates the influence of the number of hunters and anglers on total purchases. Detailed statistical output is included in Appendix C. Detailed tables that reflect the model’s performance are included in the Current Status section and Appendix C.

### ***Case Study Selection***

The vast majority of projects funded by Wildlife Restoration funds simply do not have the necessary data to calculate an ROI. These projects should not be judged as being less important to wildlife conservation as a result of data shortcomings. With few projects available to choose from, and based on the need to show case studies from across the spectrum of funded wildlife and shooting sports projects, the case studies

presented here were hand selected and do not represent a random sampling of all Wildlife Restoration projects.

Case studies presented here were identified using a two pronged approach. The first round occurred in early 2009 when state fish-and-wildlife departments nationwide were asked to identify projects that met budget and hunter participation data requirements. Approximately 11 projects receiving Wildlife Restoration funds were received. Follow-up contact was made with each project manager to discuss the project as well as investigate the availability of required data. While a number of projects initially nominated are included as case studies, the breadth of projects identified was not viewed to be fully representative of the variety of projects across the nation receiving Wildlife Restoration funds. Some project types by themselves do not lend themselves to a quantitative ROI analysis (e.g., wildlife health research, education centers) even though they ultimately contribute to continued participation in hunting and shooting sports. In other cases, investments have not been made to collect the necessary data (e.g., participation before and after the project) or the accounting mechanisms in place at the state level are not suited for breaking out the investment data as needed for an ROI analysis.

The second approach involved a review of U.S. Fish and Wildlife Service's Federal Aid Information Management System (FAIMS) database. The goal was to select projects for follow-up that would, as a whole, reflect a broad cross-section of projects based upon project type and location. Project managers were contacted to discuss the project as well as investigate the availability of required data.

None of the cases presented should be seen as an affirmation of any one particular project over another. All projects were explored in depth to determine the level of data available to analyze a return on investment. Those studies presented here are those that offered a rich level of data, as well as representing a diverse array of funded projects.

## **History and Evolution of the Wildlife Restoration Program**

While the Federal Aid in Wildlife Restoration program [commonly known as the Pittman-Robertson Act (or PR) in honor of its two prime sponsors, Senators Key Pittman (NV) and A. Willis Robertson (VA)], was passed into law in 1937, its roots go back more than a decade prior to its passage. In 1919, John B. Burnham, president of the American Game Association (the predecessor of the Wildlife Management Institute) wrote, "If the young men of the next generation are to enjoy from the country's wild life anything like the benefits derived by present outdoor man, we must be the ones that shoulder the

burden and see that our thoughtlessness or selfishness does not allow us to squander that which we hold in trust.”<sup>5</sup>

The idea behind this statement was to create a network of "shooting grounds" and "refuges" for the perpetuation of wildlife and hunting. Shortly thereafter, a proposal was drafted to enact a federal hunting stamp. While this idea enjoyed broad support from numerous recreational hunting and shooting groups, it also had its critics and failed to become law.

However, the debate on how to fund wildlife conservation continued. In 1925, a committee was formed to find an alternative funding mechanism to the federal-stamp idea. This group recommended that an *existing* 10 percent excise tax on sporting arms and ammunition be diverted from general tax receipts to fund the shooting grounds and refuge proposal.<sup>6</sup> Before the idea of redirecting this existing tax could be implemented, all excise taxes, including those on firearms and ammunition, were repealed.

The hiatus from paying excise taxes did not last long, and they were reinstated in 1932. However, these taxes continued to go into the general tax fund.

The reinstatement of excise taxes renewed the interest in redirecting the excise tax on firearms and ammunition to fund wildlife conservation. Numerous drafts of a potential bill were written by Carl Shoemaker in early 1937. The drafts were vetted among a small cadre of ardent conservations before they were widely circulated. The bill was unveiled in the spring of 1937 and support of the bill, with relatively minor changes, was obtained from the Sporting Arms and Ammunition Manufacturers Institute (SAAMI) and other conservation-minded organizations. The bill was signed into law on September 2, 1937<sup>7</sup>, when the existing excise tax on sporting arms and ammunition was redirected from general tax revenue to fund conservation programs.

This law has been amended several times since then. The funds were put into a "permanent and indefinite" account in 1951, which took them out of the annual appropriations process. In 1969, Congressman John Dingle (MI) and Senator Hugh Scott (PA) sponsored legislation that redirected an *existing* excise tax on handguns and handgun ammunition into the fund. In 1972, Congressman George Goodling (PA) and Senator Frank Moss (UT) sponsored amendments to *levy* an excise tax on archery equipment. Hunter education and shooting-range construction were added to the allowable projects for funding when handgun and archery excise taxes were added to the fund.<sup>8</sup>

The funds are collected by the federal government and held for one year and apportioned to the states for use the next year. They are apportioned through grants

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<sup>5</sup> Restoring America's Wildlife: 1937-1987. 1987. United States Department of the Interior, Fish and Wildlife Service. U.S. Government Printing Office, Washington, DC. Page 5.

<sup>6</sup> Ibid. Page 6.

<sup>7</sup> Ibid. Page 9.

<sup>8</sup> Ibid. Pages 14-15.

administered by the U.S. Fish and Wildlife Service to the states and territories based on a formula that includes the state's population, area and hunting license sales. Only state wildlife agencies and their counterparts in U.S.-held territories and Commonwealths are eligible for these grants. To maintain eligibility, the states and territories must enact laws that prohibit the diversion of hunting-license fees for any purpose other than the administration of "said agencies."<sup>9</sup> Allowable projects are funded on a 3:1 matching basis. In most cases, states use hunting-license dollars for their 25 percent match.

The initial legislation focused on wildlife research and habit acquisition. However, the list of allowable projects has expanded as new sources of funds were added to the program and new needs were identified. Funding for law enforcement is specifically prohibited from eligibility. Until 1982, projects were approved on a project-by-project basis. However, today grants are often approved to fund comprehensive planning and management activities. In both cases, projects often have numerous sub-projects (jobs) and tasks assigned to them. Annual reviews of projects and project approval are jointly conducted by state and federal managers. In addition, independent program audits are conducted in each state every five years to ensure funds are spent according to the legislation's requirements.

Over the years, millions of dollars have been invested in wildlife conservation from this fund. This investment created recreational hunting and shooting opportunities, which in turn, generated billions of dollars in purchases of hunting and shooting equipment.

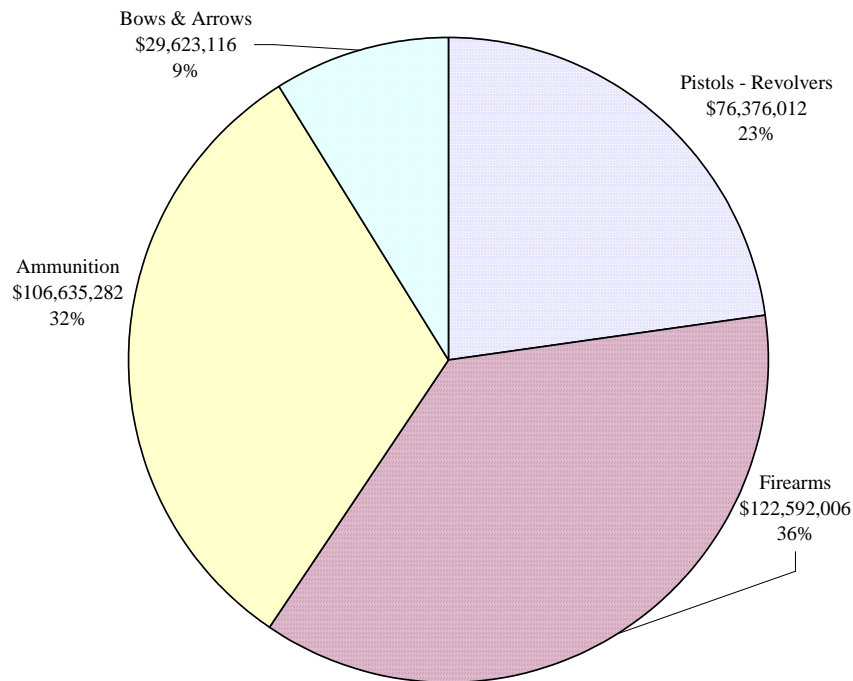
### ***Long Term Trends and Current Program Status***

Over the last five years (2005-2009), industry contributed an annual average amount of \$335,226,416 into the Wildlife Restoration account. Of this, \$76,376,012 (23%) came from the excise taxes on pistols and revolvers; \$122,592,006 (36%) from long-guns; \$106,635,282 (32%) from ammunition; and \$29,623,116 (9%) from archery equipment (Figure 1).

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<sup>9</sup> Ibid, Page 21.

**Figure 1. Average Annual Contributions to Wildlife Restoration Account (2005-2009)**



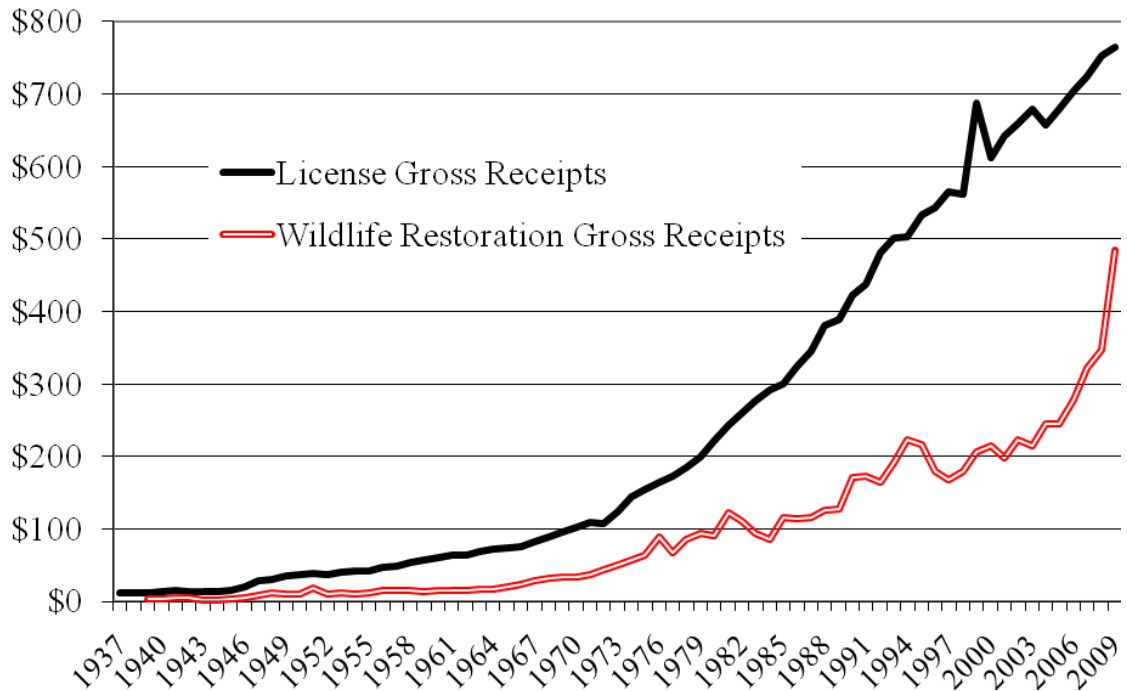
Source: U.S. Fish and Wildlife Service

Every year since 1939, the revenue generated by hunting licenses in the United States has exceeded that provided by Wildlife Restoration (Figure 2). The amount by which hunting license revenue has exceeded Wildlife Restoration funding has been as high as *1,000 percent* in the early years of the program (1943 and 1944), and has averaged *228%* annually during the life of the program.

This means is that before the industry investment even hits the ground, its value is doubled. As mentioned earlier, without the provision that states cannot divert hunting-license funds to other purposes, license money would not likely be available for wildlife management and conservation programs.

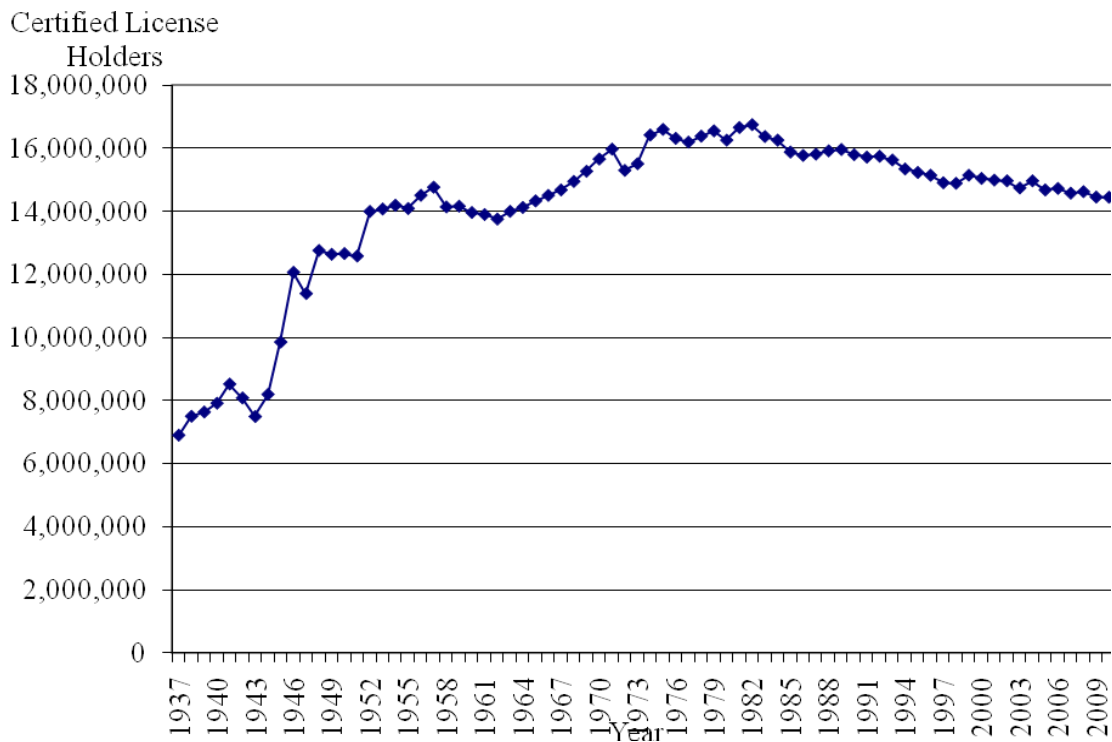
**Figure 2. Wildlife Restoration and Hunting License Income in the United States (1937-2009)**

(\$\$ Millions)



From 1937 until 1982, the number of certified hunting license holders in the United States grew steadily (Figure 3). Hunter participation peaked in 1982 at nearly 2-1/2 times the number of hunters in 1937. Since 1982, the number of hunters has declined by approximately 15%. However, even though the number of hunters has recently declined, there were still more than twice as many hunters in 2010 as there were in 1937.

**Figure 3. Recreational Hunters in the United States (1937-2009)**

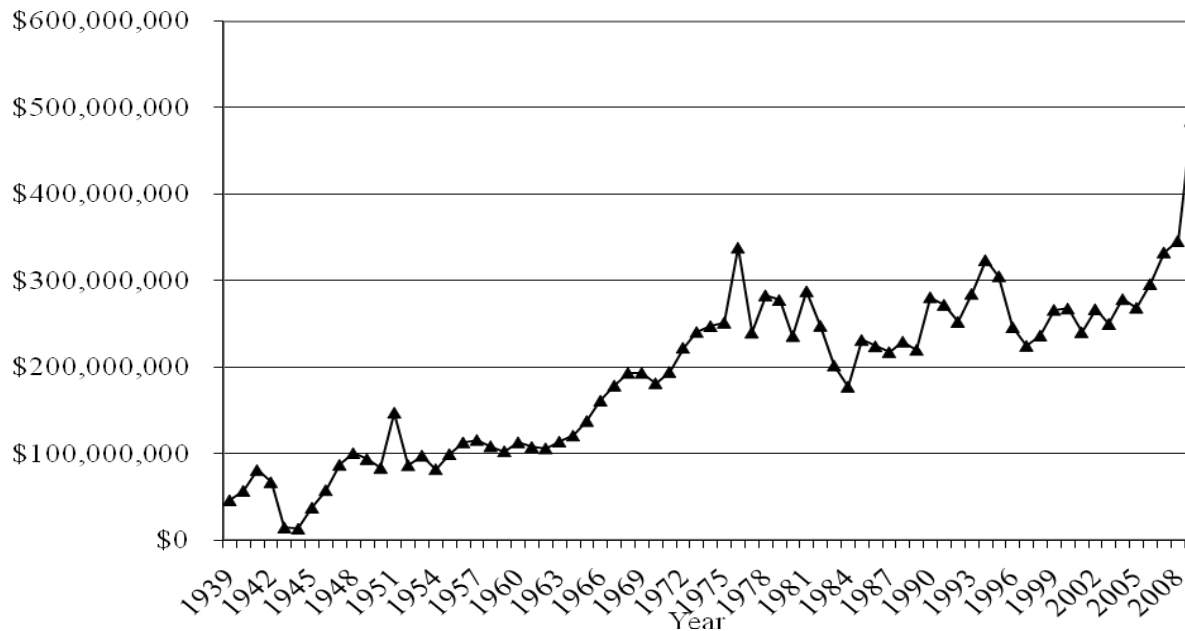


Source: U.S. Fish and Wildlife Service's National License Certification Report and National Hunting Statistics Report.

From 1976-1999, the excise-tax collections on sport-hunting equipment fluctuated, but began to increase again in the last ten years (Figure 4). The sharp increase in 2008-09 was led by significant increases in excise taxes collected for ammunition and handguns. The 2009 excise-tax collections were the highest collections since the program began.



**Figure 4. Wildlife Restoration Excise-Tax Collections (1939-2009) in 2009 dollars**



Although industry has been a long-term partner in the development and continued success of these programs, today's competitive business climate presents difficult challenges to companies. The Wildlife Restoration excise tax is often one of the top three expenses for a company, challenging the business value of paying these taxes, particularly in the absence of a measure connecting this expenditure to company profitability. Traditional communications over the years have described Wildlife Restoration "success" in terms of how much money was spent, not how much was returned. While this approach is valuable, it is only mildly effective from a business perspective as companies measure success in earnings.

Table 1 provides a comparison between Wildlife Restoration excise-tax collections and hunter purchases of tax-related equipment items for the last seven cycles of the National (conducted every five years between 1955 and 2006). *In years prior to 1970, purchases of hunting equipment are reported as an aggregate thereby not allowing itemization of spending on tax-related items.* It is also important to note that the items impacted by tax collections changed over this period and adjustments were made to calculations to accurately reflect spending on only those items where taxes were collected. For example, bows and arrows were not subject to excise-tax collections prior to the 1975 survey, therefore they are not included as part of hunter purchases of tax-related items in 1970.

## Returns on Investment

During the period available for analysis (1970-2006), excise tax collections ranged between a low of \$177 million in 1984 to a high of \$305 million in 1995 (based on constant 2009 dollars). Hunter spending on tax-related equipment items over the period ranged from a low of \$2.8 billion to a high of \$5.2 billion. Hunter retail spending is only a rough indicator of the amount of the tax contributed by industry because the tax is levied at the point of first sale, and sales related to non-hunting activities such as target shooting are not included. To estimate an manufacturer-level return on investment, it is necessary to remove mark-ups in the market chain. Therefore, to account for the mark-up in prices from manufacturers (which is reflected in the excise tax collections) to retail (which is reflected in hunter purchases), retail purchases were adjusted by a factor of 1.3, which assumes a thirty percent mark-up. Wholesale adjusted spending ranges between \$2.1 billion and \$4.0 billion. An estimated Excise Tax-Related return on investment, which reports the returns to manufacturers who pay the tax, ranges between a low of 957% in 2006 to a high of 1,540% in 1996.

It is important to remember that the reported returns to manufacturers (Excise-Tax-Related ROI) only include the Wildlife Restoration excise tax as the "investment," which results in rather high ROIs. Adding in the hunting license funds and other leveraged funding sources not paid directly by manufacturers would greatly reduce the ROIs reported in this document, but these would not adequately explain the true ROIs to the companies who collectively pay the excise tax.

**Table 1. Wildlife Tax Collections and Hunter Purchases of Tax Related Equipment Items, 1970-2006\***

Year**	Wildlife Restoration Excise Tax Collections		Hunter Purchase of Tax Related Equipment Items			Excise Tax-Related ROI
	Actual \$s	2009 \$s	Actual \$s	2009 \$s	Wholesale Adjusted 2009 \$s	
1970	\$32,805,725	\$181,392,830	\$506,680,000	\$2,801,587,813	\$2,155,067,549	1088%
1980	\$90,644,651	\$236,002,809	\$1,456,349,000	\$3,791,756,619	\$2,916,735,861	1136%
1985	\$115,999,616	\$231,284,476	\$1,958,339,000	\$3,904,611,283	\$3,003,547,141	1199%
1991	\$172,777,090	\$272,151,825	\$2,431,274,000	\$3,829,649,267	\$2,945,884,051	982%
1996	\$180,000,000	\$246,122,753	\$3,837,045,000	\$5,246,578,223	\$4,035,829,402	1540%
2001	\$198,485,863	\$240,443,600	\$3,080,860,000	\$3,732,120,055	\$2,870,861,581	1094%
2006	\$278,244,176	\$296,099,557	\$3,822,853,000	\$4,068,171,697	\$3,129,362,844	957%

\* In years prior to 1970, purchases of hunting equipment are reported as an aggregate thereby not allowing itemization of spending on tax-related items

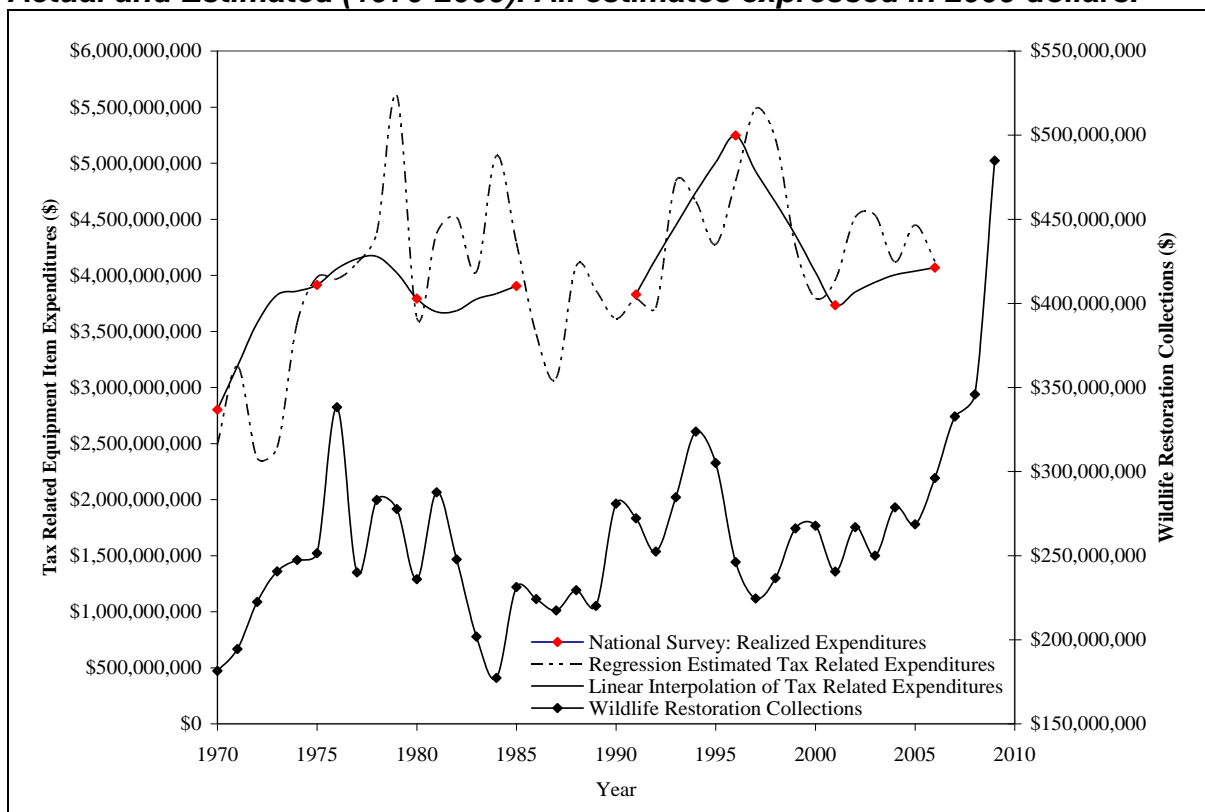
\*\*In 1975, data was collected by a private contractor utilizing different methodology and reporting detail that does not enable comparisons with other survey years.

Figure 5 compares these same excise tax receipts to hunter purchases on taxable hunting equipment (expressed in 2009 dollars) and broadens the picture beyond those years when National Survey data were collected. (Note the two graphs are on different scales.) Similar to Figure 4, annual excise-tax collections fluctuated between \$338 million in 1976 and \$177 million in 1984, then rose sharply to \$485 million in 2009.

Hunter purchases reported for the National Survey are reflected in each of the red points.<sup>10</sup> To overcome the limitation of having data available related to hunter purchases only every five or six years, spending is estimated using two different approaches. The first involves linear interpolation between survey years. These estimated hunter purchases are reflected by the solid black line. It is arguable that spending likely did not steadily increase from one year to the next, particularly given that excise tax collections, which are a reflection of hunter spending, showed annual fluctuations over the period.

A second approach utilized the correlation between excise-tax collections and hunter spending and utilized linear regression. Regression-estimated hunter purchases are reflected by the broken black line. These regression-estimated purchases do share some fluctuations with the tax collections.

**Figure 5. Wildlife Tax Collections and Tax-Related Equipment Item Purchases: Actual and Estimated (1970-2009). All estimates expressed in 2009 dollars.**



\*A break is placed between National Survey collection years of 1985 and 1991 to denote a methodological change in survey implementation to minimize recall bias. Hunters were asked to report purchases three times during the year to minimize recall bias. This change to implementation impacts the ability to make direct comparisons over the whole period.

Using these hunter-spending estimates, it is possible to calculate an annual Excise Tax-Related ROI for the whole period between 1970 and 2006. After adjusting for market chain mark-ups and inflation, the average annual purchase of tax-related items is

<sup>10</sup> The data point for 1975 was interpolated using total hunter purchases of tax related equipment items in 1970 and 1980.

estimated to be between \$3.09 billion and \$3.13 billion over the period from 1970 to 2006. Over the same period, average annual tax collections are \$252 million. This results in an estimated annual Excise Tax-Related ROI between 1,147% (interpolated range: 823% and 1588%) and 1,161% (regression range: 688% and 20,989%). Annual collections, equipment purchases and Excise- Tax-Related ROI values are reported for the whole period in Appendix table C1.

### ***The Effect of Time Lags***

In reality, there is a delay in the time from when the excise-tax payments are made and when the resulting hunter purchases take place. Not only are there time lags in the normal marketplace, but state agencies take time to invest the excise tax funds into projects and additional time is necessary for those projects to impact the wildlife resources and hunter participation. A simple project, such as calculating deer-hunter success rates, will have a relatively short time lag since hunters can judge their success against the rate of other hunters and will invest in equipment to improve their chances of success. However, projects such as habitat improvement or wildlife reintroductions may take years to produce changes that create new hunting opportunities or become evident in equipment purchases. To account for these time lags, comparing excise-tax collections in a period of years prior to purchases may be a more realistic way to evaluate return-on-investment.

Using the off-set approach (collections between 1970 – 2001 and purchases 1975 – 2006, all expressed in 2009 dollars) yields the following: collections total \$7.9 billion and adjusted hunter purchases of tax- related items are estimated to range between \$101 billion and \$105 billion. The estimated Excise-Tax-Related ROI is between 1,175% and 1,222%.

### ***Programs Funded By the Tax***

Excise taxes on sporting arms and ammunition, handguns and archery equipment are deposited into the U.S. Treasury, but are collected by the Internal Revenue Service (for archery-related products), U.S. Customs and Border Protection (for imported items), and Tax and Trade Bureau (for domestically produced firearms and ammunition). The excise tax paid on imports is due on entering the country. The tax on other equipment is paid quarterly. The funds are transferred from the U.S. Treasury to the dedicated Wildlife Restoration Account. The funds are held for one year before they are distributed to eligible agencies according to an allocation formula. The allocation formula was recently updated in 2005.

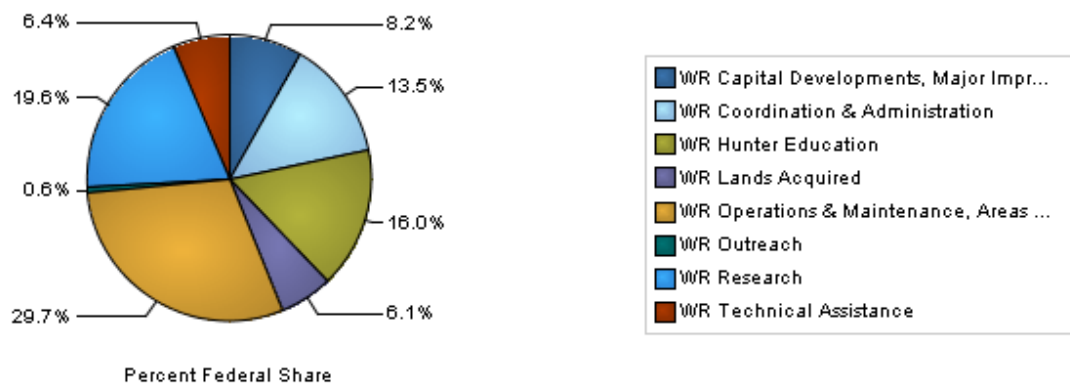
Programs eligible for funding include:

- Wildlife Restoration (for the restoration, conservation, management, and enhancement of wild birds and wild mammals; and providing for public use and benefit from these resources).

- Hunter Education and Shooting Ranges (up to 50 % of the receipts from archery and handguns *may* be used for educating responsible hunters and archers in skills, knowledge, and attitudes).
- Enhancements to the Hunter Education and Shooting Range program (fixed at \$8 million per year).
- Administration of the program (at the national level; fixed at \$3 million per year).
- Funding of the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.
- Multi-state Conservation Grants (capped at \$3 million per year).

The Wildlife Restoration and Hunter Education portions of these funds are distributed as grants to states by a formula that takes into account the state's land area and number of certified licensed hunters. Each year, every state sends in a report certifying the number of license holders it has. This report is used in the allocation of the funds. All funds are matched on a 3:1 basis. The funds are only paid (reimbursed) *after* work is completed for approved projects. Hunter-education programs may use the time contributed by volunteer instructors as a match for federal funds.

**Figure 6. Areas of investment of Wildlife Restoration state grants, 2009-2010.**



## Benefits to Industry

### Leveraged Funds

An often overlooked benefit of the Wildlife Restoration Program to the hunting and shooting sports industries is the program's ability to leverage outside funding for wildlife-enhancement projects. The most obvious demonstration of this leveraging ability is the provision requiring states to utilize hunter and angler license dollars for wildlife and sport fish programs as a condition of receiving funds. Undoubtedly, if these provisions were weakened, or the Wildlife Restoration Program was eliminated, the majority of hunting-

license dollars would eventually be redirected by state legislatures to programs other than wildlife management. This is poignantly true in today's fiscal climate where state governments are facing unprecedented shortfalls and are searching for revenue wherever it can be found.

Additional leveraging often occurs when various conservation non-government organizations (NGOs) provide additional funding for specific conservation projects. However, while important, funds from NGOs are often far outstripped by investments from state bonds for open space, by federal agencies through agricultural and pollution-prevention programs, or wildlife research efforts. In addition, private landowners have also implemented practices to enhance wildlife. These investments have resulted in improved habitat conditions for wildlife and open space that hunters can enjoy. Many of these investments would not have been made if the state wildlife agency was unable to offer initial investments from the Wildlife Restoration Program.

The total impact of these programs has allowed the hunting and shooting sports industries to grow far beyond what existed in 1937. The array of products manufactured for hunters' use and displayed in various catalogs numbers in the thousands of items and hundreds of pages (and can be measured in pounds of paper in some catalogs!). While not all of these items are subject to excise taxes, they are all dependent on healthy, sustainable wildlife populations.

In addition, the success of these wildlife conservation programs also has created a large constituency that is politically active in supporting conservation and other important programs beneficial to hunting and shooting sports.

### ***Then And Now: What Would Hunting And Conservation Look Like Without The Wildlife Restoration Program?***

It is important to note that the excise tax on long guns and ammunition, handguns and ammunition were *existing* excise taxes that were transferred in the 1930's from the general treasury to the Wildlife Trust Fund and dedicated to wildlife conservation. Some of these taxes were in place in the early 1900s, and all of them have continuously existed since at least 1932, well before the Wildlife Restoration Program was established.

Prior to their inclusion in the trust fund, taxes on sporting arms and ammunition were used to support general government programs. This historical perspective is important because in 1982, and again in 1994, some members of Congress recommended that these excise taxes be redirected to fund a crime victim's assistance program. Conservationists, state wildlife agencies, and arms and ammunition manufacturers rallied in defense of the current trust fund and prevailed. In short, unlike many other taxes, this excise tax provides direct benefit to the industries on which the tax is levied. Its continued existence – as a positive contributor to wildlife conservation and the hunting and shooting-sports industries – depends on a vigilant defense and strong alliance from all of its partners.

If the Wildlife Restoration program were rescinded or reallocated, the direct annual loss of \$484,765,728 in state conservation grants would have to be made up in license fees to maintain current programs. This would require an across the board increase in hunting license fees of more than 36%! Assuming that state agencies could hold off state-legislated diversions of these license dollars, which might be unlikely, this increase in license fees and in the overall cost of hunting would cause a decline in hunters. This decrease in participation would, in turn, further decrease overall sales by hunting manufacturers and other businesses. Plus, the degradation of wildlife conservation funding would seriously undermine long-term conservation efforts and likely destroy what is widely regarded as the most successful wildlife conservation program in the world!

### **More Wildlife Translates Into More Hunting**

In simple terms, abundant wildlife populations equate to more hunting opportunities; more hunting opportunities equate to increased purchases of hunting and shooting equipment. For example, in 1937, 11 states had no open seasons for deer and three others had only local seasons. Virtually all of the remaining states had far more restrictive seasons than enjoyed today.

When comparing "Then and Now," an obvious question is: "How large would the hunting and shooting-sports industries be today if wildlife populations were not restored?"

An exact answer to this question is not possible, but clearly, the hunting and shooting-sports industries of today exist largely because wildlife populations have been restored to numbers inconceivable in the early 1900s. These restored wildlife populations provide millions of Americans opportunities to hunt a wide array of species with a diversity of equipment that was not even dreamed about when the Wildlife Restoration Act was passed.

### ***Potential Hunting-Opportunity Days***

The purpose of the maps to follow and the corresponding maps and detailed table in Appendices E and F respectively is to illustrate the success of modern wildlife management that is the result of the partnership between the hunting and shooting-sports industries, state and federal wildlife and land management agencies, and conservation minded non-government organizations.

The precise number of hunting-opportunity days varies annually as a result of the season-setting processes used by each state, as well as calendar-day adjustments. Some seasons may be slightly inflated because Sundays may be included in the calculations. However, hunting on Sunday is not legal in all states or on all lands within a state. Readers should consult specific hunting regulations for details on hunting opportunities available for specific species. The numbers cited are used to illustrate the relative success of our collective conservation efforts.

Potential hunting-opportunity days were developed as a result of a careful review of state-agency websites and the Federal Register (for waterfowl seasons). Opportunity

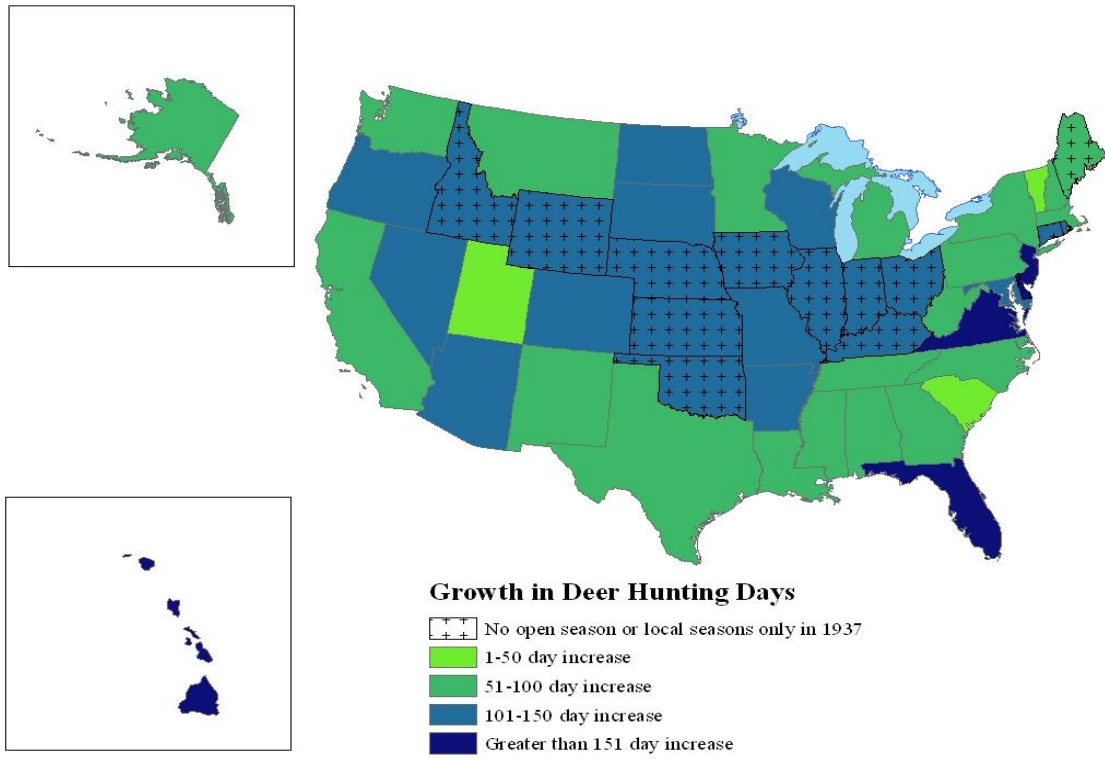
days were calculated by adding the hunting days available for general firearms seasons, archery seasons, muzzleloader seasons, youth hunting seasons, spring and fall seasons, and duck and goose seasons. Waterfowl seasons are an aggregate of duck, goose and brant seasons. However, for waterfowl seasons, a "day" was only counted once when multiple species were open at the same time. Essentially, an "opportunity day" was counted when that particular species was open somewhere in the state.

Big-game seasons may include hunts that are limited entry or available by drawing a special tag or urban population control hunts. Generally, a threshold of 100 participants was needed before that day of a limited entry or special season was included. Special animal damage control hunts were generally excluded, as were special draw hunts that were extremely limited. The actual hunting opportunity for any individual hunter is likely to be less than what it is identified because the ability to draw multiple tags or hunt with all equipment types is limited. In addition, some hunts may be available on private lands only.

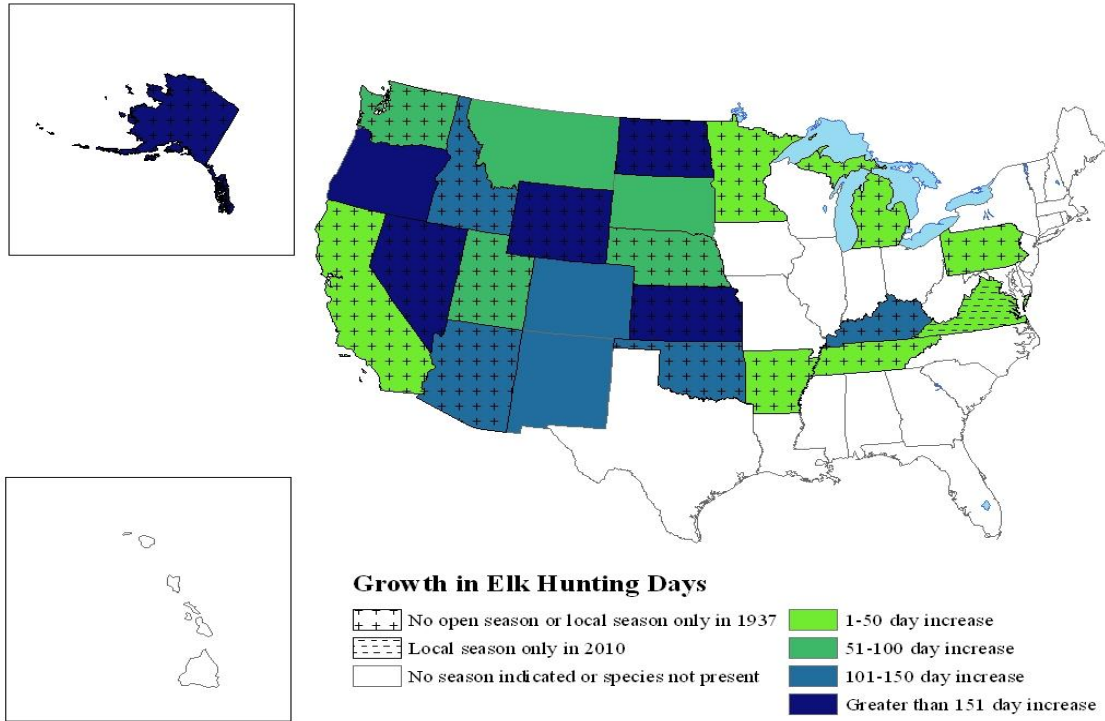
Figures 6 through 10 reflect the growth in hunting seasons available across the nation between 1937 and 2010 for deer, elk, turkey, pheasant and waterfowl hunters. The supporting data is presented in two successive tables in Appendix F. State hunting opportunities are characterized using two different and complimentary approaches. First, changes to the number of days open to hunting are defined in either four- or five-color schematics. Those states that are not assigned a color reflect states where there are either no hunting seasons indicated or the state is outside of the particular species range. Second, states that have transitioned from either a localized season or a closed season since 1937 or have since closed a season in 2010 are identified by distinct hatch markings.



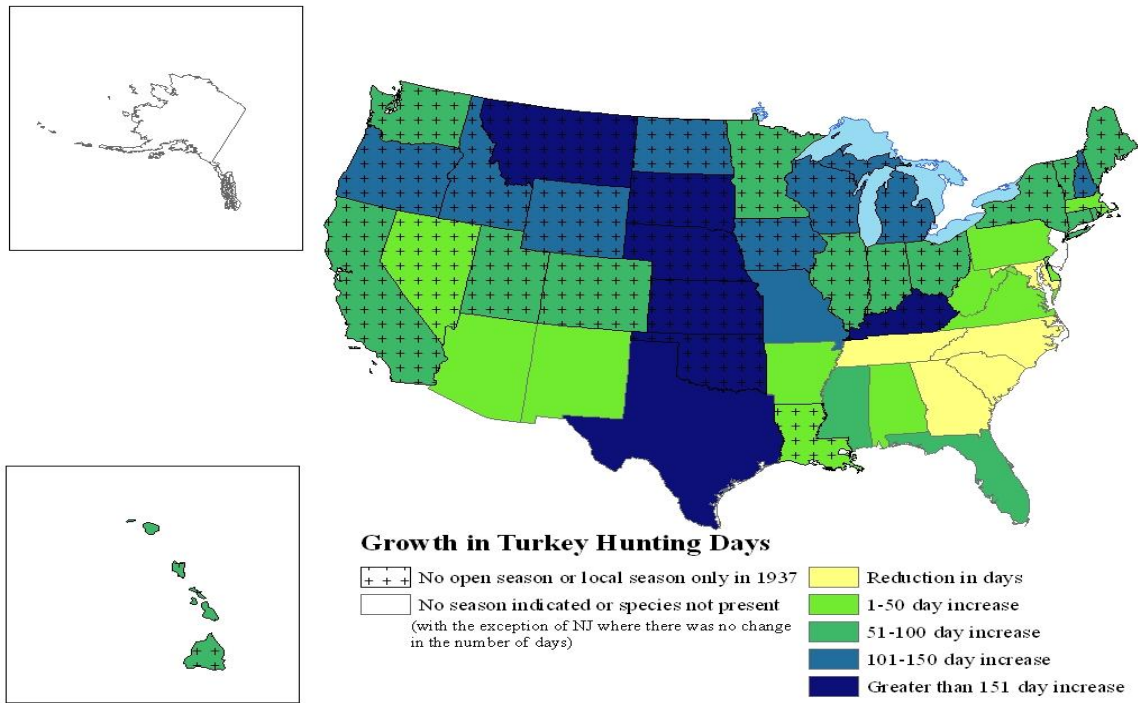
**Figure 7. National Growth in Deer Hunting Days (1937-2010)**



**Figure 8. National Growth in Elk Hunting Days (1937-2010)**

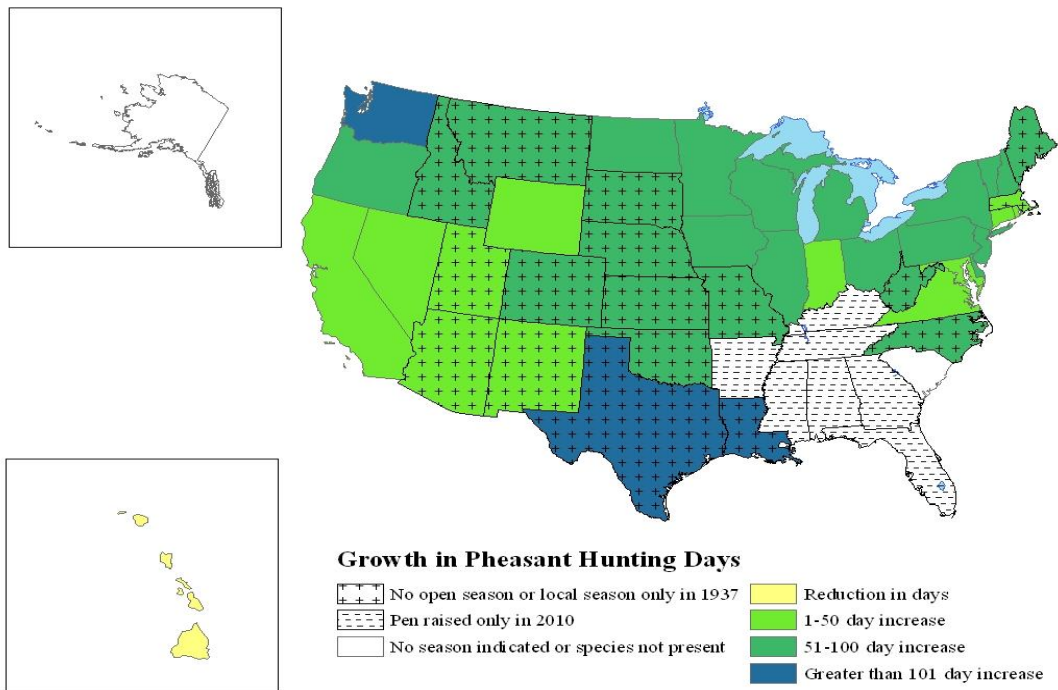


**Figure 9. National Growth in Turkey Hunting Days (1937-2010)**

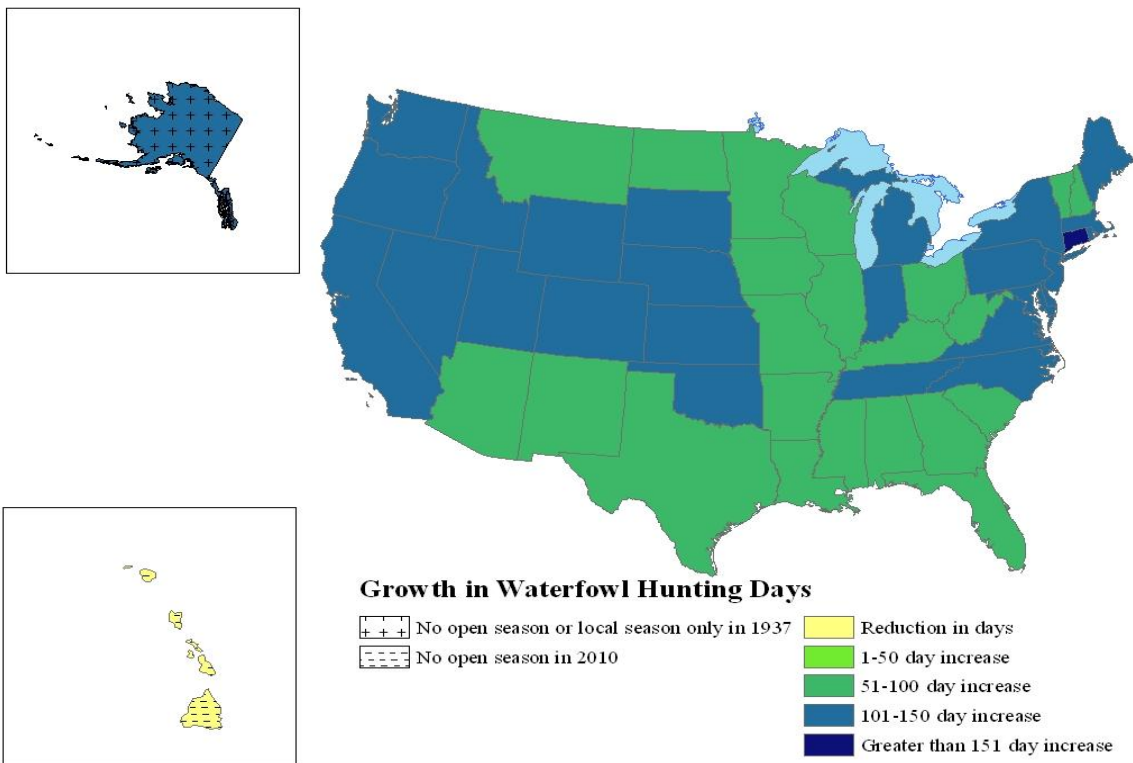


Note: In 1937, turkey hunters in the southeast had liberal fall seasons, but the turkey harvest was relatively low. Under current modern management programs, the turkey populations and hunter harvests have grown substantially in all states, including those in the southeast.

**Figure 10. National Growth in Pheasant Hunting Days (1937-2010)**



**Figure 11. National Growth in Waterfowl Hunting Days (1937-2010)**



Here are a few more examples comparing hunting opportunities available in 1937 to what is available today:

- In 1937, Missouri's deer season was only three days long, and they harvested only 108 deer. Today hunters in the Show Me state potentially can hunt deer for 123 days – more than a 4000% increase! During 2009, Missouri hunters used this time afield to take more than 295,000 deer.
- Today, Kansas is a destination state for deer hunting, and hunters enjoy more than 140 days of deer hunting with a variety of equipment. They regularly harvest more than 100,000 deer each year. In 1937, the deer season was closed and would remain closed until 1965.
- In 1937, the deer population in Illinois was estimated to be 3,000 animals, and the hunting season was closed. In 2010, hunters in Illinois could potentially hunt deer for 108 days. In 2008, hunters harvested more than 188,400 deer.
- A New Jersey deer hunter in 1937 enjoyed 6 days of deer hunting; hunters harvested 2,173 deer. In 2009, there were more than 161 deer hunting days available to Garden State hunters, and they harvested 52,784 deer.
- In 1910, Colorado estimated there were approximately 1,000 elk in the state.. In 1937, Colorado held a seven-day elk season. In 2008, elk hunters in Colorado could potentially hunt for 128 days. In 2008, 170,500 hunters spent more than 1.1 million days elk hunting, and harvested more than 45,200 elk.
- In 1937, Wyoming elk hunters had only limited local seasons. Today, 170 days of elk hunting are available for various specialty hunts. More than 53,000 hunters took advantage of these seasons, putting in more than 412,000 hunter-days devoted to elk hunting and harvesting approximately 23,000 elk.
- In 1937, turkey hunting was unheard of in Kentucky because the season was closed. Today, Kentucky turkey hunters enjoy 159 days of turkey hunting annually.
- North Carolina historically had a long fall turkey season even during times when turkeys were scarce. The fall season was closed in 1971, and a spring season was established in 1972. During the spring of 1977, 144 wild turkeys were reported taken. By 2008, the spring harvest exploded and 10,404 birds were taken; an increase of 7,200 %.
- During Ohio's first turkey season in 1966, hunters took 12 birds; in 2009 they took 20,710.
- While Arkansas had a 30-day turkey season in the 1930's, hunting success was pretty dismal – an estimated 300 birds were taken each year. Today, turkey hunters in Arkansas enjoyed a 72-day season and harvested more than 11,700 birds.
- Wisconsin grouse hunters would have had to travel out-of-state in 1937 to hunt ruffed grouse because the season was closed. Today, the Badger state

is a destination for grouse hunters from around the country, and they enjoy a 136 day season.

- A pheasant hunter in South Dakota had only restrictive, local seasons in which to hunt in 1937. Today, pheasant hunters enjoy an 86-day, state-wide season.
- In 2010, 11 states provide more than five times as much waterfowl hunting opportunity (150 or more hunting days); 23 states provide more than four-times as much waterfowl hunting opportunity (120 or more hunting days); and 13 states provide more than three times as much waterfowl hunting opportunity (90 or more hunting days) compared to what was available in 1937 (30 days).

### **Archers and Muzzleloaders Cash In On the Conservation Dividend**

In 1937, very few states even permitted archery equipment to be used during big-game hunting seasons. Since then, all states have recognized archery equipment as a valid means of hunting and most have established special archery-only seasons.

The growth of archery-only seasons began in the 1960s and continues today. In many cases, special archery-only seasons are now being used to manage difficult-to-control deer herds in urban and suburban areas where firearms are not practical. Some of these situations have extended hunting opportunities by months.

By the same token, muzzleloader hunters have also benefited from the conservation dividend resulting from improved wildlife-management programs. It is likely that muzzle-loading equipment was permitted to be used during the 1937 hunting seasons. However, special seasons specifically set up for primitive weapons are a relatively recent phenomenon.

In addition, Appendix D illustrates the national growth of archery and muzzle-loading participation and hunter spending during the last 30 years. Since 1991, the number of hunters using bows and arrows for hunting has risen from 2.7 million to 3.5 million hunters in 2006. Retail spending on archery equipment has fluctuated during this time between \$542.2 million (1991) and \$717.4 million (2006) in current dollars. Today's bow-and-arrow hunter is estimated to spend \$204.91 annually at the retail level on tax-related archery equipment.

Similarly, the number of hunters using muzzleloaders has shown consistent growth each year since 1991. Today there are roughly 2.5 million hunters using muzzleloaders or primitive firearms. This is an increase of more than one million hunters in just the last 15 years. Retail spending on muzzleloaders and primitive firearms has fluctuated but is currently estimated to be \$196 million or \$78.90 per hunter per year, in current dollars.

Table 2 reflects current hunting opportunity for archery and muzzleloading equipment in selected states. Most state hunting seasons have experienced similar growth. Note that *none* of these special seasons existed in 1937.

**Table 2. Archery and Muzzleloading Hunting Opportunities**

<b>State</b>	<b>Species</b>	<b>Archery Hunting Days*</b>	<b>Muzzleloading Hunting Days*</b>
Wyoming	Elk	30	NI
Colorado	Elk	30	9
Idaho	Elk	39	32
Oregon	Elk	60	79**
Washington	Elk	52	46
Illinois	Deer	108	3
Iowa	Deer	95	40
Wisconsin	Deer	104	10
Kansas	Deer	143	14
Kentucky	Deer	136	11
Ohio	Deer	135	10
New Jersey	Deer	161	49
Maryland	Deer	104	24
Connecticut	Deer	139	24
Michigan	Deer	77	17
Mississippi	Deer	118	53
Texas	Deer	35	14
Washington	Deer	62	50
California	Deer	175	30***
Florida	Deer	98	56
Oregon	Deer	60	72**

\* = Includes early, late and special permit seasons; as well as Sundays.

\*\* = Permit seasons

\*\*\* = Additional permit seasons available

NI + No special seasons  
indicated

## Case Studies

Case studies of how local projects funded through the Wildlife Restoration Program benefit industry were identified using a two-pronged approach. The first round involved state self-nomination of projects. The second involved a review of U.S. Fish and Wildlife Services' IFAIMS database. All projects were explored in depth to determine the level of data available to analyze return on investments. Those studies presented here are those which offered a rich level of data and should not be seen as an affirmation of any one particular project over another.

The following section develops brief narratives fourteen case studies. Every effort is made to report either an Excise-Tax-Related ROI or Total Project ROI or both in all case studies. However, not all case studies will present a ROI. Some will provide a synopsis of economic or other benefits to industry from specific hunting/shooting opportunities.

As seen earlier in this report, the overall Return-On-Investment to industry related to the excise tax nationwide regularly exceeds 1,000 %. Individual projects funded with the excise tax can be viewed as individual holdings in an investment portfolio. While some holdings yield a positive return, others yield a negative return. Likewise, with wildlife-enhancement projects, most pay positive returns (as evidenced by the significant overall ROI) but others, when measured as a stand-alone entity, are negative. Those with negative financial returns are not inherently “bad investments.” They may pay huge dividends to the advancement of knowledge to wildlife management and science that can be applied to make other projects a success – dividends that cannot be measured by traditional financial metrics. Additionally, a state relies on a mix of hunting opportunities to attract sportsmen and women to hunt in their state. Similar to grocery stores offering loss leaders in order to provide a wide selection of products that attract customers, a diversity of hunting/shooting opportunities in a state--some with positive ROIs to industry and some with negative--attracts more hunters. This is fine as long as the cumulative result of all projects is positive for industry.

It is important to note that many of these case studies investigate projects that have spanned many decades and total program expenses are not attainable. In these cases, a period of “recent history” is highlighted to reflect annual rather than total investments, purchases and return on investments.

### ***Conservation and Management Case Studies***

#### **Case #1: North Carolina Wild Turkey Re-introduction**

Data Contributors: North Carolina Wildlife Resources Commission, National Wild Turkey Federation.
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<b>SYNOPSIS (1990-2008)</b>	
<b>Project Type</b>	Conservation/Management
<b>Excise Tax Investment <sup>(b)</sup></b>	\$1.50 million (1990-2008)
<b>Additional Investment <sup>(d)</sup></b>	Approximately \$917,000: \$608,000 from NC Wildlife Resources Commission and \$309,000 from the NC State Chapter, NWTF.
<b>Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$29.6 million
<b>Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$200.2 million
<b>Excise Tax-Related ROI</b>	1,865% (cumulative 1990-2008)
<b>Total Project ROI</b>	9,883% (cumulative 1990-2008)
<b>Project Lifespan</b>	Indefinite

Excise Tax-Related ROI= (a-b)/b and Total Project ROI =(c-(d+b))/(d+b)

Most hunters and shooting sports industry staff are aware of the tremendous success for restoring the wild turkey to America's forests. This story has been featured in the National Shooting Sports Foundation's Un-Endangered Species education campaign for more than a decade.

However, while many people are aware of the final outcome, few are aware of what it took to get there.

There was keen interest in restoring wild-turkey populations right from the beginning of the modern conservation era in the early part of the 20th century. However, it took many years and many false starts before the success that we now take for granted became reality.

These false starts included releasing of pen-reared turkeys, establishing a "refuge" system, and using primitive capture techniques. From 1953 through 1969, agency personnel in North Carolina relocated an average of less than 10 birds per year. In the 1970s improved capture techniques using capture drugs, cannon nets, and more efficient rocket nets were used. Successful restoration areas also began providing additional sites in-state to trap birds. As a result, several hundred birds were relocated *each year* during this time frame. In addition, the National Wild Turkey Federation assisted states with coordinating the interstate shipment of wild turkeys.

Throughout most of the early reintroduction efforts, very liberal fall turkey seasons and bag limits were the norm. Despite tremendous opposition all across the state, the fall season was closed in North Carolina in 1971 and a spring gobbler season was established statewide in 1972.

The concentrated wild-turkey restoration efforts of the 1970s, 1980s and 1990s had brought wild- turkeys number from an all time low of only about 2,000 birds in 1970 to an estimated 130,000 birds in 2000. Not only did turkey populations increase, but their occupied range also increased. In 1980, approximately 8,900 square miles of habitat



was occupied by turkeys. By 2000, this increased to more than 31,000 square miles. Not only were there more turkeys to hunt, but turkey hunters did not have to travel far to find them.

During the spring of 1977, the first year of mandatory harvest reporting, 144 wild turkeys were reported taken. Over the next 28 years the growth in the reported harvest mirrored the growth in wild-turkey population levels in the state. In 1985, the reported harvest topped the 500 mark (509); in 1988, it topped 1,000 (1,032); in 1999, it topped the 5,000 mark (5,340); and in the spring of 2008, 10,404 birds were reported taken.

Surveys indicated that in 1977 approximately 4,800 hunters hunted 33,000 days. This increased to approximately 41,000 turkey hunters and more than 211,000 days in 2001, and to 72,609 hunters and 400,489 days in 2008.

Hunting effort over the last 19 years (1990 through 2008) is highlighted for the estimation of a return on investment. During this period, current estimates of tax-related equipment item sales for turkey hunters over the last two decades range between \$405,000 and \$3.8 million per year (Table 3). Annual spending on all items totaled between \$2.0 million and \$29.0 million.

These total and tax-related equipment item purchases are calculated from National Survey state-level reports for North Carolina for 1991, 1996, 2001, and 2006.<sup>11</sup> An assumption is made that turkey hunters are most likely to be reflected by migratory-bird hunters and their purchases given the regulatory guidelines for hunting turkey in the state. Online state-level reports do not provide the same level of detailed hunting equipment purchases that is reported at the national level but can be estimated following another assumption that the purchasing pattern for the average big-game hunter in North Carolina is similar to other migratory-bird hunters across the nation.<sup>12</sup> As a result, equipment related purchases are estimated for North Carolina using the national percentage of total hunter spending which is allocated to tax-related equipment items relative to total spending (1991: 26%, 1996: 22%, 2001: 21%, and 2006: 17%). All purchases from 1991 through 2006 are inflated to 2009 dollars. Average tax related equipment item purchases per hunter-day range between \$5.18 and \$10.89 in 2009 dollars, after adjusting for a 30% market chain markup. Total spending per hunter per day ranges between \$31.53 and \$72.62. In order to estimate a return on investment, annual per-day purchases and hunter days were interpolated using a simple straight-line assumption between two survey years.

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<sup>11</sup> State-level data for 1991 is not available online. As a result, national estimates are utilized for per-day hunter purchases.

<sup>12</sup> Wild turkeys are typically considered to be part of the big-game category. A recently release addendum to the 2006 National Survey, which looks specifically at turkey hunters relative to other quarry categories such as big game, small game, and migratory birds, indicates that turkey-hunter purchases are comparable to migratory-bird hunter spending at the national level. For example, total spending (trip and equipment) per hunter day is \$61 for turkey hunters and \$68 for migratory-bird hunters; while big-game hunters spend roughly \$71 per day.

**Table 3. North Carolina Wild Turkey Restoration Funds Invested, Hunter Purchases and Returns on Investments. All figures expressed in 2009 constant dollars.**

Year	Hunter Days <sup>a</sup>	Investments		Hunter Purchases		Return on Investment	
		Wildlife Restoration	Partial Total (Federal & State) <sup>b</sup>	Tax Related Equipment Items	Hunting Recreation Total	Excise Tax-Related ROI	Project Total ROI <sup>b</sup>
1990	39,938	\$49,243	\$65,658	\$405,470	\$2,022,405	723%	2980%
1991	51,644	\$47,255	\$63,006	\$503,145	\$2,509,591	965%	3883%
1992	63,351	\$179,482	\$239,309	\$633,662	\$3,297,116	253%	1278%
1993	75,057	\$263,903	\$351,870	\$768,623	\$4,147,871	191%	1079%
1994	83,675	\$43,429	\$57,905	\$878,623	\$4,894,579	1923%	8353%
1995	92,292	\$63,348	\$84,463	\$988,680	\$5,663,822	1461%	6606%
1996	100,910	\$61,531	\$82,041	\$1,099,138	\$6,454,665	1686%	7768%
1997	120,807	\$175,439	\$233,919	\$1,167,078	\$6,883,882	565%	2843%
1998	140,703	\$0	\$0	\$1,201,667	\$7,126,135	na	na
1999	160,600	\$0	\$0	\$1,189,208	\$7,099,807	na	na
2000	177,564	\$0	\$0	\$1,108,675	\$6,676,413	na	na
2001	194,528	\$131,739	\$175,651	\$1,006,943	\$6,133,946	664%	3392%
2002	211,492	\$89,440	\$119,253	\$1,316,856	\$8,694,347	1372%	7191%
2003	242,992	\$0	\$0	\$1,747,910	\$12,158,593	na	na
2004	274,491	\$85,179	\$113,572	\$2,218,865	\$16,010,343	2505%	13997%
2005	305,991	\$82,387	\$109,850	\$2,711,147	\$20,100,518	3191%	18198%
2006	337,490	\$79,813	\$106,417	\$3,237,328	\$24,508,995	3956%	22931%
2007	368,990	\$77,603	\$103,470	\$3,539,483	\$26,796,533	4461%	25798%
2008	400,489	\$74,733	\$99,644	\$3,841,638	\$29,084,071	5040%	29088%
Total (1990-2008)	3,443,003	\$1,504,522	\$2,006,030	\$29,564,140	\$200,263,631	1865%	9883%

<sup>a</sup> Grey shading represents years where survey data on hunter days are available. Intervening years are estimated with linear interpolation.

<sup>b</sup> Total investments include only federal and state funds. Additional leveraged funds were provided by NC State Chapter, NWTF. The exact timing of these contributions is somewhat uncertain. As a result, the ROI-TIE should be considered a maximum possible return.

Wildlife Restoration funds were also inflated to current dollars and range between \$43,000 and \$263,000. The resulting Excise Tax-Related ROI ranges between 191% and 5040% and is estimated to be 1865% over the period.

(Historic information adapted from: Seamster, Michael H. 2004. *Wild Turkey Management in North Carolina*. North Carolina Wildlife Resources Commission. Raleigh, N.C.. Survey Data supplied by Dain Palmer and Brad Gunn, North Carolina Wildlife Resources Commission. Raleigh, N.C.)

## Case #2: Virginia Resident Canada Geese

Data Contributors: Virginia Department of Game and Inland Fisheries

<b>SYNOPSIS (2009 \$s)</b>	
<b>Project Type</b>	Conservation/management
<b>Excise Tax Investment</b> <sup>(b)</sup>	\$16,954 average annual investment between 1993 and current ( <i>Total investment between 1985 and 2009 is estimated to be \$877,067</i> )
<b>Additional Investment</b> <sup>(d)</sup>	Not yet determined
<b>Hunter Spending on Tax Related Items</b> <sup>(a)</sup>	\$672,465 (average annual)
<b>Annual Hunter Spending on All Hunting Recreation Items</b> <sup>(c)</sup>	N/A
<b>Excise Tax-Related ROI</b>	3877% (average annual)
<b>Total Project ROI</b>	N/A
<b>Project Lifespan</b>	Indefinite

Excise Tax-Related ROI=(a-b)/b and Total Project=(c-(d+b))/(d+b)

While Canada geese all pretty much look alike to us, their populations are composed of family groups which make up numerous sub-populations. Some Canada geese migrate long distances and some do not migrate at all. Not all sub-populations are doing as well as desired, especially those that migrate.

By employing coordinated research among state and federal wildlife agencies, waterfowl biologists have been able to parse out these sub-populations and develop management plans for each. As a result, hunting season structures have been developed that allow different levels of hunting pressure to be applied to various sub-populations at different times of the year. This has meant increased hunting opportunity, increased hunter participation, increased goose harvests, and increased equipment sales.

For example, in Virginia, biologists began banding birds and tracking their movements in 1986. This research was coordinated with similar research in the 17 states that make up the Atlantic flyway. Some of this research is still on-going, but at a much-reduced level. Annual research assessments of the impact that the hunting seasons may be having on various sub-populations are required to meet the annual season-setting requirements established by law.

The Wildlife Management Institute contributed valuable coordination and banking services that allowed the research to be conducted flyway-wide, rather than being restricted to individual states. In 1986, the combined flyway-wide costs, spread among all states for this coordinated research was \$63,000. Virginia contributed \$4,500 to this

effort. States annually contributed \$4,500 to this project until 1990 when the per-state amount was raised to \$6,500.

In addition to this flyway-wide research, Virginia also invested approximately \$34,000 per year in Wildlife Restoration funds to support establishing resident goose seasons for a total of 40,000 per year. These funds were invested for six years for a total initial investment of \$240,000.

Virginia continues to invest approximately \$15,000 of Wildlife Restoration funds annually in on-going goose research and collecting hunter-harvest information. Current-day values of these annual investments made by the state, between 1985 and 2009, range between \$15,000 and \$79,753. Over the last 25 years, Wildlife Restoration investments have totaled roughly \$800,000. The largest portion (\$509,831, 64%) was invested prior to opening a goose season in the state.

As a result of the flyway-wide research, the first 15-day late-season Canada goose season was held in Connecticut in 1986, and the first ten-day September resident Canada goose season was held in North Carolina. As additional research refined knowledge of sub-populations, additional states expanded hunting opportunities. Within 10 years, eight states added late seasons to their goose-hunting seasons, and 14 states added early-September seasons.

Virginia instituted a September resident goose season in 1993 and a late goose season in 1996.

In addition, the seasons themselves were expanded. The initial Virginia September season was only 10 days long. This was expanded to 15 days in 1994 and then to 25 days by 1996. A similar expansion occurred to the late-season hunting opportunity. It was initially only 15 days long, but was preceded by a break in the hunting season to protect migratory birds whose populations were not doing as well as desired. The current early season for resident geese is 25 days and the late season is 30 days long in Virginia. The late season now runs without any breaks after the "regular" goose season. Many other states implemented similar season expansions for Canada geese.

This research also allowed waterfowl managers to "zone" states into sub-regions that allow seasons to be tailored to the specific birds that use a particular part of the state. For example, Virginia is divided into three zones, each with its own season structure. This optimizes goose-hunting opportunity. Before the biological knowledge was available to zone the state, only one season structure was available for Virginia goose managers, and this structure was restricted by the need to protect the migratory-goose population from James Bay. As a result, very restrictive "regular" goose seasons were permitted. In some states the regular goose season was closed altogether for several years in order to protect the James Bay sub-population.

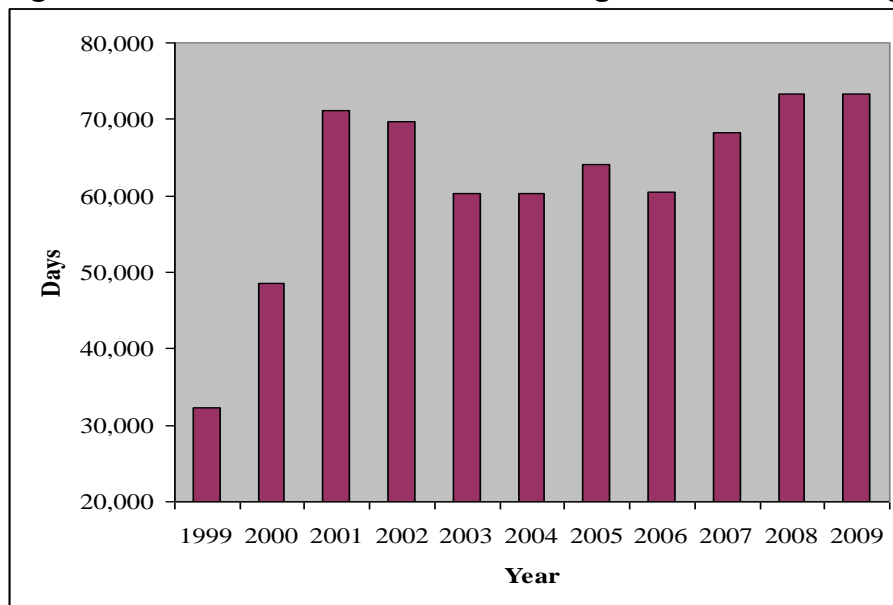
Not only has season length increased, but so has the daily bag limit. In the early days of the experimental resident goose seasons, bag limits were often only one or two birds

per day. Now these special early or late seasons allow daily bags of 5 or more birds. As result the harvests of resident Canada geese have also increased. In Virginia, hunters participating in the first September season in 1993 harvested an estimated 3,677 birds. In 2008, that number increased to 17,500. Today, Virginia allows 10 birds to be taken each day in the September season and five birds per day in the late season.

The late-season harvests are a bit more difficult to track because the regular and late season harvests were combined for the first few years. However, overall goose harvests during this time frame rose as well. In 1999, the first year that separate statistics were kept, Virginia hunters took 9,000 geese during the regular season and 14,300 in the late season. In 2008, goose hunters took 38,000 geese in the regular season and 16,800 in the late season. However, the regular seasons in some of the Virginia goose hunting zones were reestablished (they were actually closed during some years), and expanded in other zones.

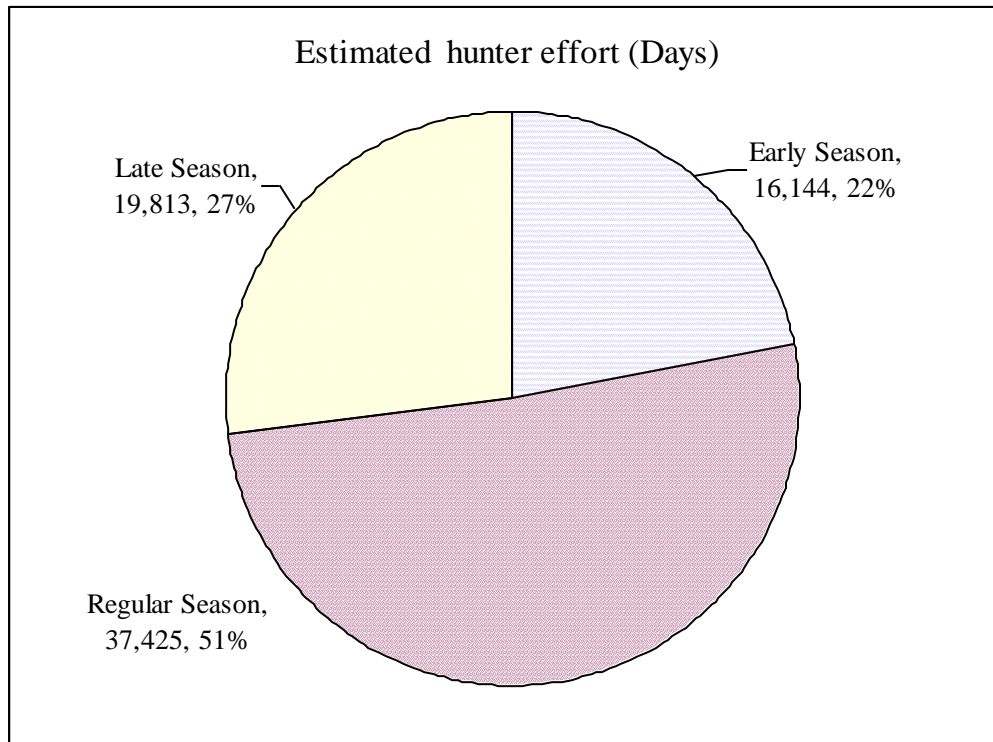
From an Atlantic flyway perspective, the creation of the early September resident Canada goose season resulted in a harvest of approximately 238,000 geese in 2008, and additional 19,500 geese were taken in the extended late season.

**Figure 12. Growth in the number of Virginia Goose Hunting Days (1999 to 2008)**



The creation of these extended early and late seasons not only resulted in increased harvests, but also increased participation by goose hunters. In 1999, Virginia estimated that it had approximately 9,100 active goose hunters who hunted approximately 32,292 days (Figure 11). This increased to 15,200 hunters in 2008 and 73,383 hunter-days. Almost 50 % of the hunter effort now takes place during the early and late seasons (Figure 12).

**Figure 13. Estimated Hunter effort in Virginia over three seasons (2008)**



Virginia verified the increased interest in waterfowl hunting during a telephone survey conducted in 2004. Seventeen percent of the respondents indicated that they either started or returned to waterfowl hunting as a result of the increased goose-hunting opportunity. This equated to more than 2,000 new or returning waterfowl hunters. Thirty-five percent of hunters participating in this survey indicated that they hunted in the early September season and 41 percent indicated that they hunted in the late extended season.

Most of the 17 states that belong to the Atlantic flyway have similarly invested in improving their understanding of resident Canada goose populations. This information has resulted in similar expansions of hunting opportunities.

As we previously mentioned, Virginia has contributed Wildlife Restoration funds towards research since 1985 that total roughly \$800,000, with approximately \$500,000 of that amount spent prior to the extended-season openings. It is challenging to develop a long-run return on investment with a great level of certainty; instead, the focus is on the last decade. Since 1999, Virginia has seen strong growth in the number of hunter days spent pursuing resident Canada geese. These hunting efforts have resulted in tax-related equipment item purchases ranging between \$392,000 and \$1.0 million (Table 4).

These tax-related hunter purchases and days related to equipment purchases for migratory birds are isolated from National Survey state-level reports for Virginia for 2001

and 2006. These online state-level reports do not provide the same level of detailed hunting equipment purchases that is reported at the national level, but can be estimated following the assumption that the purchasing pattern for the average migratory-bird hunter in Virginia is similar to other hunters across the nation. As a result, equipment-related purchases are estimated for Virginia using the national percentage of total hunter spending that is allocated to tax-related equipment items relative to total spending (2001: 21% and 2006: 17%). Average purchases per hunter day are \$14.52 for 2001 and \$8.62 for 2006, in current day (2009) dollars and adjusting for a 30% market chain markup.<sup>13</sup>

**Table 4. Virginia’s Resident Canada Goose Hunting: Annual Tax-Related Investments, Purchases and Returns (2009 \$s)**

Year	Annual Wildlife	Annual Tax Related	Annual Excise
1999	\$19,316.06	\$391,658	1928%
2000	\$18,687.89	\$647,393	3364%
2001	\$18,170.84	\$1,033,435	5587%
2002	\$17,888.02	\$930,516	5102%
2003	\$17,489.43	\$733,804	4096%
2004	\$17,035.76	\$661,717	3784%
2005	\$16,477.50	\$624,306	3689%
2006	\$15,962.57	\$521,440	3167%
2007	\$15,520.52	\$588,391	3691%
2008	\$14,946.63	\$632,228	4130%
2009	\$15,000.00	\$632,228	4115%
Average Annual	\$16,954.11	\$672,464.94	3877%

An important assumption is that hunter effort is spread equally across all seasons. This is not likely the case because the daily bag limit for the regular season is 2 or 3 birds depending on the hunting zone; the daily bag limits for the extended season is 10 birds/day in September and 5 birds/day in the late season. This increased opportunity for harvest is likely to have increased participation during the extended seasons.

Evidence does suggest that industry has recouped their investment in research and management of resident Canada geese in Virginia and continues to earn positive benefits on annual investments. In fact, in 2009 alone, migratory-bird hunters spent an estimated \$623,228 on tax related items based upon hunting days spent in Virginia. This is a marked increase (\$240,570) in annual purchases relative to spending by goose hunters in 1999 (\$391,658).

When reviewing the return on investments, it is also critical to remember that efforts across the flyway and within Virginia, in particular, extend well before 1999. The period highlighted reflects a period that might be described as the later portion of recovery when returns on investments tend to be larger as direct monetary investments trend

<sup>13</sup> Intervening years are estimated using simple linear interpolation.

towards smaller amounts. The success enjoyed today would not have been possible without the significant investments and efforts made in the mid-1980s.

## **Access and Land-Management Case Studies**

### **Case #3: Pennsylvania Game Lands**

Data Contributors: Pennsylvania Game Commission
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<b>SYNOPSIS</b>	
<b>Project Type</b>	Access
<b>Annual Excise Tax Investment <sup>(b)</sup></b>	\$9.39 million ( <i>average between 2006-2008</i> )
<b>Annual Additional Investment <sup>(d)</sup></b>	None (Maintenance and habitat work is supported by excise tax funds. However, a significant amount of leverage funds were used to purchase the lands currently managed)
<b>Annual Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$12,377,709
<b>Annual Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$84,109,754
<b>Excise Tax-Related ROI</b>	31.8% ( <i>average annual</i> )
<b>Total Project ROI</b>	796% ( <i>average annual</i> )
<b>Project Lifespan</b>	Indefinite

Excise Tax-Related ROI=(a-b)/b and Total Project ROI=(c-(d+b))/(d+b)

Finding a place to hunt has become increasingly difficult during the last few years. In fact, not having a place to hunt is often cited as one of the most important reasons for people who drop out of hunting. Finding a place to hunt is generally not difficult in Pennsylvania.

The Pennsylvania Game Commission (PGC) has invested heavily in both the purchase and maintenance of public lands for hunting. They own and maintain public hunting areas in 65 of the states' 67 counties.

This investment started in 1920. By 1936, the PGC had purchased approximately 500,000 acres; by 1965, it exceeded 1 million acres; and today PGC has 304 Game Lands comprising more than 1,450,000 acres. In addition, PGC has numerous other programs that open private lands to public hunting. While these land holdings are substantial, only about 180,000 acres were purchased with Wildlife Restoration funds. In total, these lands cost \$4.6 million, an average of \$25.55 per acre. Eighty-seven percent of the land currently managed was purchased with leveraged funds obtained



through hunting license dollars, state bonds or other non-Wildlife Restoration funding mechanisms.

However, since 2001 the maintenance costs and habitat work for all of the PGC's holdings is covered by the Wildlife Restoration program. This amounts to approximately \$9.2 million per year in Wildlife Restoration funding over the period highlighted in this case study (2006-2008). These funds are used for maintaining forest openings; controlling invasive plants; controlled burning; planting shrubs, trees and other wildlife food; providing and maintaining access roads and parking areas; maintaining and posting boundaries; publishing maps of the areas; and other habitat management and public-access activities.

Surveys indicate that 40% of Pennsylvania's deer hunters hunt primarily on the state's public lands, and 27 % of Pennsylvania's turkey hunters hunt primarily on State Game Lands. In 2009, this equated to 689,244 deer hunter days and 386,014 turkey hunter days on Game Lands. Similar hunter use has been generated each year. This estimate represents a minimum number of hunter days because hunters pursuing grouse, squirrel and other game also use Game Lands extensively.

In Pennsylvania, both deer and turkey are considered big game. For that reason, hunter tax-related equipment and total purchases are calculated using state-level estimates from 2006 National Survey data for total purchases by big-game hunters only. Because state-level big-game purchases are not itemized by category, a national-level adjustment factor of 19.1% is utilized to isolate tax-related item sales from these total purchases. It is assumed that Pennsylvania's big-game hunters' purchasing patterns are similar to those of other big-game hunters across the nation.

Per-day tax related purchases are estimated to have a current day value of \$11.51 after adjusting for a 30% market-chain mark-up. Annual tax-related item purchases of the 1.1 million deer and turkey hunter days utilizing state game lands are estimated to total \$12,377,709. Total purchases are estimated to be \$78.22 per day, which translates to \$84,109,754 per year.

**Table 5: Return on Investment Analysis: Pennsylvania Game Lands**

Year	Total WR Investments (2009 \$s)	Excise Tax-Related ROI	Total Project ROI
2006	\$8,552,380	44.7%	883%
2007	\$9,548,591	29.6%	781%
2008	\$10,064,365	23.0%	736%
Average	\$9,388,445	31.8%	796%

Wildlife Restoration investment funds are also inflated to 2009 dollars and average \$9.4 million per year (Table 5). Both total and tax related equipment item purchases exceeded those funds invested in the program. Net return on total purchases ranges between \$74.0 and \$75.5 million generating a Total Project ROI between 736% and

883%. The net return on tax related items ranges between \$2.3 and \$3.8 million per year and average \$3.0 million over the last three years. As a result, industry investments in Pennsylvania towards the maintenance and management of public game lands supports hunter spending at a level that has earned an Excise Tax-Related ROI between 23% and 45% over the last three years.

#### Case #4: Utah's Cooperative Wildlife-Management Unit Program

Data Contributors: Utah Division of Wildlife Resources

<b>SYNOPSIS</b>	
<b>Project Type</b>	Conservation/Management
<b>Annual Excise Tax Investment <sup>(b)</sup></b>	\$150,000
<b>Annual Additional Investment <sup>(d)</sup></b>	\$ 50,000
<b>Annual Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$399,152 ( <i>Most Recent Participation Scenario</i> )
<b>Annual Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$2,712,339 ( <i>Most Recent Participation Scenario</i> )
<b>Excise Tax-Related ROI</b>	166% ( <i>Annual Return for most recent participation Scenario</i> ) 318% and ( <i>Annual Return for the highest year participation scenario</i> )
<b>Total Project ROI</b>	1,256% ( <i>Annual return for most recent participation scenario</i> ) and 2,032% ( <i>Annual return for the highest year participation scenario</i> )
<b>Project Lifespan:</b>	

Excise Tax-Related ROI=(a-b)/b and Total Project ROI=(c-(d+b))/(d+b)

Developing innovative programs that provide private landowners with incentives to manage wildlife, while at the same time maintaining the state's public-trust responsibilities for managing wildlife and increasing the public's access to hunting opportunities, is a tall order. However, the Utah Division of Wildlife Resources (UDWR) accomplished all of these objectives when they created their Cooperative Wildlife Management Unit (CWMU) program. Versions of this program had been around for more than five decades, but managers realized that the old program was in need of a new implementation strategy to make it relevant to changing times. A task force was created in 1987 to develop recommendations for modernizing the program. Prior to the program's full implementation, a three-year pilot study was conducted to work out the bugs. The program was codified into law in 1993. It has been a huge success ever since.

The program creatively used the antlered (bull and buck) and antlerless tags the UDWR was issuing as incentives for private landowners to open up their land for public hunting. Prior to the creation of the CWMU program, the agency was having difficulty meeting its big-game population objectives in many game-management units that were predominantly private lands.

The CWMU program permitted the UDWR to allow qualified landowners to sell big-game tag vouchers directly to hunters at whatever price the market would support. The vouchers were redeemable at the UDWR for big-game tags.

In return for this important economic incentive, the private landowners had to agree to allow the public access to their land. In addition, a certain percentage of both antlered and antlerless tags were reserved for public drawings at their face value. In 2009, 2,700 bull and buck tags and 1,500 antlerless tags were issued through the program.

The precise allocation of the tags varies with the wildlife-management option that individual landholders select. However, approximately 80 % of the bull tags are sold through the cooperating landowners to resident and non-resident hunters, and approximately 80% of the antlerless tags are available to resident hunters via public drawings. The demand for these tags remains high, and in many of the popular units it may take several years to draw a tag. The tag vouchers sold by cooperating landowners can be purchased annually and are available based on market conditions.

To qualify to participate in the CWMU program, landowners had to meet minimum acreages and have a wildlife-management plan. The minimum land holding needed to participate in the deer and antelope program is 5,000 acres. This increases to 10,000 acres for participation in the elk and moose program. In many situations, adjacent landowners pool their lands in order to qualify. In 2009, approximately 2.1 million acres of private land was enrolled in the program and opened to public hunting.

The wildlife-management plans were cooperatively developed between the UDWR and the landowners. They included population goals, permit numbers and allocations, as well as habitat-improvement programs. Each plan is updated annually. The program is working so well that many landowners are now including wildlife in their ranching operational plans.

UDWR's investment has averaged approximately, \$150,000 of Wildlife Restoration funds matched with \$50,000 of state funding each year since 1993<sup>14</sup>. This investment consists largely of the staff time biologists devote to developing and updating the wildlife-management plans.

As a result, in 2009, approximately 11,655 hunter-days were generated by bull and buck tag holders and 7,500 hunter-days were generated by antlerless tag holders. In years past, Utah has issued up to at least 3,500 bull and buck tags as well as 3,000 antlerless

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<sup>14</sup> It is important to note that, as part of a larger comprehensive management project, Utah's CWMU programmatic tracking of investments provides only an estimate of funds invested.

tags. Two scenarios were developed to investigate annual return on investments. The first case reflects current hunter days (11,655 days for bulls and buck tag holders and 7,500 days for antlerless tag holders). The second case reflects the historical maximum hunter days under the program (approximately 15,000 days for bulls and buck tag holders and 7,500 days for antlerless tag holders).<sup>15</sup>

Hunter-day tax-related equipment item and total purchases are calculated using state-level estimates from 2006 National Survey data for total purchases by big-game hunters only. Because state-level big-game purchases are not itemized by category, a national-level adjustment factor of 19.1% is utilized to isolate tax-related item sales from these total purchases. The assumption is that purchasing patterns of Utah’s big-game hunters’ are similar to those of other big-game hunters across the nation. Per-day tax related item purchases, adjusted for a 30% market chain mark-up, are estimated at \$20.84. Total purchases are estimated to be \$141.60 per hunter day.

Annual tax related equipment and total purchases are estimated to be \$399,152 and \$2.7 million, respectively for the current hunter-day scenario (Table 6). Estimates of tax-related equipment and total purchases for the maximum hunter-day scenario are \$627,397 and \$4.2 million, respectively. Wildlife Restoration investments allocated to the program are \$150,000 annually. The estimated Excise Tax-Related ROIs for the two scenarios are 166% and 318% respectively.

**Table 6: Annual Return on Investment: Utah CWMU**

	Current	Maximum
Annual Wildlife Restoration Investment	\$150,000	\$150,000
Annual Additional Leveraged Investments	\$50,000	\$50,000
Annual Tax Related Equipment Purchases	\$399,152	\$627,397
Annual Hunting Recreation Related Purchases	\$2,712,339	\$4,263,326
<b>Excise Tax-Related ROI</b>	166%	318%
<b>Total Project ROI</b>	1,256%	2,032%

This creative program improved UDWR's ability to manage wildlife on private lands, improved agency-landowner relationships, provided landowners an incentive to manage wildlife on their lands, improved landowner tolerance for wildlife on their property, and opened up more than 2 million acres of private lands to public hunting. It truly is a win-win-win for all involved. The key in putting all of these pieces together is having a trained biological staff that is sensitive to the needs of private landowners, wildlife and the hunting public. The Wildlife Restoration program provides a large part of the funding that is critical to maintaining this trained biological staff.

<sup>15</sup> Over the life of the program, a maximum of 2,700 bulls & bucks and 1,500 antlerless tags were issued. Hunter days are then calculated using the “current” case where hunter days average 4.3 for bulls & bucks and 5 days for antlerless.

## Case #5: Montana Block-Management Program

Data Contributors: Montana Fish, Wildlife & Parks Department

<b>SYNOPSIS (Average Annual 1998-2009)</b>	
<b>Project Type</b>	Access
<b>Excise Tax Investment <sup>(b)</sup></b>	\$331,701
<b>Additional Investment <sup>(d)</sup></b>	\$5,127,817
<b>Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$6.5 million
<b>Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$54.5 million
<b>Excise Tax-Related ROI</b>	1,884%
<b>Total Project ROI</b>	906%
<b>Project Lifespan</b>	Indefinite

Excise Tax-Related ROI=(a-b)/b and Total Project ROI=(c-(d+b))/(d+b)

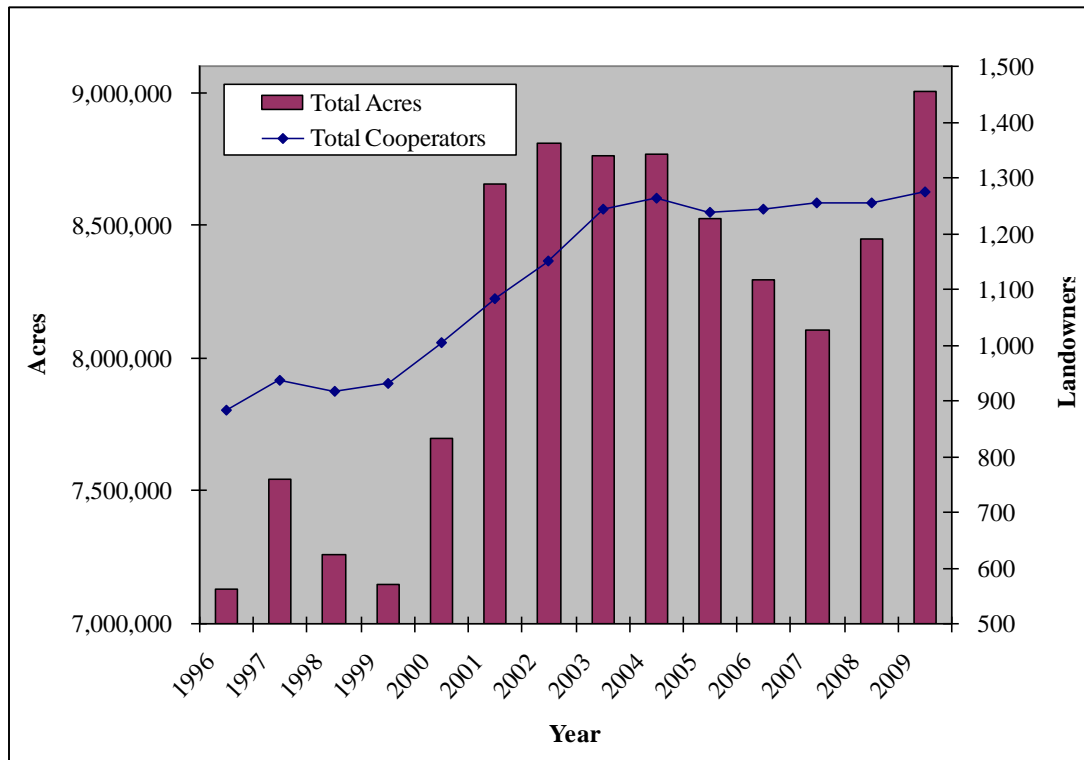
One of the most valuable things to a hunter is access to good hunting lands. And when that hunting land is in your back yard, it is even better. When you think of Montana you might not think that access to hunting land is an issue. Indeed the state has a significant amount of publicly accessible hunting lands held by a variety of state and federal entities. However, much of Montana's land is privately held. Concerned, by diminishing public access to lands offering hunting opportunities, the state created the Hunting Access Enhancement Program (HAEP) in the mid-1980s. The goal of the program is to maintain public access to private and isolated public lands. Three programs exist under the umbrella of HAEP: 1) Block Management, 2) Access Public Land Program, and 3) Special Access Projects Program. The Block Management Program is the spotlight of this study. Its focus is solely on privately held land, supports landowners through management of public hunting, and provides ways to compensate landowners for the impact of hunting. It has proven to be a win-win program for both hunters and landowners, and as this case study illustrates, it is also a win for the hunting and shooting sports industries.

As of today, more than 1,200 landowners are enrolled in the program, which comprises just over 9.0 million acres (Figure 13). The presence of Block Management Areas (BMAs) is strongest in the north-central and western portions of the state where the need for access is potentially the greatest. From year to year, landowners can choose to re-enroll or drop out of the program. A high level of satisfaction with the program has lead many to renew each year. These low levels of attrition (4.4% in 2009) provide predictable points of access for hunting opportunities, potentially improving or enhancing the hunting experience.

Wildlife Restoration investments support HAEP as a whole, with all three programs receiving a portion of funds. It is difficult to isolate those funds that are specifically

applied to Block Management. However, The Block Management Program receives the bulk of invested funds relative to the other two programs, Access Public Lands and Special Projects, which receive a much smaller portion. Annual investments have ranged between \$306,000 and \$350,000 over the last twelve years. Yet these funds have only contributed to less than 10% of the total program expenses per year.

**Figure 14. Total Landowner and Acreage Enrollment in Montana's Block-Management Program (1996 to 2009)**



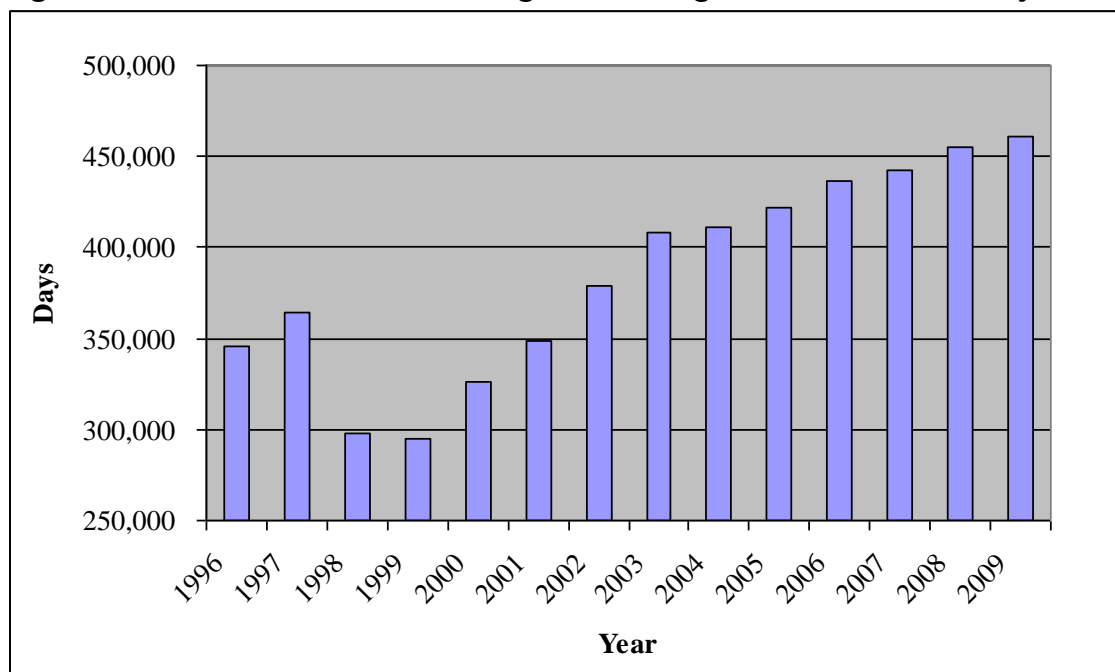
There is no direct charge to hunt on BMA lands. Rather, these Wildlife Restoration funds are leveraged with funds from various license sales, including the variable-priced, non-resident hunting licenses allocated to outfitters, non-resident upland game bird licenses, resident and non-resident hunting access enhancement fees and "Supertag" license lotteries.

Over the last decade, Montana has seen a 56% growth of hunter days spent on BMAs. The days ranged from a low of 294,784 in 1999 to the current day high of 460,757 (Figure 14). In 2006, a total of 2.14 million days were spent hunting in Montana by both residents and non-residents.<sup>16</sup> Block Management Program lands supported 20% of

<sup>16</sup> U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

those hunting days. In 2009 alone, roughly 85,000 hunters spent an average of 10 days hunting on four or five different BMAs.<sup>17</sup>

**Figure 15. Montana’s Block-Management Program Total Hunter Days**



Note: Hunter days reflect only those spend on Block Management Program Lands

As a whole, BMA lands support big game, upland birds, and waterfowl. For that reason, hunter tax-related equipment items and total purchases are calculated using state-level estimates from National Survey data for all game hunters over the period from 1996 through 2006. Intervening years were interpolated using the simple linear approach. Because state-level purchases are not itemized by category, a national-level adjustment factor (18.6% in 1996, 14.9% in 2001, and 16.7% in 2006) is utilized to isolate tax related item sales from this total purchase value. It is assumed that Montana hunters’ purchasing patterns are similar to those of other hunters across the nation.

Per-day tax-related equipment item purchases, adjusted based upon a 30% market chain mark-up, are estimated to have current day values between \$12.19 and \$20.07. This translates into total annual tax related item purchases ranging from a low of \$4.2 million in 2001 to a high of \$8.8 million in 2009 (Table 7). It is important to note that hunting days used in the calculation of hunter purchases on tax related items reflect only hunting days tracked on BMAs and not on lands involved with either Access Public Lands or the Special Projects Program. Here again, the largest proportion of hunting days are spent in BMAs relative to the other two programs. Thus, it is safe to say that the largest proportion of tax related item hunter sales is generated by those days spent hunting on Block Management lands.

<sup>17</sup> Lewis, M.S. and A. Charles, “Summary of Research: Block Management Landowner & Hunter Evaluations from the 2009 Montana Hunting Season.” Montana Fish, Wildlife, and Parks. June 2010.

In light of the fact that this return should be viewed as a minimum return because it only reflects hunting days on BMAs, industry has consistently earned positive returns on investments made in Montana's HAEP over recent years. Returns on the Wildlife Restoration funds (only) investment in this program reached a low of 1,139% during the period when investments were relatively high and hunter purchases were relatively low (2001-2003) and a high of 2,670% when the opposite was true (2006-2007).

Total daily purchases have current-day (2009) values between \$105.99 and \$149.38. Annual total purchases range between \$39.9 million and \$68.8 million. Wildlife Restoration investments are leveraged with license funds, which have ranged between \$3.5 million and \$6.5 million over the last twelve years. Together these investments cover programmatic costs of \$3.9 million and \$6.8 million. Annual Total Project ROI is estimated to range between 787% and 1,022%, with an annual average of 906%.

**Table 7. Wildlife Restoration Funds Invested relative to Tax Related Item Sales Generated (2009\$)**

Year	Investments		Purchases			
	Wildlife Restoration	Additional Funds	Total Tax Related Equipment Items	Excise Tax-Related ROI	Total Hunting Recreation Purchases	Total Project ROI
1998	\$322,233	\$3,733,904	\$5,031,650	1,461%	\$40,752,067	905%
1999	\$332,166	\$3,534,666	\$4,522,008	1,261%	\$39,923,458	932%
2000	\$350,383	\$3,540,123	\$4,489,419	1,181%	\$43,661,304	1022%
2001	\$342,946	\$3,927,625	\$4,247,524	1,139%	\$46,102,763	980%
2002	\$348,092	\$4,519,392	\$5,142,099	1,377%	\$50,590,516	939%
2003	\$344,058	\$5,870,101	\$6,116,406	1,678%	\$55,125,457	787%
2004	\$340,119	\$5,850,923	\$6,734,253	1,880%	\$56,083,286	806%
2005	\$334,690	\$6,042,606	\$7,500,219	2,141%	\$58,135,687	812%
2006	\$313,415	\$5,793,298	\$8,371,385	2,571%	\$60,763,931	895%
2007	\$306,364	\$5,848,213	\$8,486,344	2,670%	\$66,066,616	973%
2008	\$326,142	\$6,389,949	\$8,739,922	2,580%	\$68,040,736	913%
2009	\$319,800	\$6,483,009	\$8,841,315	2,665%	\$68,830,085	912%
Average Annual	\$331,701	\$5,127,817	\$6,518,545	1,884%	\$54,506,325	906%



All of the program partners are committed to the continued success of the program. The BMA program enjoys strong support among enrolled land owners and hunters, strengthening the relationship between the two. Continued growth in amount of land available and days spent hunting on BMA lands can only strengthen returns to industry in the future.

## ***Hunter Education and Recruitment Case Studies***

### **Case #6: Hunter Education in Idaho Case Study**

Data Contributors: Idaho Department of Fish and Game

<b>SYNOPSIS</b>	
<b>Project Type:</b>	Hunter Education
<b>Annual Average Excise Tax Investment <sup>(b)</sup></b>	\$439,949
<b>Average Additional Investment <sup>(d)</sup></b>	\$146,733
<b>Average Annual Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$924,208
<b>Average Annual Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$8.8 million
<b>Excise Tax-Related ROI</b>	110%
<b>Total Project ROI</b>	1,406%
<b>Project Lifespan</b>	Annual

Excise Tax-Related ROI=(a-b)/b and Total Project ROI=(c-(d+b))/(d+b)

Hunter education has improved safety in the field, thereby improving the public's image of hunting and hunters. The high public support for hunting is partly due to the required safety training that hunters must undergo. When seen from the non-hunting public's view, taking hunter education is a cost of participation that the public strongly supports. In addition, a very strong majority of existing hunters support required hunter education.

In the case of Idaho, without proof of a valid hunting license, all hunters born after January 1, 1975, are required to complete a basic hunter education course prior to purchasing a hunting license. Any hunter interested in participating in an archery-only hunting season must also complete a bow hunter education course. After a surge in attendance in 2003-2004 due to the lowering of the minimum hunting age from 12 to 10 years of age, Idaho has graduated, on average, 10,000 hunters from the combined basic and bow hunter education classes each year since 2005. Similar laws are in place in many other states,

Great strides have been taken to improve the course availability and make sure that courses are effectively and efficiently delivered. Instructor-led hunter education courses are offered statewide with the largest portion of classes held in the southwest region of

the state meeting a population-driven need. Over recent years, Idaho has also improved instructor recruitment and training, use of class-room technology for learning, and added more hands-on activities, including a live-fire range field-day requirement. In recent years, Idaho has also worked to implement online versions of both the basic and bow hunter education courses. While enrollment in these home-based courses is growing, the majority of students (90% of basic education students and 70% of bow hunter students) graduate from instructor-led courses. While no formal satisfaction surveys are available, the popularity of classroom-based instruction may be indicative of student preference.

Between 2003 and 2008, Wildlife Restoration funds have contributed \$2.6 million to support the hunter education program. This translates to an average investment per year of \$438,402 or per student of just over \$41. It is important to note that all instructor time is volunteered, and an estimated 15,800 hours are allocated to student instruction each year.<sup>18</sup>

Nationally, research shows that the youngest age cohorts spend less than the average hunter, regardless of quarry, on total purchases including tax related equipment items. Average equipment purchases for hunters age 16-17 are roughly half of purchases for hunters aged 45-54, and total purchases are roughly one-third of the amount spent by the older cohort.<sup>19</sup> Idaho hunter education graduates are more reflective of this younger age cohort and are estimated to spend roughly \$122 per year on tax-related hunting equipment and \$935 in total per year on hunting recreation. This translates into just under \$1 million per year in annual equipment purchases and at least \$5.8 million in total spending per year for this group (Table 8). These per-hunter tax related equipment item expenses are calculated using national retail purchases for hunting from 2006 National Survey data adjusted for a 30% market chain mark-up.

**Table 8. Minimum Return on Investment: Idaho Hunter Education**

Average Annual:	Including 2003 & 2004	Excluding 2003 & 2004
Wildlife Restoration Investments	\$438,402	\$439,949
Funds Invested (Wildlife Restoration and State)	\$584,592	\$586,681
Tax Related Equipment Item Purchases	\$967,271	\$924,208
Trip and Equipment Purchases on Hunting Recreation	\$9,310,251	\$8,810,586
<b>Estimated Excise Tax-Related ROI</b>	121%	110%
<b>Estimated Total Project ROI</b>	1,496%	1,406%

Note: Wildlife Restoration funds are leveraged with state funds at an annual rate of \$146,733, excluding 2003-04. The number of students graduated from the program is 10,593 (including 2003-04) and 10,061 (excluding 2003-04). The 2003 and 2004 numbers represent atypical years due to an influx of young hunters as a result of a legislative change to the minimum hunting age.

<sup>18</sup> At an hourly rate of \$28.20, this volunteer time provides an in-kind match of roughly \$445,000. This hourly rate is an agreed upon rate between Idaho Department of Fish and Game and U.S. Fish & Wildlife Service and is based upon the average salary and benefits of a Wildlife Educator who typically performs educational functions very similar to the Hunter Education Program volunteer instructors.

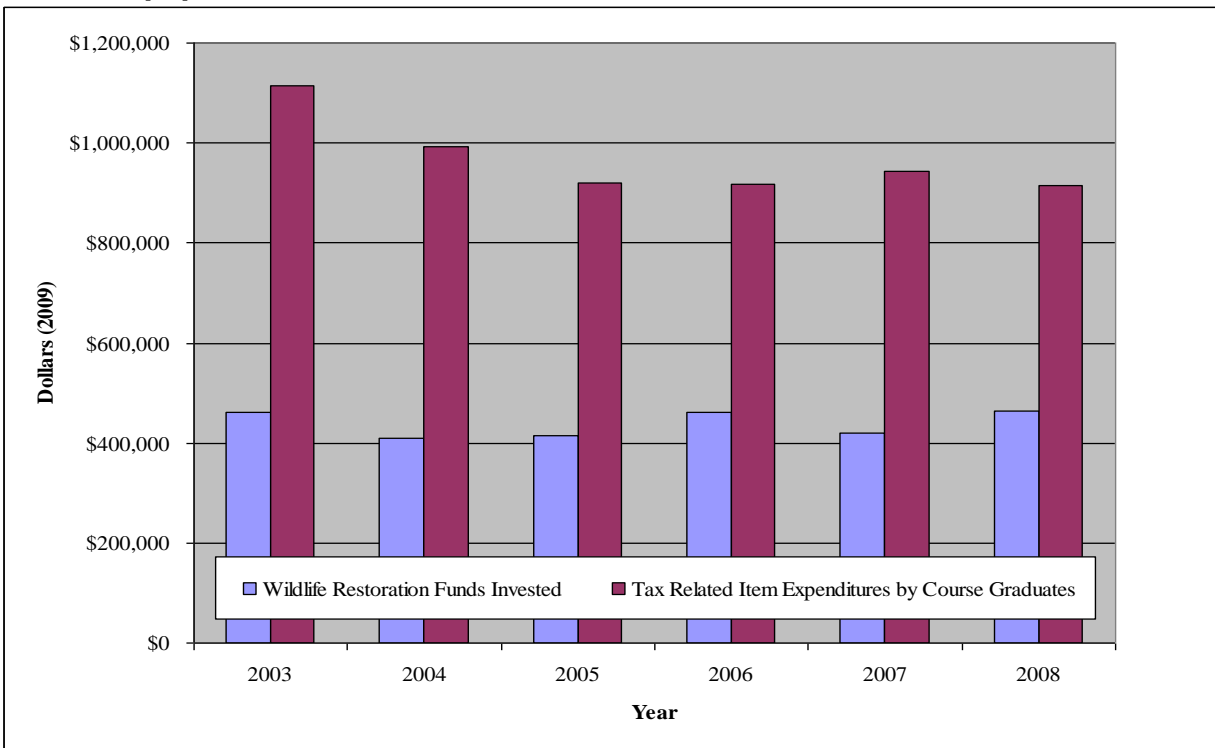
<sup>19</sup> *Lifetime Retail Sales Value from Newly Recruited Hunters and Target Shooters*. Southwick Associates. 2007.

Comparing Wildlife Restoration program investments to hunter tax related equipment item purchases, it is evident that invested funds quickly earn positive net benefits. Again, 2003 and 2004 represent atypical years due to an influx of young hunters as a result of a legislative change to the minimum hunting age. Even excluding these two years, Figure 16 shows that purchases are consistently greater than investments. The estimated Excise Tax-Related ROI is 110% and Total Project ROI is 1,406%.

For a couple of reasons, this return should be considered cautiously. First, the ROI estimation focuses only on hunter graduate purchases on tax related items. The purchases are, in reality, generated from hunting activity and not from the educational experience. However, without the successfully completing the hunter education program, the other purchases cannot happen. It is arguable that only a portion of the benefit at this point is attributable to the investment allocated to hunter education, and a larger portion of the return should be allocated to Wildlife Restoration funds invested in management of the wildlife resource.

The Idaho Fish and Game Department also offers a number of specialized instructional opportunities that provide additional "next step" and "how-to" activities. These include Archery for Women, Elk Hunting for Beginners, and advanced youth hunting clinics. All increase the skills and knowledge of attendees so that they can take advantage of the breadth of opportunities available. This potentially results in diversification of equipment-purchasing patterns. At present, this is impossible to quantify.

**Figure 16. Trends in Annual Wildlife Restoration Funds and Purchases of Tax Related Equipment Items for Hunter Education Graduates in Idaho**



More importantly, hunter-education graduates tend to be younger and just starting out their hunting careers. The average age for a basic education graduate is between 11 and 14 years and 21 to 30 years for bow hunter graduates. Given the ideal, this group would hunt for many years to come. However, Idaho is experiencing a period of low hunter graduate loyalty with their estimates indicating that approximately 55% of graduates purchased a license the year following graduation, with even fewer purchasing two years after graduation. In all likelihood, this reflects their young age and changing interests. The above return estimate does not account for purchases beyond one year. State-level survey estimates indicate that just under half of graduates, roughly 4,500 young hunters, purchase a license and hunt the second year following graduation resulting in just over \$750,000 in tax related item sales.

Some additional societal benefits of hunter education classes include enhancing the social support network of hunters, offering a place where new members of the hunting community can participate in an event with other members of the hunting community, and reaffirming hunting as an accepted activity among both hunting and non-hunting communities. These benefits are likely to become more important in the future as other hunting community events and activities such as game check stations (in many places, game can now be remotely checked via phone or internet); license vendors at local sports shops, hardware stores, etc.; and local "big buck" (turkey/elk) contests sponsored by local businesses disappear.

### Case #7: Nebraska National Archery in the School Program

Data Contributors: Nebraska Game and Parks Commission

<b>SYNOPSIS</b>	
<b>Project Type</b>	Hunter Education
<b>Annual Excise Tax Investment <sup>(b)</sup></b>	\$35,000 annually
<b>Annual Additional Investment <sup>(d)</sup></b>	The program has many partners, local and national, which leverage the Wildlife Funds through monetary and non-monetary support.
<b>Annual Hunter Spending on Tax Related Items <sup>(a)</sup></b>	na
<b>Annual Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	na
<b>Excise Tax-Related ROI</b>	Non-traditional (10% return if roughly 1% of class takes up hunting or target shooting)
<b>Total Project ROI</b>	na
<b>Project Lifespan</b>	Annual

From its small roots in Kentucky, the National Archery in the School Program has grown to a point where it is now introducing target archery in physical-education classes for

elementary and secondary students in 5,000 schools in five countries. Core course instruction includes archer technique and safety. In addition to many of the state's community recreation centers, nearly 140 of Nebraska's schools offer the program in grades 4-12 and reach at least 20,000 students. The annual Wildlife Restoration investment totals \$35,000, and covers the costs of a coordinator and program supplies.

The potential for a return on investment was investigated from the standpoint that the program has multiple benefits, including being a gateway between archery and other hunting and target shooting recreational activities. It is difficult to know with any level of certainty just how many program graduates actually take up hunting or target shooting as a result of exposure to the course. This makes estimating a typical return on investment a bit challenging. It is possible, however, to estimate the number of graduates who would need to take up either hunting or target shooting in order generate a certain level of return on investment.

In order to do this, we estimated the tax-related equipment item purchases of graduates as if they were hunters or target shooters and then how many would actually need to be converted to active hunters or shooters in order to cover program costs. Per-hunter or target shooter tax related equipment item expenses are calculated using national retail purchases for hunting from 2006 National Survey data adjusted for a 30% market chain mark-up.

A recent study that looks at the lifetime retail sales of recruited hunters and target shooters annually across seven age cohorts from 16 years of age to 65 years and older<sup>20</sup> was used to guide these calculations. The age cohort that most closely reflects program graduates are hunter or target shooters who are aged 16 to 17. Using national estimates, hunters in this age group are expected to spend \$122 annually on tax related hunting equipment items. Target shooters typically spend slightly more (54%) on equipment because they often hunt as well. As a result, shooters in this age group are estimated to spend \$188 annually.

In the case of Nebraska, it would only take between 1.0% and 1.6% of students (205 to 317) to take up either recreational hunting or shooting for one year as a result of taking the program to earn a return of 10%. These estimates are certainly achievable given that, on average, 48% of students completing the course indicate that they will participate in archery in the future. Another 32% of students indicate that they have more interest in other shooting sports since having completed a school-based archery class.<sup>21</sup> Successfully recruited young hunters or shooters continue to provide benefits to industry. Over a lifetime, it is estimated that an individual has the potential to spend between \$17,000 and \$23,000 on primary hunting equipment, including both tax related and tax exempt items.<sup>22</sup> These younger hunters are also likely to recruit family

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<sup>20</sup> *Lifetime Retail Sales Value from Newly Recruited Hunters and Target Shooters*. Southwick Associates. 2007.

<sup>21</sup> *An Assessment and Evaluation of the National Archery in the Schools Program-Phase II: Student Survey Results*, Responsive Management, 2009.

<sup>22</sup> *ibid*

members into hunting or shooting sports. In fact, 11% of students indicate that their experiences with archery at school have had an indirect, and positive, impact on their family's interest in archery. As a result, returns on investment estimated based upon student recruitment should be viewed as a minimum return.

### ***Shooting-Range Development Case Studies***

#### **Case #8: Brown County Sportsman Club Shooting Range, South Dakota**

Data Contributors: South Dakota Game, Fish and Parks Department

<b>SYNOPSIS</b>	
<b>Project Type</b>	Shooting Range Construction/Development
<b>Excise Tax Investment <sup>(b)</sup></b>	\$215,445 (Phase 1) and \$48,500 (Phase 2)
<b>Additional Investment <sup>(d)</sup></b>	\$71,815 (Phase 1) and \$16,167 (Phase 2)
<b>Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$370,678 (Phase 1) and \$67,019 (Phase 2)
<b>Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$2.36 million (Phase 1) and \$427,050 (Phase 2)
<b>Excise Tax-Related ROI</b>	72% (Phase 1) and 38% (Phase 2)
<b>Total Project ROI</b>	722% (Phase 1) and 560% (Phase 2)
<b>Project Lifespan</b>	Lifespan after Phase 2 could be up to 25 years

Excise Tax-Related ROI=(a-b)/b and Total Project ROI=(c-(d+b))/(d+b)

The Brown County Sportsman Club Shooting Range is located in Aberdeen, South Dakota. Historically, the site was utilized for agricultural purposes. After developing the shooting range, it now functions as a public shooting range, sportsman club, and youth event center hosting hunter education classes and other programs. The range is operated by a volunteer staff on a part-time basis. It is open to the public seven months of the year, mid-April through mid-November, for a minimum of two days of shooting per week.

The range is host to an average of 400 to 500 target shooters per year who average a total of 2,500 to 3,000 shooter days. Special events open the range to roughly 200 kids for National Rifle Association Youthfest as well as 200 hunter education students.

Return on Investment estimates looked at two periods over the life of the range (Tables 9 and 10). The first highlights the shooting range development and construction phase and the range's initial utilization, covering a lifespan of just over 10 years (1996 to 2008). Range development included initial design, survey, major construction, berm work, and baffle construction. Wildlife Restoration funds invested in development of the range totaled \$215,000. Total investments accrued to \$287,261 after including the state match. The second period highlights 2009 when Wildlife Restoration funds were utilized

for maintenance and rehabilitation of the baffle system. This investment totaled approximately \$64,000 between federal and state monies.

Target-shooter purchases are based on state-level National Survey data for 2006.<sup>23</sup> A 2007 report studying the lifetime purchases of hunters and target shooters found that shooters spend more (54.4%) on equipment than hunters.<sup>24</sup> Assuming that this proportion would not change dramatically since 2007 and adjusting the national survey retail sales information results in an estimate of \$13.48 in sales per day of tax related equipment, net of a 30% market chain mark-up, and \$85.89 in total purchases made by South Dakota target shooters. Annual visitation is assumed to average 2,750 resulting in annual tax related retail sales of \$37,068. Total annual purchases are estimated to be \$236,198. Spending estimates driven by visitation to the range are conservative estimates as they do not include spending by NRA Youthfest attendees and hunter education students.

**Table 9. Brown County Shooting Range: Phase I**

<b>Period One: Initial Construction and Opening</b>		
	Wildlife Restoration (2009\$)	Total (Wildlife Restoration and State Funds) (2009\$)
Total Funds Invested	\$ 215,445	\$287,261
Annual Target Shooter Tax Related Item Sales	\$37,068	\$236,198
Lifespan		10 years
Total Tax Related Purchases (1999-2008)	\$370,678	\$2,361,977
Net Benefit	\$155,233	\$2,074,716
ROI	72%	722%

The range opened to the public after construction was complete in 1999 and continued to operate for roughly ten years before any major maintenance or improvements were necessary. Over this period, target shooter retail sales on tax related items totaled \$371,000. Net benefits earned from the initial investment are in excess of \$155,000 and earned a positive Excise Tax-Related ROI of 72%. Similarly, total spending on hunting recreation grew to \$2.36 million. Net benefits are in excess of \$2.07 million earning a Total Project ROI of 722%.

<sup>23</sup> U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

<sup>24</sup> *Lifetime Retail Sales Value from Newly Recruited Hunters and Target Shooters*. Southwick Associates. 2007.

**Table 10. Brown County Shooting Range: Phase II**

<b>Period Two: Second Investment for Rehabilitation</b>		
	Wildlife Restoration	Total (Wildlife Restoration and State Funds)
Total Wildlife Restoration Funds Invested	\$48,500	\$64,667
Annual Target Shooter Tax Related Item Retail Sales	\$37,068	\$236,198
Discount Rate	7%	
Time Horizon (years)	2 <sup>a</sup>	
Present Value of Annual Tax Related Purchases	\$67,019	\$427,050
Net benefit	\$18,519	\$362,383
<b>ROI</b>	<b>38%</b>	<b>560%</b>

<sup>a</sup> Assumes that the next lifespan is short, relative to phase one, and that maintenance or improvements occur in 2011.

*Phase II: 2009*

The range baffle systems were rehabilitated in 2009. Wildlife Restoration funding applied toward that project totaled \$48,500. Given that annual target shooter retail sales on tax related items are slightly more than \$37,000, industry begins to see positive net benefits and return on investment just shortly after one year. It is difficult to know exactly when the next major maintenance effort will be necessary, but these returns have the potential for growth even over just a few short years. Applying a discount rate of 7% to determine the present value of annual target shooter purchases on tax related items over just two years estimates the return to the excise tax investment at 38%. Using the same approach estimates a Total Project ROI of 560%.



## Case #9: Georgia Shooting Range: Chickasawatchee WMA

Data Contributors: Georgia Department of Natural Resources
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<b>SYNOPSIS</b>	
<b>Project Type</b>	Shooting Range Construction/Development
<b>Excise Tax Investment <sup>(b)</sup></b>	\$364,357
<b>Additional Investment <sup>(d)</sup></b>	\$125,139
<b>Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$791,502
<b>Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$4,057,372
<b>Excise Tax-Related ROI</b>	117%
<b>Total Project ROI</b>	729%
<b>Project Lifespan</b>	25 years

Excise Tax-Related ROI=(a-b)/b and Total Project ROI=(c-(d+b))/(d+b)

The Georgia Department of Natural Resources shooting ranges have a strong presence across the state, and federal excise tax dollars have a similarly strong presence in their operation, maintenance, and construction. The state is guided by two core approaches when allocating funds: 1) a previously completed needs-assessment survey of existing ranges, and 2) a goal to provide a shooting range within 30 miles of every Georgia resident.

One newly constructed range has been selected as the focus of this case study. The range is located in the Chickasawatchee Wildlife Management area in the southwest region of the state and opened to the public in late 2008. The range operates year round six days a week. The range supported more than 2,000 user days in the first eight months of operations alone. Construction of the range, from design and plan to completion, took place between 2007 and 2009. Wildlife Restoration funds invested in construction total \$111,632. An additional \$37,211 in leveraged state funds contributed to construction.

Restoration funds are also currently used for annual operation and maintenance. In 2009, operation and maintenance costs totaled \$42,000. For 2010, these same expenses are on track to total approximately \$27,000. Wildlife Restoration funds are allocated to cover roughly \$20,000 of that expense. These costs are largely devoted to maintaining a team of safety officers at the range. Their duties include hands-on maintenance, educational outreach to new target shooters, as well as enforcement of range-safety rules. Georgia has had great success with the implementation of range safety officers across the state. As a whole, they have found a reduction in complaints and an improved shooting experience that is translating into increased participation.

The range has seen over 2,200 user days during the first eight months of operation resulting in an estimated \$39,500 of retail purchases through June of 2009. Target-shooter purchases are based on state-level National Survey data for 2006. A 2007 report studying the lifetime purchases of hunters and target shooters found that shooters spend more (54.4%) on equipment than hunters.<sup>25</sup> Shooters also typically spend less on travel relative to those who only hunt. As a result, the trip-related purchases of total hunting recreation spending were reduced by 56.5%. Assuming that this proportion would not change dramatically from 2007 and adjusting the National Survey retail sales information provides an estimate of \$13.76 in sales per day of tax related equipment, net of a 30% market chain mark-up, and \$70.54 in total hunting related recreational spending made by Georgia target shooters.

Because this is a new shooting range it is important to remember that the bulk of the return to industry has not yet occurred. To estimate future benefits to industry a present value calculation was applied. Future annual visitation is assumed to average 5,000 user days resulting in annual tax related retail sales of \$68,809 and total sales of \$352,728 (Table 11).

**Table 11. Georgia Shooting Range Project**

	Wildlife Restoration	Total (WR+Leveraged)
Construction and Operation/ Maintenance Investments (Past & Future)	\$364,357	\$489,497
Future <u>Annual</u> Purchases.	\$68,809 <sup>a</sup>	\$352,728
Present Value of Future Purchases	\$791,502	\$4,057,372
Net benefit	\$427,145	\$3,567,876
<b>ROI</b>	117% (Excise Tax- Related)	729% (Total Project)

<sup>a</sup> An annual visitation level of 5,000 user days is assumed based upon unofficial visitation for FY 2010.

<sup>b</sup> Present value calculations assume a 25 year lifespan and a 7% discount rate.

A lifespan of 25 years is assumed for the range before any major rehabilitation needs to occur and a discount rate of 7% is applied. The present value of tax related sales is estimated at \$791,502. Assuming that Wildlife Restoration funds will support future operation and maintenance costs and applying the same present value application to an annual cost of \$20,000, past and future investments total \$364,357 in current-day dollars. Net benefit to industry is estimated to be \$427,145, which earns an Excise Tax-Related ROI of 117%. These benefits are anticipated to grow over the next few years as this new range is discovered and used by more people. It is anticipated that range utilization could reach 6,000 user days in just the next few years. If this is the case, the return to industry from tax related items could reach as high as 159%.

Assuming continued support of operation and maintenance at an average cost of \$27,000, total investments (past and future) are estimated to have a current day value

<sup>25</sup> *Lifetime Retail Sales Value from Newly Recruited Hunters and Target Shooters*. Southwick Associates. 2007.

of \$489,497. Net benefit to industry on all investments from spending on target-shooting recreation is estimated to be \$3.6 million, generating a Total Project ROI of 729% (assuming 5,000 user days). The return to industry jumps to 905% with an additional 1,000 annual user days.

### Case #10: Ben Avery Shooting Facility, Arizona

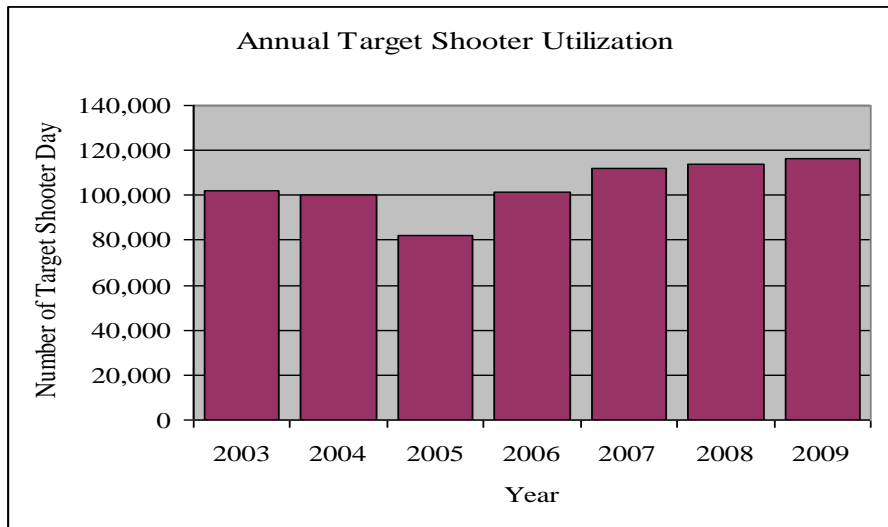
Data Contributors: Arizona Game and Fish Department

<b>SYNOPSIS (2003-2009)</b>	
<b>Project Type</b>	Shooting Range Construction/Development
<b>Excise Tax Investment <sup>(b)</sup></b>	\$4,431,105
<b>Additional Investment <sup>(d)</sup></b>	\$3,64,760
<b>Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$24,923,801
<b>Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$91,549,043
<b>Excise Tax-Related ROI</b>	462%
<b>Total Project ROI</b>	1,032%
<b>Project Lifespan</b>	

Located just north of Phoenix, Arizona, the Ben Avery Shooting Facility is nationally recognized by the National Association of Shooting Ranges and plays host to a number of major events every year. The complex of shooting ranges provides shooting opportunities and safety education for both new and experienced marksmen. Wildlife Restoration funds for this particular case focus only on investments made, and shooter days spent, at the main range complex during the period between 2003 and 2009, and exclude the archery and clay-target ranges.

This facility is not typical of the majority of shooting ranges frequented by target shooters across the country. In fact, the range is only a part of the 1,650-acre Ben Avery Facility, which offers recreational shooting of multiple types as well as campground facilities, and houses the agencies' headquarters offices. Utilization of the main range has shown slight growth over the last few years (15% between 2006 and 2009) and averages just over 104,000 target shooter days annually (Figure 16).

**Figure 17. Ben Avery Main Range Annual Target Shooter Utilization (2003-2009)**



Target-shooter purchases are based on state-level National Survey data for 2006 inflated to 2009 dollars. A 2007 report studying the lifetime purchases of hunters and target shooters found that shooters spend more (54.4%) on equipment than hunters.<sup>26</sup> Shooters also typically spend less on travel, relative to those who only hunt, by 56%. As a result, tax-related equipment purchases were increased by 54.4% and the trip-related purchases of total hunting recreation spending was reduced by 56.5%. Assuming that this proportion would not change dramatically from 2007 and adjusting the National Survey retail sales information provides an estimate of \$34.23 in sales per day of tax related equipment, net of a 30% wholesale mark-up, and \$125.71 per day in total sales made by Arizona target shooters. These values do not include purchases unique to hunting such as hunting dogs, boats, and taxidermy.

**Table 12. Wildlife Restoration Investments and Target-Shooter Purchases: Ben Avery Shooting Facility (2003-2009) All estimates in 2009 dollars.**

Year	Investments		Purchases			
	Wildlife Restoration	Additional Funds	Tax-Related Equipment Items Total	Excise Tax-Related ROI	Total Hunting Recreation Purchases	Total Project ROI
2003	\$613,717	\$488,238.02	\$3,493,271	469%	\$12,831,333	1064%
2004	\$582,134	\$475,771.37	\$3,438,921	491%	\$12,631,698	1094%
2005	\$582,586	\$385,862.28	\$2,809,587	382%	\$10,320,054	966%
2006	\$576,905	\$469,246.79	\$3,463,598	500%	\$12,722,339	1116%
2007	\$710,162	\$516,718.25	\$3,832,683	440%	\$14,078,047	1047%
2008	\$716,309	\$562,221.59	\$3,899,901	444%	\$14,324,951	1020%
2009	\$649,292	\$756,702.00	\$3,985,841	514%	\$14,640,621	941%
Average	\$633,015	\$522,108.61	\$3,560,543	462%	\$13,078,435	1032%

<sup>26</sup> Lifetime Retail Sales Value from Newly Recruited Hunters and Target Shooters. Southwick Associates. 2007.

In constant (2009) dollars, annual target-shooter purchases on tax related items range between \$2.8 and \$3.9 million dollars, with an average of \$3.5 million per year (Table 12). Similarly, total purchases ranged between \$10.3 million and \$14.6 million, averaging \$13.1 million per year. The increased utilization of the shooting facility over the last five years has equated to rising purchases over the same time frame.

Wildlife Restoration investment funds have fluctuated between \$582,000 and \$716,000 and average \$633,000 per year. Wildlife Restoration funds are a significant portion (55%) of funding for the shooting range but they are leveraged by additional donations and Arizona Fish & Game Department funds as well as revenues generated on-site. Additional investments, provided by revenue from the main range, are slightly less and have annually generated between \$386,000 and \$757,000. The estimated Excise Tax-Related ROI has been calculated to be between 382% and 514% and Total Project ROI has s been calculated to be between 966% and 1,094%.

### **Other Value-Added Case Studies**

#### **Case #11: Southeastern Cooperative Wildlife Disease Study**

Data Contributors: Southeastern Cooperative Wildlife Disease Study (SCWDS) at the University of Georgia's College of Veterinary Medicine.

<b>SYNOPSIS</b>	
<b>Project Type</b>	Conservation/Management
<b>Total Excise Tax Investment</b>	Uncertain ( <i>A portion of each state's \$15,000 annual investment</i> )
<b>Total Additional Investment</b>	Uncertain ( <i>Funds are leveraged by at least 20:1</i> )
<b>Hunter Spending</b>	Not applicable
<b>Excise Tax-Related and Total Project ROI</b>	Atypical ( <i>Wildlife population health</i> )
<b>Project Lifespan</b>	Indefinite
<b>Average Annual Return:</b>	Not applicable

What is the value of scientific credibility? What is the benefit of understanding the cause of death of individual wild animals? What is the value of understanding the disease transmission mechanisms and interactions among and between wildlife populations? What is the value of understanding the potential transmissions and interactions between wildlife diseases, domestic animals and humans? Putting a monetary value on the answers to these questions is difficult, but most people would conclude that finding the answers to these questions is critically important.

These are the basic questions that the Southeastern Cooperative Wildlife Disease Study (SCWDS) grapples with every day. SCWDS is a specialized unit of the University of Georgia's College of Veterinary Medicine. SCWDS was initially started in 1957 when 11 Southeastern state wildlife agencies pooled their money to study a mysterious deer disease that almost derailed their initial deer restocking efforts.

Some of the initial outbreaks of what is now known as hemorrhagic disease killed more than 90% of the local deer population and caused some to question the feasibility of restoring deer in the Southeast.

The answers to the cause and management implications of this disease, and numerous other diseases, are often slow in coming. However, because of their nature and potential to have profound impacts, it is critical to understand wildlife diseases. Understanding wildlife diseases is a specialty that was initially recognized by the state wildlife agencies and has since proven its value to numerous other cooperators.

It is impossible to say how much of the initial funds were from the Wildlife Restoration excise tax. However, many wildlife historians conclude that it is likely that a large portion of SCWDS' initial budget of \$18,000 was from Wildlife Restoration funds. Even today, it is difficult to precisely determine how much of each state's \$15,000 annual contribution to SCWDS is Wildlife Restoration funds. Needless to say, this initial pooling of funds formed the nucleus of what is today one of the world's premier wildlife-disease laboratories. Its budget is approximately \$4 million and cooperators include the Department of the Interior, 17 state wildlife agencies, Department of Agriculture's Animal and Plant Health Inspection Services, National Institute of Health, the Center for Disease Control and Prevention and several non-government organizations, including the National Wild Turkey Foundation, Rocky Mountain Elk Foundation and Safari Club International. If all of the state funding that goes into SCWDS is provided by the Wildlife Restoration funds, it is annually leveraged at least 20:1!

The purpose of this case study is not to sing the praises of SCWDS, although they are plenty and include: developing the abomasal parasite count which is used as an index for managing deer populations throughout the southeast; determining that it was NOT necessary to eradicate deer populations in order to control tropical cattle fever and protect our food supply; developing the CapChur gun to used by biologists worldwide to tranquilize animals; understanding transmission pathways of important poultry diseases such as Newcastle disease, which prevented the need to eradicate wild birds to control this disease from spreading; and developing monitor protocols for emerging diseases like avian influenza (N1H1).

The purpose of this case study *is* to illustrate four important concepts: 1) ROI cannot always be calculated for specific projects; 2) Wildlife Restoration funding often forms the core for much larger efforts; 3) Wildlife Restoration funds are often heavily leveraged by numerous other funding sources; and 4) Wildlife Restoration funding frequently fund

projects that are critically important yet largely invisible to people not intimately familiar with the inner workings of the program.

## Case #12: National Wildlife Refuge Hunting Lawsuit

Data Contributors: U.S. Fish and Wildlife Service, Safari Club International
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<b>SYNOPSIS</b>	
<b>Project Type</b>	Conservation/Management
<b>Total Excise Tax Investment</b>	Uncertain
<b>Total Additional Investment</b>	Uncertain
<b>Hunter Spending on Tax Related Items</b>	\$ 4.5 million ( <i>Lawsuit sub-set</i> )
<b>Hunter Spending on All Hunting Recreation Items</b>	\$24.0 million ( <i>Lawsuit sub-set</i> )
<b>Excise Tax-Related and Total Project ROI</b>	Atypical ( <i>Value-added use of data generated for other purposes</i> )
<b>Project Lifespan</b>	Indefinite
<b>Average Annual Investment</b>	Not applicable

While the federal excise taxes paid on hunting equipment are clearly dedicated to wildlife conservation at the state level, the use and application of the information generated from projects paid by these funds is used by a variety of agencies and organizations.

One critical use of this information was in the defense of hunting programs on 60 National Wildlife Refuges (Refuges) scattered across 26 states. The use of state-generated data will be a critical part of maintaining current hunting programs and developing new hunting programs on *all* Refuges in the future.

Refuges supply hunting opportunities on millions of acres for thousands of hunters each year.

This state-generated data was used in support of hunting from a lawsuit filed in 2003 by the Fund for Animals (FFA) that challenged hunting on Refuges. In that suit, the FFA alleged that the U.S. Fish and Wildlife Service (FWS) violated National Environmental Policy Act (NEPA) by failing to analyze a variety of environmental issues when the FWS opened or expanded hunting opportunities on 37 Refuges between 1996 and 2003. The suit was expanded to include 23 additional Refuges the FWS opened to hunting in 2007.

The FFA claimed that these increased recreational hunting opportunities have a detrimental impact on the habitat, breeding and other normal behaviors of the wildlife that reside in the refuges.

As a result of the suit, the FWS re-drafted the Environmental Assessments (EAs) for the 60 Refuges involved in the litigation.

In completing individual EAs, the Refuges were compelled to analyze (among other environmental issues) the "direct, indirect and cumulative impacts" of hunting on hunted migratory birds and hunted resident species.

Fortunately, the states, through projects funded by the Wildlife Restoration program, have been collecting abundance, breeding success, and annual harvest estimates for many years on hunted species. Critical data at the state-level was combined with national-level data for more than 30 species of ducks and geese, plus woodcock and doves to provide the needed information.

In addition, states provided similar data for 21 species of resident small and upland game, and eight species of resident big-game. Again, this information was collected through projects funded by the Wildlife Restoration program. The basic biological histories of these species were also utilized to illustrate the minimal impacts (and in some cases beneficial impacts) that hunting has on Refuges.

While this lawsuit has not yet been decided, the preparers of the EAs are confident that the questions on the direct, indirect and cumulative impact that hunting has on hunted species were more than adequately answered, thanks to the investment that hunters and the hunting and shooting sports industry has made in wildlife management during the past decades. This investment will continue to be critical because, by law, *all hunting programs* on Refuges have to be reviewed every 10 years. This cycle of drafting EAs and examining direct, indirect and cumulative impact of hunting likely will continue until all 318 Refuges that currently allow hunting have been completed. In addition, this requirement is also necessary for all new refuges that are open for hunting.

It would be extremely difficult to estimate a traditional return on investment in this instance for a number of reasons. First and foremost, this case spans many states and species and as a result draws from many different sources of state and federal funding. However, we can calculate part of the story by identifying the retail spending by hunters utilizing the Refuge system. Table 13 reports hunter visitation and tax related equipment item purchases for hunters using Refuges.



**Table 13. National Wildlife Refuge Hunting: Visitation and Spending by Hunters (2009\$)**

	National Wildlife Refuge Visitation (Days)		National Wildlife Refuge Tax Related Equipment Item Purchases		National Wildlife Refuge Total Purchases for Hunting Recreation	
	<u>Lawsuit Subset</u>	<u>National</u>	<u>Lawsuit Subset</u>	<u>National</u>	<u>Lawsuit Subset</u>	<u>National</u>
Waterfowl	157,701	833,189	\$1,464,731	\$7,738,664	\$11,089,111	\$58,587,469
Other migratory bird	13,124	69,339	\$121,897	\$644,021	\$922,849	\$4,875,720
Upland game	118,434	625,728	\$986,045	\$5,209,604	\$9,088,819	\$48,019,259
Big game	181,641	959,669	\$1,973,334	\$10,425,779	\$13,409,314	\$70,845,878
<b>Total hunting</b>	470,901	2,487,925	\$4,546,006	\$24,018,067	\$34,510,093	\$182,328,326

Visitation days are derived from surveys conducted for the Refuge Annual Performance Plan. Purchases are estimated using the 2006 National Fishing, Hunting and Wildlife-Associated Recreation (National Survey). Using this information, we determined the amount of retail spending on tax related equipment items per hunting day specific to the game pursued as well as the total amount spent on hunting related recreation (lodging, food, fuel, etc.). Per day purchases on tax related items, adjusted for a 30% market chain markup, for waterfowl and other migratory birds are \$9.29, for upland game are \$8.33, and for big game are \$10.86. Total purchases per day for waterfowl and other migratory birds are \$70.32, for upland game are \$76.74, and big game are \$73.82.

National refuge visitation is estimated to be 2.5 million hunter days per year. Total hunting visits to the 60 refuges involved in the lawsuit is estimated to be approximately 471,000. The impact of these days on industry is roughly \$24 million dollars in retail-adjusted sales on tax related hunting equipment items across the entire refuge system and \$4.5 million across the refuges involved in the lawsuit. Total spending is estimated to be \$182.3 million for the entire refuge system and \$34.5 million for the sixty refuges.

While this lawsuit is obviously important to the hunters that participate in the refuge hunts, its ramifications go far beyond the thousands of hunters that may be directly impacted. Refuges are visited by nearly 40 million wildlife enthusiasts every year, most of which are non-hunters. Well-managed hunting programs on these Refuges are accepted by most of these visitors as part of the purpose of the Refuge and as a part of mainstream wildlife-dependent recreation. By inference, the public accepts the idea that, if hunting is okay on a *National Wildlife Refuge*, then it must be okay on other lands. Without the data supplied by state agencies to meet the legal requirements of EAs, this public acceptance would likely diminish and hunting – both on and off Refuges – would suffer.

## Case #13: Wisconsin Bear-Population Estimation

Data Contributors: Wisconsin Department of Natural Resources.

<b>SYNOPSIS</b>	
<b>Project Type</b>	Conservation/Management
<b>Total Excise Tax Investment <sup>(b)</sup></b>	\$157,174 (2006-2009)
<b>Total Additional Investment <sup>(d)</sup></b>	\$212,926 (In in-kind funding from the University of Wisconsin and donations from the Wisconsin Bear hunters Association, including 500 volunteers donating more than 8,000 hours.)
<b>Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$129,035
<b>Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$876,825
<b>Excise Tax-Related ROI</b>	-17.9%
<b>Total Project ROI</b>	137%
<b>Project Lifespan</b>	

Excise Tax-Related ROI=(a-b)/b and Total Project ROI=(c-(d+b))/(d+b)

In 2006, the Wisconsin Department of Natural Resources (WDNR) employed a new, simple-yet-sophisticated, research method to estimate bear populations. The research was conducted by graduate students at the University of Wisconsin – Madison, but paid for from funds from the Wildlife Restoration program and other partners.

A growing number of bear sightings, bear damage and nuisance complaints, and very high hunter success rates all indicated that the bear population may be higher than estimates indicated. The availability of new technology, and its successful application in a neighboring state, prompted WDNR to fund a research project aimed at obtaining an updated population estimate.

Researchers placed bacon strips that were wrapped around tetracycline pills at locations around the state. The baits were placed inside wooden boxes which were attached to trees 5 feet off of the ground to minimize consumption by other animals. Approximately 2,200 baits were distributed in 29 counties by more than 500 volunteers from the Wisconsin Bear Hunters Association. Approximately 970 baits were consumed by bears.

Because a small portion of tetracycline is permanently incorporated into the body tissue of anything that eats it, these bears were "captured" and could be used to calculate the bear population if they were "recaptured" at some future date.

The recapture process involved hunters voluntarily submitting a small portion of a bear rib-bone from any bear that was harvested. Hunters whole-heartedly embraced the research project and submitted more than 2,500 rib-bones for analysis. Sixty-nine rib-bones tested positive for tetracycline and, therefore, represented "re-captured" bears.

Statisticians at the University were able to estimate the population of bears by comparing the ratio of captured and re-captured bears to the number of harvested bears. The revised estimate was almost twice as large as any previous estimate. A second year of research verified the larger population estimate.

In addition, other on-going research to identify preferred habitat and use by bears also supported the larger population size. This research indicated that occupied habitat was 30 percent greater than initially estimated. Additional research is planned to further refine the population estimate and habitat use information.

Once the research was completed in 2008, the Wisconsin bear managers, armed with new population numbers, quickly responded by increasing the bear quota licenses by 55 percent – from 4,700 to more than 7,300! The additional 2,600 bear hunters harvested approximately 1,000 more bears and spent more than 16,400 days hunting bears!

An additional 45,000 "trips" were dedicated to setting-up and maintaining bait sites (note some of these trips occurred during the season and likely occurred in conjunction with the actual hunt; an estimated 30,000 non-hunting baiting trips occurred). An untold amount of time and resources were also dedicated to training dogs and scouting new bear hunting areas by the new bear hunters.

Tax related equipment item purchases on hunting equipment are estimated using the reported hunter days of 16,443 and tax related equipment purchases at \$7.62 per day, once adjusted for a 30% market chain markup. Per day equipment related expenses are calculated using state-level estimates from 2006 National Survey data for total purchases of big game hunters only. Because state-level big game purchases are not itemized by category, a national-level adjustment factor of 19.1% is utilized to isolate tax related item sales from this total purchase value. The assumption being that Wisconsin's big game hunters' purchasing patterns are similar to that of other big game hunters across the nation. Total spending on bear hunter recreation is estimated at \$51.75 per hunting day.

**Table 14. Return on Investment: Wisconsin Bear Population (2009). Expressed in constant (2009) dollars.**

Total Wildlife Restoration Investments (2006-2009)	\$157,174
Total Additional Leveraged Funds (2006-2009)	\$212,926
Tax Related Equipment Item Purchases	\$129,035
Total Hunting Recreation Purchases	\$876,825
<b>Excise Tax-Related ROI</b>	-17.9%
<b>Total Project ROI</b>	137%

Note: Additional leveraged funding sources are from University of Wisconsin and Wisconsin Bear Hunters Association

Per day hunter purchases of taxable equipment items is then estimated to be \$129,035 and total purchases is \$876,825 (Table 14). Excise tax investments allocated towards this research total \$157,174 between 2006 and 2009. Additional leverage funds total \$212,926. Net benefits are currently negative and the estimated Excise Tax-Related ROI is -17.9%. However, the Total Project ROI is 137%.

Because Wisconsin bear permits are allocated on a quota system, the amount of waiting time to be selected for a permit has also been reduced and over time more hunters will be participating in this new opportunity. Both the Excise Tax-Related ROI and the Total Project ROI will likely increase over time as more permits are issued, more hunters take advantage of this opportunity, and the research costs needed to support the bear hunt decline.

### Case #14: Maryland Bear Hunting

Data Contributors: Maryland Department of Natural Resources.
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<b>SYNOPSIS: 2007-2009</b>	
<b>Project Type</b>	Conservation/Management
<b>Total Excise Tax Investment <sup>(b)</sup></b>	\$523,429
<b>Total Additional Investment <sup>(d)</sup></b>	\$174,476 The cost to the agency of the litigation is unknown. However, this cost was necessary to support the scientific credibility and professionalism of the Maryland Department of Natural Resources and the public trust doctrine.
<b>Hunter Spending on Tax Related Items <sup>(a)</sup></b>	\$23,037
<b>Hunter Spending on All Hunting Recreation Items <sup>(c)</sup></b>	\$151,920
<b>Average Annual Excise Tax-Related ROI</b>	-95.6%
<b>Average Annual Total Project ROI</b>	-77.6%

Excise Tax-Related ROI=(a-b)/b and Total Project ROI =(c-(d+b))/(d+b)

In October 2004, Maryland's Department of Natural Resources (DNR) implemented Maryland's first bear-hunting season in 51 years. Subsequent hunts have been held each year since.

This conservation triumph did not happen by accident, nor did it come about without controversy. You see, Maryland is also home to the Humane Society of the United States and the Fund for Animals. Both of these anti-hunting groups challenged the initial hunt and have brought frivolous lawsuits virtually every year since. These groups have been beaten in court each and every year because of the credibility of the DNR and the scientific data collected and analyzed by their bear biologists. Both the biologists and the data collected are funded, by the excise tax dollars contributed by industry and sportsmen. Twenty-five percent of the cost of the project was funded from hunting license dollars. Maryland's bear season is a tribute to the long-standing partnership among state wildlife agencies, hunters, and the hunting and shooting sports industries.

However, as the calculated ROI indicates, the economic return to hunting and shooting sports industry for this project was not positive. Nonetheless, the non-economic benefits of this project are significant for the future of hunting. This investment supported the long standing public trust doctrine where wildlife is held – and managed – for the benefit of the public by trained wildlife professionals and not on the emotional whims of a small minority. Time and time again, the courts of Maryland supported the professional biologist employed by the DNR, the science they used to make their decisions, and the public trust doctrine.

Essentially, this investment is best measured in decades and not dollars. The conservation success that it represents is remarkable in its own right.

In 1972, the black bears in Maryland were declared an 'endangered species.' However, because of protective laws and improving habitat conditions, bear populations began to recover. In 1985, the black bear was removed from the endangered species list and declared a 'forest game animal' but with a closed season.

About that time, biologists started to monitor bear populations and over time began to implement more sophisticated scientific research efforts. For example, bear reproductive rates were first calculated in 1986 and have been periodically reassessed since then. These rates have consistently ranged between 2.5 and 3.5 cubs per sow. This reproductive rate is one of the highest long-term rates ever recorded, and provided the first insights that Black bear populations in Maryland might be sustainable and provide hunting opportunities.

In addition, population densities have been calculated. In 1991, the population density in Garrett County was estimated to be 12 bears/square mile. This estimate was re-calculated in 2000 using a more sophisticated technique – for both Garrett and Allegany Counties – to be 27 bears per square mile. Based on these calculations the bear population increased more than 127%!

During that same time frame, bear auto collisions, nuisance bear complaints and agricultural damage also increased substantially. These negative interactions between bears and people helped the public understand the need for managing the bear population.

Armed with the scientific evidence of a bear population that had exceeded the "cultural carrying capacity" (or human tolerance for bears), the Maryland DNR proposed a highly regulated bear hunting season. A bear harvest quota was established and permits were available by a limited drawing. Hunters were required to call in each night to find out if the harvest quota had been reached and if the hunt would continue the next day.

Two hundred permits were issued in 2004 and 2005; 220 in 2006, 2007 and 2008 and the hunt area expanded; and 240 permits were issued in 2009. Harvest quotas have ranged from 30 to 75 bears between 2004 and 2008; and between 60 – 85 bears for 2009. Actual harvests have ranged from 20 to 56 bears and each year the seasons have been closed early to avoid any possibility of over harvest.

Total hunting recreation and tax related equipment item purchases are estimated using total hunter days using the reported hunter numbers (220-240) and a season length of four days. Total purchases are estimated to be \$57.55 per big game hunter day. Tax related equipment purchases, after adjusting for markup, are estimated to be \$10.78 per big game hunter day. Per day equipment related expenses are calculated using state-level estimates from 2006 National Survey data for total purchases of big game hunters only. Because state-level big game purchases are not itemized by category, a national-level adjustment factor of 19.1% is utilized to isolate tax related equipment sales from this total purchase value. The assumption being that Maryland's big game hunters' purchasing patterns are similar to that of other big game hunters across the nation. Hunter purchases of taxable equipment items are then estimated to total \$23,037 since 2007 (Table 15).

**Table 15. Maryland Bear-Hunting Return on Investment (2009\$)**

Year	Investments		Purchases			
	Wildlife Restoration	Additional Funds	Total Tax Related Equipment Items	Excise-tax Related ROI	Total Hunting Recreation Purchases	Total Project ROI
2007	\$176,879	\$58,960	\$7,453	- 95.8%	\$50,645.21	- 78.5%
2008	\$174,051	\$58,017	\$7,453	- 95.7%	\$50,645.21	- 78.2%
2009	\$172,500	\$57,500	\$8,131	- 95.3%	\$55,249.32	- 76.0%
<b>Total</b>	<b>\$523,429</b>	<b>\$174,476</b>	<b>\$23,037</b>	<b>- 95.6%</b>	<b>\$156,540</b>	<b>- 77.6%</b>

The funding for these efforts were borne jointly by a Wildlife Restoration grant to Maryland DNR and hunting license funds. The exact cost prior to 2007 is difficult to determine because the bear research was combined with grouse, turkey and squirrel research. Since 2007 the bear project is a separate line-item in the budget and has averaged approximately \$230,000 per year between both Wildlife Restoration and state funds. Benefits relate to costs are negative and the estimated Excise Tax-Related ROI is -95.6% and Total Project ROI is -77.6%.

Some people may question the cost of all of this effort for providing a few hundred hunters with an opportunity to hunt bears. However, the real benefits far exceed the costs. First and foremost, Maryland is fulfilling its public trust responsibility by managing bears for their long-term viability. The state wildlife agency has repeatedly demonstrated its credibility as the foremost wildlife authority within the state. As a result of the agencies' credibility, scientific data and long-term management perspective, the public has accepted of the need for a highly regulated recreational hunting opportunity for bears. It is important to remember that this hunt is a by-product of effective bear management. Additional investments in scientific bear management data collection is planned and will be necessary in order to maintain this hunting season.

It is important to understand that not all ROIs will be positive. Some ROIs, such as this Black bear case study, will improve over time. However, in this instance the project will not likely yield a positive ROI because the hunting opportunity will remain very limited and the costs of supporting the hunting season will remain very high. Nonetheless, there are non-monitory benefits that are also important to factor into the conservation equation. These include, among other issues, enhancing the agencies' scientific credibility and having the agency pro-actively embrace its public trust responsibilities. Both of these are core elements that support long-term conservation initiatives which provide long-term hunting opportunities for other species.

From a philosophical point of view, the planning, collecting and analyzing scientific data on bear populations is expensive; however, beating anti-hunters in court – in their own backyard – is priceless!

## Conclusion

The abundance of wildlife that we know today, and the hunting opportunities that result from this abundance, is the result of numerous investments from a variety of sources, including excise taxes, license dollars, state, federal and private land acquisition programs, pollution prevention and management programs, agricultural programs, and conservation minded non-government organizations.

As a result, it is difficult to calculate a return-on-investment in the classical business sense. This is largely due to the difficulty in determining what the "total investment" is, as well as what the "total return" is. Nonetheless, the conservation programs in the United States, and the funding mechanisms that support them, are unique, and arguably, the best in the world. The level of wildlife restoration that has resulted from these programs would likely be unimaginable to the visionaries who established the core programs that we have today.

During the past decades, "conservation equity" has been built up, in the form of abundant wildlife populations and the habitat that supports them. This has led to increased hunting opportunities for millions of Americans. As a result, the hunting and shooting sports industries have, and continue to, benefit from the past and current investments in conservation programs.

The Wildlife Restoration excise tax is the core funding source for these successful programs. These funds, as mentioned earlier, are often leveraged by many other sources – not just license dollars – to benefit hunting.

In addition to the core funding and leveraging aspects of the excise tax, the existence of this tax, because of unique provisions in the law, protects hunting license dollars from being diverted to other uses by state legislatures.

If this core funding were lost, it would be devastating to conservation efforts, and to the hunting and shooting sports industries, because it would require a 40-70 percent increase in license fees to recoup the lost funds. This would likely result in a significant loss in the number of hunters, which, in turn, would significantly erode the industries' customer base. The conservation equity that we now enjoy would eventually be depleted and the hunting heritage that we proudly support would become a mere shadow of its former self.

The success of the investments in conservation throughout the nation – both in restoring wildlife populations to levels where regulated hunting is possible and in establishing public lands open to all – is the primary factor that has enabled millions of Americans from all walks of life to enjoy the great outdoors. These participants are both conservationists and our industries' customer base.



The future of conservation, participation in recreational hunting and shooting, and the hunting and shooting sports industries, is inseparable from our past. The partnership of the past is the blueprint for the future. At a time when today's state agencies face a multitude of new issues and demands beyond traditional fish and game activities, continued, indeed strengthened, excise tax funding is critical in continuing efforts for wildlife conservation and land acquisition, as well as recruitment and retention efforts. This partnership is the foundation which supports the customer base that our "user pay" system depends.

# APPENDICES

*Appendix A:* Taxable Equipment Items

*Appendix B:* Hunting Recreation Total Purchases by Category

*Appendix C:* Macro-level Purchase Estimation: Model Results and Raw Data

*Appendix D:* Archery and Muzzleloader Hunters, Days, and Purchases (1975-2006)

*Appendix E:* Growth in Hunting Opportunity (Maps): Bear, Grouse, Quail, Rabbit, Tree Squirrel

*Appendix F:* Growth in Hunting Opportunity (Tables)

## Appendix A: Taxable Equipment Items

**Table A1. List of Items Subject to the Wildlife Restoration Excise Tax. Table is for general reference only. Consult IRS guidelines for specific items subject to the tax.**

Hunting and Shooting Sports Equipment List of Taxable Items in the Wildlife Restoration Program As of May 2010
<p><u>Sporting firearms and ammunition are taxed at 11%; Handguns are taxed at 10%.</u> These include:</p> <ul style="list-style-type: none"><li>• Pistols</li><li>• Revolvers</li><li>• Firearms (other than pistols and revolvers)</li><li>• Shells</li><li>• Cartridges</li><li>• Firearm parts/accessories – if in knockdown/kit form and contain all components</li><li>• Rifles</li><li>• Shotgun and combination guns</li><li>• Component parts for shells/cartridges sold as a “kit”</li><li>• Reloaded ammunition for resale (some exemptions apply)</li><li>• Portable weapons that use matchlock, flintlock, percussion cap ignition system, or black powder firearms</li><li>• Centerfire rifles including autoloaders, lever action, slide action, bolt action, single shot, drillings, combination guns, and double rifles</li><li>• Rimfire rifles including autoloaders, lever action, slide action, bolt action, and single shot</li><li>• Competition rifles: both centerfire and rimfire</li><li>• Shotguns including autoloaders, slide actions, over/under, side by sides, bolt action and single shot</li></ul> <p><u>Archery equipment is taxed at 11% for bows and archery accessories that are attached to a bow, quivers, points and broadheads.</u></p> <p>Arrow shafts are taxed at \$0.45 per shaft (as of 1/1/09) whether sold separately or incorporated as part of a finished product (including bow fishing arrows); regardless of shaft material or the type of head, that measure 18 inches or more in overall length (including the tip or head, and nock), and all arrows sold after 9/30/84 that measure less than 18 inches in overall length, and are suitable for use with a taxable bow; wood arrows designed for use by children are exempt.</p> <p>Arrow points including field, target, bow fishing and broadheads.</p>

Arrow holders (all items to be affixed to a to a bow to hold an arrow in ready position)

Arrow plates (whether fixed, adjustable, spring loaded etc.)

Arrow rests (whether bow shelf or auxiliary type)

Quivers designed to provide ready access to taxable arrows during the time that an archer is engaged in target shooting, hunting or fishing regardless of material from which constructed including bow quivers for attaching to bows and ground quivers

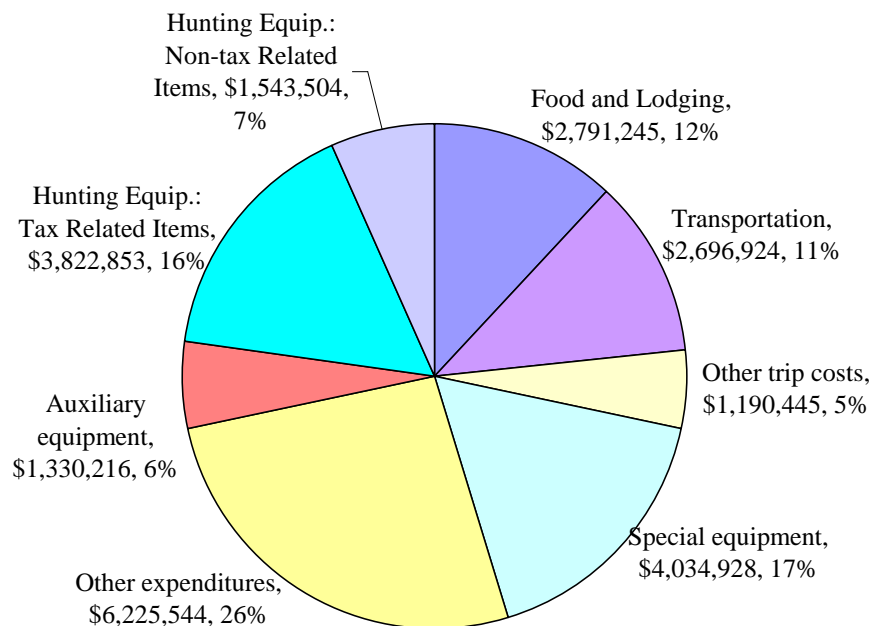
Bows – peak draw weight 30 pounds or more including laminated, composite bows, solid glass, wood, steel, etc., bows and crossbows.

Bow parts and accessories, including:

- bow handles, handle sections, bow levels, bow limbs
- bow saddles (including interchangeable or replaceable bow grips)
- bow sights and bow sight extensions (including parts and attachments therefore)
- bow silencing pads
- bow stabilizers (all attachments and weights for use on bows to effect stabilization, counterbalancing or modification of weight distribution)
- bowstrings
- bow wrist slings
- draw stops
- finger protectors attached to bowstring)
- grip formers
- kisser buttons (all items attached to bowstring to establish consistent anchor point)
- knocking points (all items attached to bowstring to establish arrow positioning)
- bowstring silencers
- bow tip protectors
- brush buttons
- cushion nocks
- cable guards and slides
- camouflaged bow covers (slip over cover cloth, self adhesive tape type, etc.)
- draw checks (spring loaded clickers, mirrors, or any other device attached to a bow or string to insure consistent draw length)
- release draw bars
- string peeps (all items attached to bowstring for use in sighting)

## Appendix B: Hunting Recreation Purchases by Category

**Figure B1. Total Retail Purchases for Hunting Recreation by Category (2006)**



Source: 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

Figure B1 above presents monies spent in 2006 on hunting related activities in the United States across eight different sub-categories. Their definitions are:

**Food and lodging:** Includes food and meal purchases as well as costs related to lodging.

**Transportation:** Includes both public and private transportation related expenses

**Other trip costs:** Includes guide fees, pack trip or package fees, land use fees, equipment rental, boating costs (mooring, maintenance, insurance, fuel, etc), and heating or cooking fuel.

**Hunting equipment**

**Tax Related Items:** Includes rifles, shotguns, muzzleloaders, primitive firearms, pistols, handguns, ammunition, bows, arrows, and archery equipment.

**Non-tax Related Items:** Includes sights, decoys and game calls, hand loading equipment, hunting dogs and associated costs, and other hunting related equipment.

**Auxillary equipment:** Includes camping equipment, field glasses, telescopes, hunting clothing, boots and foul weather gear as well as processing and taxidermy costs

**Special equipment:** Includes boats, campers, trail bikes, etc.

**Other purchases:** Includes magazines, books, memberships, land leasing or ownership costs, licenses, stamps, tags, and permits.

# Appendix C: Macro-level Purchase Estimation: Model Results and Raw Data

## Macro-level Linear Regression Model Output and Performance

### Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.992 <sup>a</sup>	.985	.978	1.84541E8	2.633

a. Predictors: (Constant), cert\_lic, hunt\_t3

b. Dependent Variable: hunt\_exp

### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.091E19	2	5.454E18	160.151	.000 <sup>a</sup>
	Residual	1.703E17	5	3.406E16		
	Total	1.108E19	7			

a. Predictors: (Constant), cert\_lic, hunt\_t3

b. Dependent Variable: hunt\_exp

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	-4.140E9	3.463E9		-1.196	.285
	hunt_t3	19.651	1.895	1.102	10.368	.000
	cert_lic	258.284	209.069	.131	1.235	.272

a. Dependent Variable: hunt\_exp

**Table C1. Tax Related Equipment Item Purchases: Actual and Estimated (1970-2006)**

Year	National Survey: Tax Related Equipment Item Purchases		Linear Interpolation				Regression Estimation				Difference between actual and regression estimated exp.	
	Actual	Inflated (2009\$)	Actual Excise Tax Related Purchases	Inflated (2009\$) Excise Tax Related Purchases	Wholesale Adjustment of Inflated TR Exp (2009\$).	Excise Tax Related ROI	Actual Excise Tax Related Purchases	Inflated (2009\$) Excise Tax Related Purchases	Wholesale Adjustment of Inflated Exp (2009\$)	Excise Tax Related ROI		
1970	\$506,680,000	\$2,801,587,813	\$506,680,000	\$2,801,587,813	\$2,155,067,549	1088%	\$450,373,869	\$2,490,254,092	\$1,915,580,071	956%	\$56,306,131	11%
1971			\$601,646,900	\$3,187,049,901	\$2,451,576,847	1161%	\$601,805,553	\$3,187,890,321	\$2,452,223,323	1161%		
1972			\$696,613,800	\$3,575,345,330	\$2,750,265,639	1137%	\$461,039,875	\$2,366,270,612	\$1,820,208,163	718%		
1973			\$791,580,700	\$3,824,850,195	\$2,942,192,457	1123%	\$510,140,377	\$2,464,954,639	\$1,896,118,953	688%		
1974			\$886,547,600	\$3,857,956,642	\$2,967,658,956	1099%	\$822,027,376	\$3,577,186,351	\$2,751,681,808	1012%		
1975	\$981,514,500	\$3,913,962,385	\$981,514,500	\$3,913,962,385	\$3,010,740,296	1098%	\$998,343,677	\$3,981,071,699	\$3,062,362,845	1118%	-\$16,829,177	-2%
1976			\$1,076,481,400	\$4,058,788,930	\$3,122,145,331	823%	\$1,051,876,030	\$3,966,016,307	\$3,050,781,775	802%		
1977			\$1,171,448,300	\$4,147,178,283	\$3,190,137,141	1229%	\$1,160,349,972	\$4,107,887,820	\$3,159,913,708	1217%		
1978			\$1,266,415,200	\$4,167,069,291	\$3,205,437,916	1033%	\$1,330,150,785	\$4,376,787,714	\$3,366,759,780	1090%		
1979			\$1,361,382,100	\$4,022,959,113	\$3,094,583,933	1014%	\$1,897,200,687	\$5,606,332,560	\$4,312,563,508	1453%		
1980	\$1,456,349,000	\$3,791,756,619	\$1,456,349,000	\$3,791,756,619	\$2,916,735,861	1136%	\$1,390,739,640	\$3,620,935,803	\$2,785,335,233	1080%	\$65,609,360	5%
1981			\$1,556,747,000	\$3,674,145,557	\$2,826,265,813	882%	\$1,852,742,094	\$4,372,736,310	\$3,363,643,315	1069%		
1982			\$1,657,145,000	\$3,684,133,854	\$2,833,949,118	1044%	\$2,032,236,627	\$4,518,030,563	\$3,475,408,125	1303%		
1983			\$1,757,543,000	\$3,785,722,918	\$2,912,094,552	1343%	\$1,869,788,324	\$4,027,497,767	\$3,098,075,206	1435%		
1984			\$1,857,941,000	\$3,836,353,112	\$2,951,040,855	1564%	\$2,453,992,302	\$5,067,104,393	\$3,897,772,610	2098%		
1985	\$1,958,339,000	\$3,904,611,283	\$1,958,339,000	\$3,904,611,283	\$3,003,547,141	1199%	\$2,151,294,940	\$4,289,334,225	\$3,299,487,865	1327%	-\$192,955,940	-10%
1986			\$2,037,161,500	\$3,987,650,700	\$3,067,423,615	1268%	\$1,775,064,314	\$3,474,607,416	\$2,672,774,935	1092%		
1987			\$2,115,984,000	\$3,996,099,115	\$3,073,922,396	1314%	\$1,631,269,457	\$3,080,701,193	\$2,369,770,149	990%		
1988			\$2,194,806,500	\$3,980,280,660	\$3,061,754,354	1234%	\$2,250,680,724	\$4,081,608,541	\$3,139,698,878	1268%		
1989			\$2,273,629,000	\$3,933,689,877	\$3,025,915,290	1275%	\$2,232,456,538	\$3,862,455,873	\$2,971,119,902	1250%		
1990			\$2,352,451,500	\$3,861,422,245	\$2,970,324,804	958%	\$2,201,478,790	\$3,613,608,685	\$2,779,698,988	890%		
1991	\$2,431,274,000	\$3,829,649,267	\$2,431,274,000	\$3,829,649,267	\$2,945,884,051	982%	\$2,406,120,562	\$3,790,028,539	\$2,915,406,568	971%	\$25,153,438	1%
1992			\$2,712,428,200	\$4,147,656,513	\$3,190,505,010	1164%	\$2,426,284,940	\$3,710,106,146	\$2,853,927,805	1031%		
1993			\$2,993,582,400	\$4,444,527,248	\$3,418,867,114	1101%	\$3,258,043,811	\$4,837,169,171	\$3,720,899,362	1207%		
1994			\$3,274,736,600	\$4,740,567,921	\$3,646,590,709	1026%	\$3,217,847,799	\$4,658,214,664	\$3,583,242,049	1007%		
1995			\$3,555,890,800	\$5,005,709,610	\$3,850,545,854	1162%	\$3,037,005,497	\$4,275,262,784	\$3,288,663,680	978%		
1996	\$3,837,045,000	\$5,246,578,223	\$3,837,045,000	\$5,246,578,223	\$4,035,829,402	1540%	\$3,539,411,864	\$4,839,609,962	\$3,722,776,894	1413%	\$297,633,136	8%
1997			\$3,685,808,000	\$4,926,742,622	\$3,789,802,017	1588%	\$4,104,853,126	\$5,486,871,495	\$4,220,670,381	1780%		
1998			\$3,534,571,000	\$4,652,124,286	\$3,578,557,143	1413%	\$3,963,642,358	\$5,216,858,531	\$4,012,968,101	1596%		
1999			\$3,383,334,000	\$4,356,844,696	\$3,351,418,997	1159%	\$3,308,466,685	\$4,260,435,277	\$3,277,257,906	1131%		
2000			\$3,232,097,000	\$4,026,738,642	\$3,097,491,263	1057%	\$3,046,752,163	\$3,795,825,023	\$2,919,865,402	990%		
2001	\$3,080,860,000	\$3,732,120,055	\$3,080,860,000	\$3,732,120,055	\$2,870,861,581	1094%	\$3,263,415,252	\$3,953,265,488	\$3,040,973,452	1165%	-\$182,555,252	-6%
2002			\$3,229,258,600	\$3,851,003,070	\$2,962,310,054	1010%	\$3,787,213,749	\$4,516,383,969	\$3,474,141,515	1202%		
2003			\$3,377,657,200	\$3,938,219,797	\$3,029,399,844	1112%	\$3,890,509,006	\$4,536,185,492	\$3,489,373,456	1296%		
2004			\$3,526,055,800	\$4,004,602,611	\$3,080,463,547	1005%	\$3,625,706,822	\$4,117,778,001	\$3,167,521,539	1037%		
2005			\$3,674,454,400	\$4,036,387,218	\$3,104,913,244	1056%	\$4,049,163,215	\$4,448,004,755	\$3,421,542,119	1174%		
2006	\$3,822,853,000	\$4,068,171,697	\$3,822,853,000	\$4,068,171,697	\$3,129,362,844	957%	\$3,875,214,686	\$4,123,893,517	\$3,172,225,783	971%	-\$52,361,686	-1%

**Table C2. Annual Purchases, Collections and ROI-TR: 1970-2006**

Year	National Survey: Tax Related Equipment Item Purchases (2009 \$s)	Excise Tax Collections (2009 \$s)	Linear Interpolation			Regression Estimation		
			Estimated Tax Related Equipment Item Purchases (2009 \$s)	Wholesale Adjustment of Linear Interpolated Purchases (2009 \$s)	Excise Tax Related ROI	Estimated Tax Related Equipment Item Purchases (2009 \$s)	Wholesale Adjustment of Regression Estimated Purchase (2009 \$s)	Excise Tax Related ROI
1970	\$2,801,587,813	\$181,392,830	\$2,801,587,813	\$2,155,067,549	1088%	\$2,490,254,092	\$1,915,580,071	956%
1971		\$194,429,264	\$3,187,049,901	\$2,451,576,847	1161%	\$3,187,890,321	\$2,452,223,323	1161%
1972		\$222,407,802	\$3,575,345,330	\$2,750,265,639	1137%	\$2,366,270,612	\$1,820,208,163	718%
1973		\$240,630,633	\$3,824,850,195	\$2,942,192,457	1123%	\$2,464,954,639	\$1,896,118,953	688%
1974		\$247,412,388	\$3,857,956,642	\$2,967,658,956	1099%	\$3,577,186,351	\$2,751,681,808	1012%
1975	\$3,913,962,385	\$251,409,634	\$3,913,962,385	\$3,010,740,296	1098%	\$3,981,071,699	\$3,062,362,845	1118%
1976		\$338,158,400	\$4,058,788,930	\$3,122,145,331	823%	\$3,966,016,307	\$3,050,781,775	802%
1977		\$239,988,721	\$4,147,178,283	\$3,190,137,141	1229%	\$4,107,887,820	\$3,159,913,708	1217%
1978		\$283,039,562	\$4,167,069,291	\$3,205,437,916	1033%	\$4,376,787,714	\$3,366,759,780	1090%
1979		\$277,698,649	\$4,022,959,113	\$3,094,583,933	1014%	\$5,606,332,560	\$4,312,563,508	1453%
1980	\$3,791,756,619	\$236,002,809	\$3,791,756,619	\$2,916,735,861	1136%	\$3,620,935,803	\$2,785,335,233	1080%
1981		\$287,673,109	\$3,674,145,557	\$2,826,265,813	882%	\$4,372,736,310	\$3,363,643,315	1069%
1982		\$247,782,518	\$3,684,133,854	\$2,833,949,118	1044%	\$4,518,030,563	\$3,475,408,125	1303%
1983		\$201,842,919	\$3,785,722,918	\$2,912,094,552	1343%	\$4,027,497,767	\$3,098,075,206	1435%
1984		\$177,312,567	\$3,836,353,112	\$2,951,040,855	1564%	\$5,067,104,393	\$3,897,772,610	2098%
1985	\$3,904,611,283	\$231,284,476	\$3,904,611,283	\$3,003,547,141	1199%	\$4,289,334,225	\$3,299,487,865	1327%
1986		\$224,160,707	\$3,987,650,700	\$3,067,423,615	1268%	\$3,474,607,416	\$2,672,774,935	1092%
1987		\$217,349,495	\$3,996,099,115	\$3,073,922,396	1314%	\$3,080,701,193	\$2,369,770,149	990%
1988		\$229,469,482	\$3,980,280,660	\$3,061,754,354	1234%	\$4,081,608,541	\$3,139,698,878	1268%
1989		\$220,063,058	\$3,933,689,877	\$3,025,915,290	1275%	\$3,862,455,873	\$2,971,119,902	1250%
1990		\$280,824,721	\$3,861,422,245	\$2,970,324,804	958%	\$3,613,608,685	\$2,779,698,988	890%
1991	\$3,829,649,267	\$272,151,825	\$3,829,649,267	\$2,945,884,051	982%	\$3,790,028,539	\$2,915,406,568	971%
1992		\$252,347,606	\$4,147,656,513	\$3,190,505,010	1164%	\$3,710,106,146	\$2,853,927,805	1031%
1993		\$284,697,737	\$4,444,527,248	\$3,418,867,114	1101%	\$4,837,169,171	\$3,720,899,362	1207%
1994		\$323,762,202	\$4,740,567,921	\$3,646,590,709	1026%	\$4,658,214,664	\$3,583,242,049	1007%
1995		\$305,059,910	\$5,005,709,610	\$3,850,545,854	1162%	\$4,275,262,784	\$3,288,663,680	978%
1996	\$5,246,578,223	\$246,122,753	\$5,246,578,223	\$4,035,829,402	1540%	\$4,839,609,962	\$3,722,776,894	1413%
1997		\$224,562,093	\$4,926,742,622	\$3,789,802,017	1588%	\$5,486,871,495	\$4,220,670,381	1780%
1998		\$236,559,330	\$4,652,124,286	\$3,578,557,143	1413%	\$5,216,858,531	\$4,012,968,101	1596%
1999		\$266,181,182	\$4,356,844,696	\$3,351,418,997	1159%	\$4,260,435,277	\$3,277,257,906	1131%
2000		\$267,778,022	\$4,026,738,642	\$3,097,491,263	1057%	\$3,795,825,023	\$2,919,865,402	990%
2001	\$3,732,120,055	\$240,443,600	\$3,732,120,055	\$2,870,861,581	1094%	\$3,953,265,488	\$3,040,973,452	1165%
2002		\$266,903,141	\$3,851,003,070	\$2,962,310,054	1010%	\$4,516,383,969	\$3,474,141,515	1202%
2003		\$249,908,724	\$3,938,219,797	\$3,029,399,844	1112%	\$4,536,185,492	\$3,489,373,456	1296%
2004		\$278,689,808	\$4,004,602,611	\$3,080,463,547	1005%	\$4,117,778,001	\$3,167,521,539	1037%
2005		\$268,630,812	\$4,036,387,218	\$3,104,913,244	1056%	\$4,448,004,755	\$3,421,542,119	1174%
2006	\$4,068,171,697	\$296,099,557	\$4,068,171,697	\$3,129,362,844	957%	\$4,123,893,517	\$3,172,225,783	971%



## Appendix D: Archery and Muzzleloader Hunters, Days, and Purchases (1975-2006)

**Table D1. Archery Excise Tax Collections, Retail Purchases, Hunters, and Days (1975-2006)**

	1975	1980	1985	1991	1996	2001	2006
Wildlife Restoration Excise Tax Collection (Bow & Arrow ONLY)	\$546,137	\$6,160,076	\$8,399,239	\$15,096,809	\$18,000,000	\$22,668,686	\$28,667,274
Wildlife Restoration Excise Tax Collection: Bow & Arrow ONLY (2009 \$s)	\$2,177,831	\$16,038,374	\$16,746,403	\$23,780,494	\$24,611,400	\$27,460,846	\$30,507,713
Bow & Arrow Retail Purchases (actual \$s)	N/A	\$104,507,000	\$196,740,000	\$344,239,000	\$589,565,000	\$462,097,000	\$674,117,000
Bow & Arrow Retail Purchases (2009 \$s)	N/A	\$272,094,425	\$392,260,212	\$542,245,273	\$806,112,225	\$559,784,306	\$717,395,311
Archery Hunters	2,302,000	2,015,000	2,369,000	2,732,000	3,289,000	3,070,000	3,501,000
Archery Hunter Days	23,143,000	17,474,000	N/A	N/A	41,467,000	38,705,000	50,027,000
Purchases per Hunter (2009 \$s)	N/A	\$135.03	\$165.58	\$198.48	\$245.09	\$182.34	\$204.91
Purchases per Day (2009 \$s)	N/A	\$15.57	N/A	N/A	\$19.44	\$14.46	\$14.34

Source: Collections-U.S. Fish and Wildlife Service Certified Collections. Note-Wildlife Restoration Excise tax collections on bows and arrows began in fiscal year 1975.

Source: Purchases, hunters, and days-National Survey on Fishing, Hunting, and Wildlife Associated Recreation. Note-Data pre- and post 1991 are not directly comparable due to a change in methodology.

**Table D2. Muzzleloader Retail Purchases, Hunters, and Days (1975-2006)**

	1975	1980	1985	1991	1996	2001	2006
Muzzleloader & Primitive Firearm Retail Purchases (actual \$s)	N/A	N/A	\$57,227,000	\$83,852,000	\$171,949,000	\$105,507,000	\$184,157,000
Muzzleloader & Primitive Firearm Retail Purchases (2009 \$s)	N/A	N/A	\$114,099,193	\$132,083,670	\$235,105,868	\$127,811,180	\$195,979,879
Muzzleloader & Primitive Firearm Hunters	415,000	833,000	853,000	1,439,000	1,677,000	2,050,000	2,484,000
Muzzleloader & Primitive Firearm Hunter Days	2,756,000	5,553,000	N/A	N/A	9,120,000	12,841,000	16,787,000
Purchases per Hunter (2009 \$s)	N/A	N/A	\$133.76	\$91.79	\$140.19	\$62.35	\$78.90
Purchases per Day (2009\$)	N/A	N/A	\$0.00	N/A	\$25.78	\$9.95	\$11.67

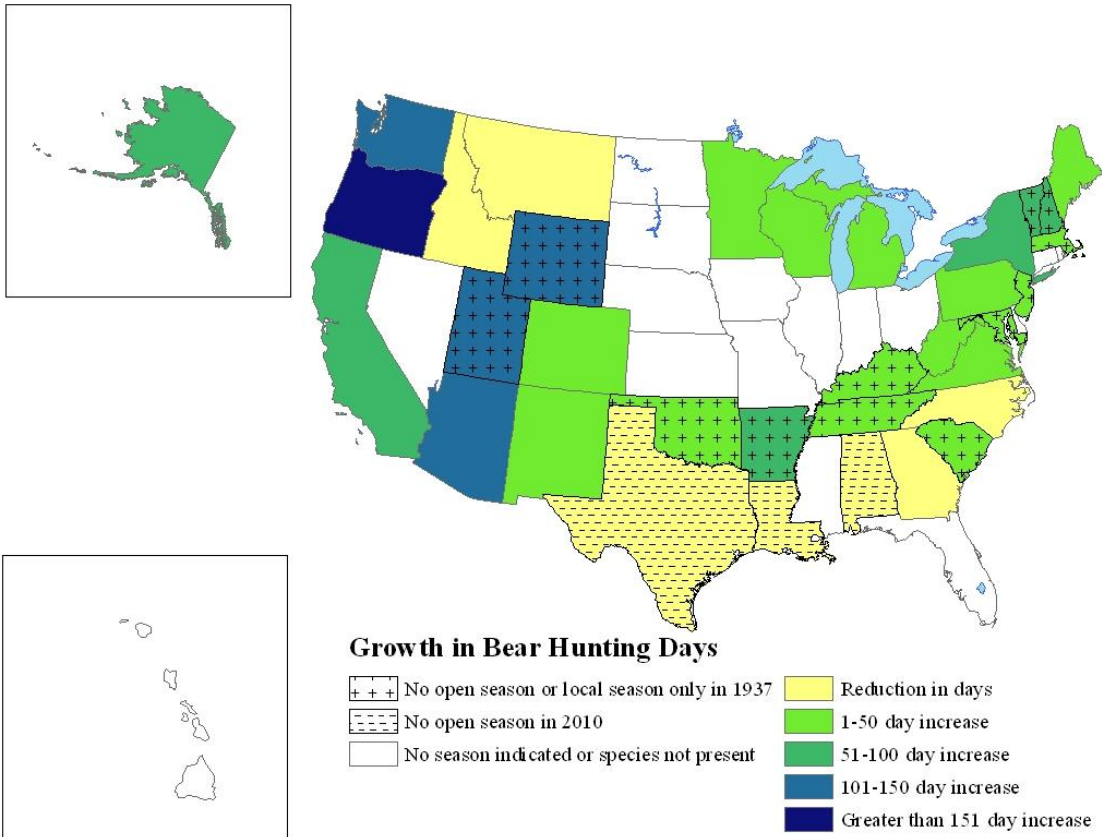
Note-Wildlife Restoration excise tax collections related to muzzleloaders and other primitive firearms are tallied collectively with other firearms. As a result, collections for this category of firearms are not reported.

Source: Expenditures, hunters, and days-National Survey on Fishing, Hunting, and Wildlife Associated Recreation. Note-Data pre- and post 1991 are not directly comparable due to a change in methodology.

## Appendix E: Growth in Hunting Opportunity (Maps): Bear, Grouse, Quail, Rabbit, Squirrel

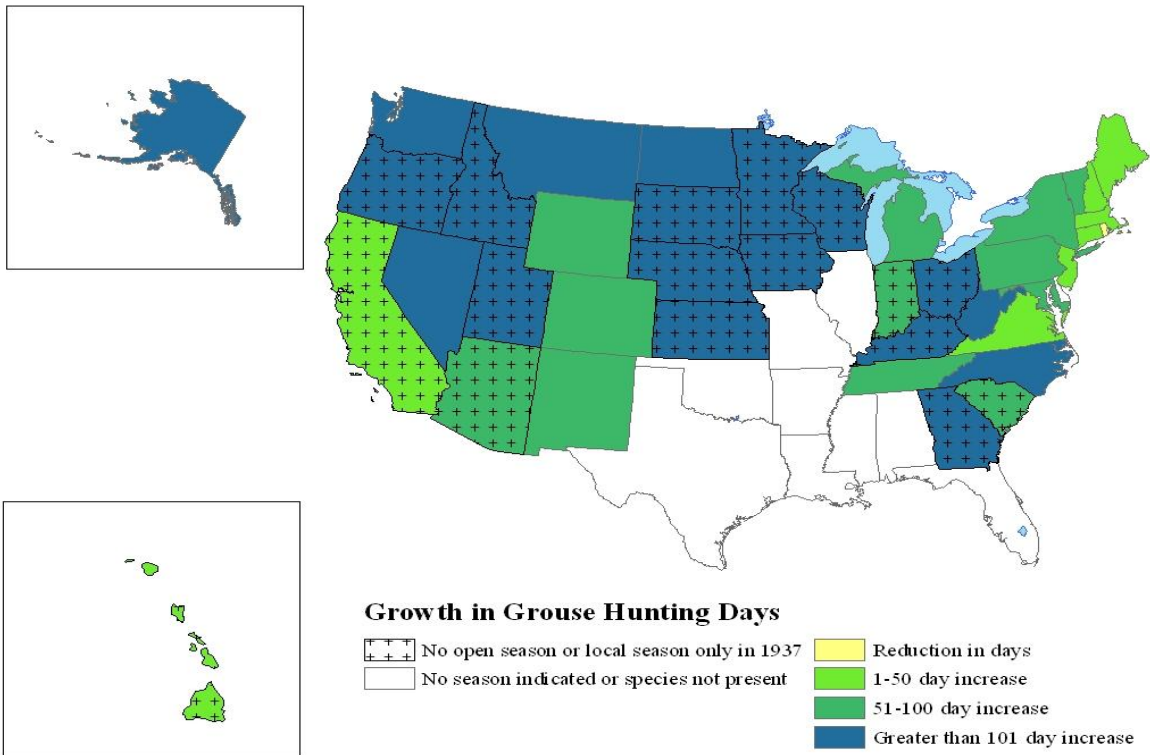
Figures E1 through E5 reflect the growth in hunting seasons available across the nation between 1937 and 2010 for bear, grouse, quail, rabbit and tree squirrel hunters. The supporting data is presented in two successive tables in Appendix F. State hunting opportunities are characterized using two different and complimentary approaches. First, changes to the number of days open to hunting are defined in either four or five color schematics. Those states that are not assigned a color reflect states where there are either no hunting seasons indicated or the state is outside of the particular species range. Second, states that have transitioned from either a localized season or a closed season since 1937 or have since closed a season in 2010 are identified by distinct hatch markings.

Figure E1: National Growth in Bear Hunting Days (1937-2010)

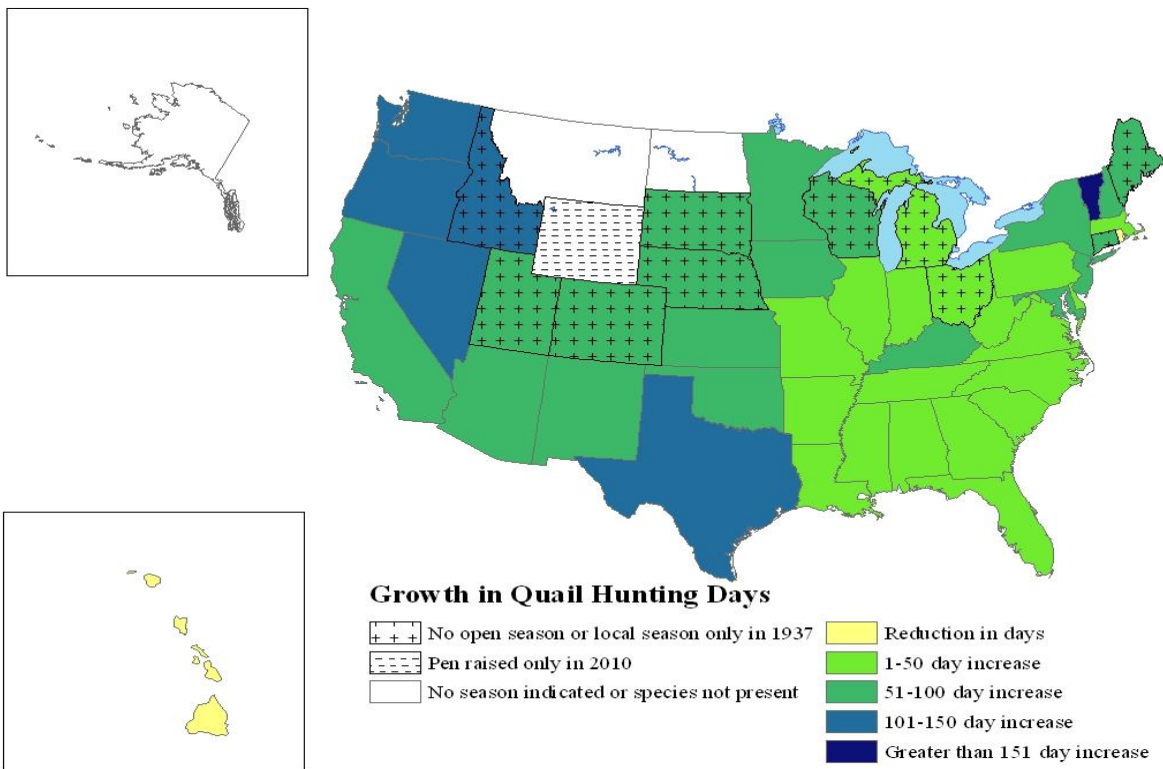


Note: In 1937 some states had very liberal bear seasons because bear were considered predators and not managed as game animals.

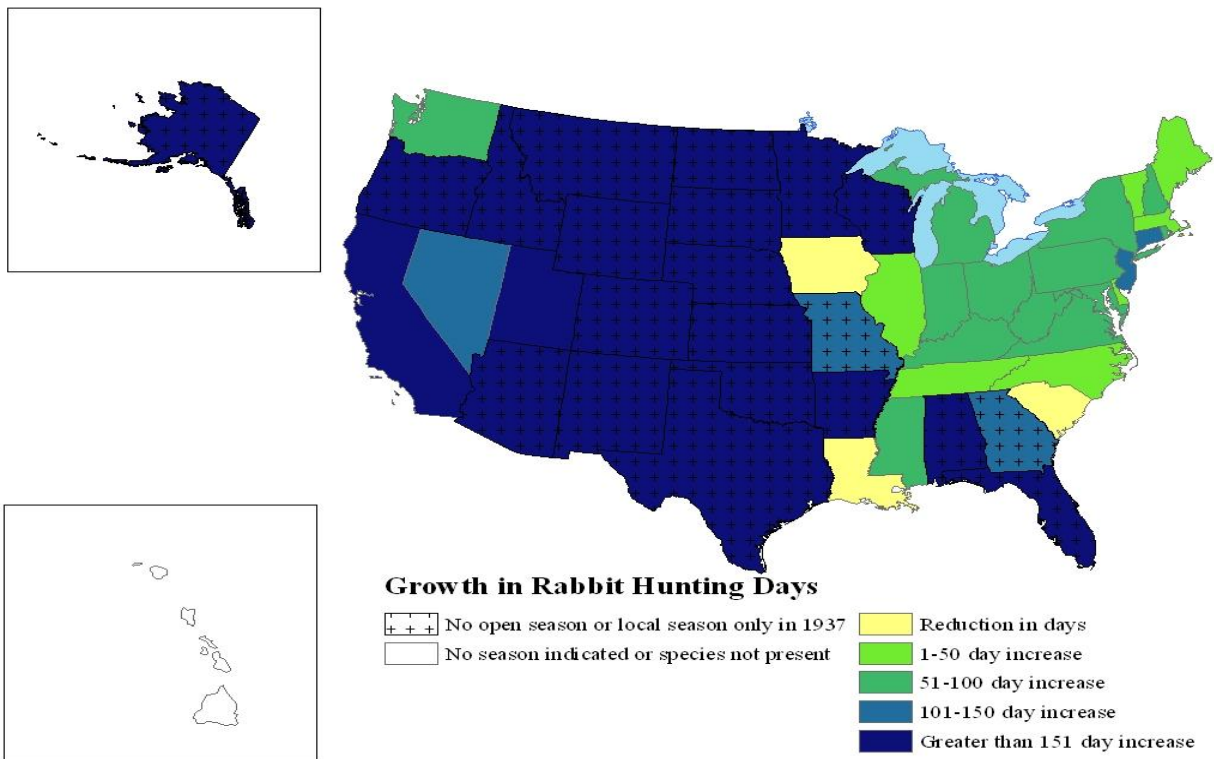
**Figure E2. National Growth in Grouse Hunting Days (1937-2010)**



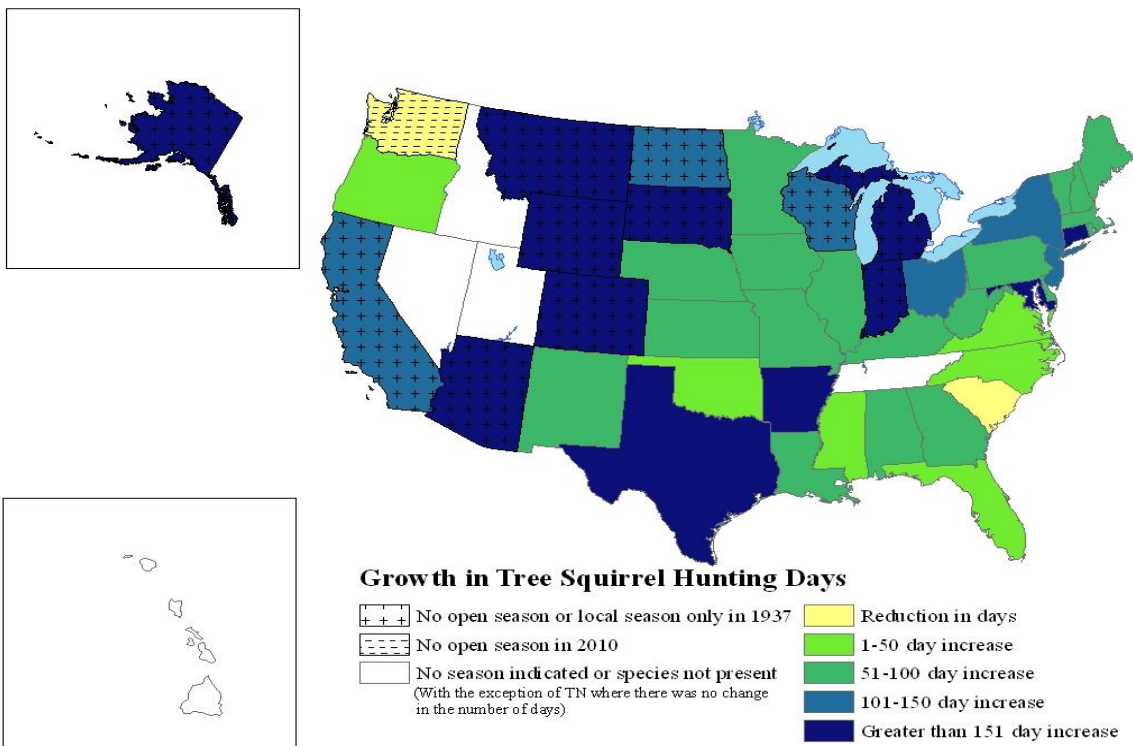
**Figure E3: National Growth in Quail Hunting Days (1937-2010)**



**Figure E4. National Growth in Rabbit Hunting Days (1937-2010)**



**Figure E5. National Growth in Tree Squirrel Hunting Days (1937-2010)**



Note: The state of Tennessee does offer more than 200 days of hunting opportunity but had no change in the length of hunting season between 1937 and 2010.

## Appendix F: Growth in Hunting Opportunity (Tables)

**Table F1. Growth in Hunting Opportunity Days: by state (1937-2010)**

Hunting Opportunities: 1937 vs 2010

Maximum Annual Days of Hunting Allowed, Per Species

State	Deer			Elk			Bear			Turkey			Pheasant		
	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr
ALABAMA	42	109	159.5%		NP		123	NOS		74	89	20.3%	42	P	
ALASKA	93	153	64.5%	NSI	153		293	365	24.6%	NSI	NP		NSI	NP	
ARIZONA	31	133	329.0%	NOS	120		31	148	377.4%	31	62	100.0%	NOS	15	
ARKANSAS	15	151	906.7%	NSI	15		NOS	68		30	53	76.7%	NOS	NOS/P	
CALIFORNIA	76	175	130.3%	NSI	31		61	120	96.7%	NOS	67		6	44	633.3%
COLORADO	7	121	1628.6%	7	128	1728.6%	7	52	642.9%	NOS	96		NSI	80	NA
CONNECTICUT	NOS	138		NP	NP		NSI	NOS		NSI	62		35	85	142.9%
DELAWARE	NOS	153		NOS	NP		NOS	NP		NSI	22		6	76	1166.7%
FLORIDA	47	212	351.1%	NP	NP		NSI	NOS		88	139	58.0%	NOS	P	NA
GEORGIA	52	143	175.0%	NP	NP		101	86	-14.9%	102	51	-50.0%	NOS	P	NA
HAWAII	214	365**	70.5%	NP	NP		NP	NP		NSI	53		64	22	-65.6%
IDAHO	LS	125		LS	125		365	173	-52.6%	NP	141		LS	84	NA
ILLINOIS	NOS	108		NP	NP		NSI	NOS		NOS	52		6	71	1083.3%
INDIANA	NOS	110		NP	NP		NP	NP		NOS	80		3	45	1400.0%
IOWA	NOS	132		NP	NP		NP	NP		NSI	123		3	75	2400.0%
KANSAS	NOS	143		NP	196		NP	NP		NSI	164		NOS	82	NA
KENTUCKY	NOS	136		NP	108		NP	2		NOS	162		NOS	P	NA
LOUISIANA	62	136	119.4%	NOS	NP		62	NOS		NOS	32		NOS	101 (P)	NA
MAINE	LS	92		NP	NP		61	90	47.5%	NP	61		NOS	92	NA
MARYLAND	5	138	2660.0%	NP	NP		NSI	6		47	45	-4.3%	47	71	51.1%
MASSACHUSETTS	6	75	1150.0%	NP	NP		NSI	39		NP	35		NSI	44	NA
MICHIGAN	16	104	550.0%	NP	27		16	47	193.8%	NOS	104		17	68	300.0%
MINNESOTA	11	105	854.5%	NSI	18		11	47	327.3%	NSI	75		9	79	777.8%
MISSISSIPPI	43	138	220.9%	NP	NP		NOS	NOS		20	89	345.0%	NOS	P	NA
MISSOURI	3	123	4000.0%	NP	NP		NSI	NOS		31	136	338.7%	NOS	78	NA
MONTANA	32	86	168.8%	32	86	168.8%	212	149	-29.7%	NOS	160		NOS	84	NA
NEBRASKA	NOS	126		NSI	100		NSI	NOS		NOS	176		NOS	96	NA
NEVADA	30	146	386.7%	NSI	153		NSI	NOS		NSI	43		2	30	1400.0%
NEW HAMPSHIRE	15	92	513.3%	NSI	NP		NSI	84		NSI	123		10	92	820.0%
NEW JERSEY	5	161	3120.0%	NP	NP		NSI	6		36	36	0.0%	36	99	175.0%
NEW MEXICO	15	98	553.3%	15	147	880.0%	71	108	52.1%	15	40	166.7%	NOS	4	NA
NEW YORK	32	114	256.3%	NP	NP		32	95	196.9%	NSI	88		73	153	109.6%
NORTH CAROLINA	93	148	59.1%		NP		93	54	-41.9%	88	31	-64.8%	NSI	74	NA
NORTH DAKOTA	4	122	2950.0%	NSI	153		NSI	NOS		NSI	131		9	87	866.7%
OHIO	NOS	135		NP	NP		NSI	NOS		NSI	82		11	70	536.4%
OKLAHOMA	NSI	123		NOS	123		NSI	31		NOS	157		NOS	62	NA
OREGON	36	184	411.1%	8	243	2937.5%	30	215		NOS	127		17	84	394.1%
PENNSYLVANIA	13	104	700.0%	NOS	12		6	8		25	43	72.0%	25	84	236.0%

**Table F1. (cont'd)**

	Deer			Elk			Bear			Turkey			Pheasant		
	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr
RHODE ISLAND	NOS	125		NSI	NP		NSI	NOS		NSI	57		61	96	57.4%
SOUTH CAROLINA	140	142	1.4%	NSI	NP		NSI	14		98	48	-51.0%	NOS	NP	NA
SOUTH DAKOTA	20	143	615.0%	20	76	280.0%	NSI	NOS		NSI	167		LS	87	NA
TENNESSEE	15	109	626.7%	NSI	5		NSI	27		62	58	-6.5%	NOS	P	NA
TEXAS	47	121	157.4%	NSI	NOS		47	NOS	NA	47	212		NOS	149	NA
UTAH	11	59	436.4%	NSI	76		NSI	107		NSI	53		NOS	30	NA
VERMONT	10	50	400.0%	NSI	NP		NSI	78		NSI	69		9	98	988.9%
VIRGINIA	47	204	334.0%	3	LS		47	85	80.9%	71	109		47	87	85.1%
WASHINGTON	25	110	340.0%	8 LS	74	NA	25	139	456.0%	NSI	89		8	115	1337.5%
WEST VIRGINIA	2	88	4300.0%	NSI	NOS		34	80	135.3%	34	56	64.7%	NSI	57	NA
WISCONSIN	7	113	1514.3%	NSI	NOS		7	35	400.0%	NOS	126		6	77	1183.3%
WYOMING	LS	127	NA	LS	170		NSI	138		NSI	142		32	56	75.0%

ALL -- Ducks, geese, brant and coots. The 1937 figure includes jacksnipe.

NSI = No season identified

NP = Not present

NOS = No Open Season

LS: Local Seasons

ZS: Zone Seasons

X / X: 2 Seasons

\*\*= Open year round on private land; seasons on public lands vary

P= pen raised only

SH = Showshoe Hare

PC = Prairie Chicken

**Table F1. (cont'd)**

State	Quail			Grouse			Tree Squirrel			Rabbit			Waterfowl - ALL		
	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr	1937	2010	% Incr
ALABAMA	93	108	16.1%	NOS	NOS		93	151	62.4%	NSI	151		30	111	270.0%
ALASKA	NSI	NP		181	288	59.1%	NSI	365		NSI	365		LS	144	
ARIZONA	32	129	303.1%	NOS	66		NOS	365		ZS	365		30	119	296.7%
ARKANSAS	62	98	58.1%				125	290	132.0%	NSI	181		30	108	260.0%
CALIFORNIA	47	142	202.1%	NOS	31		NOS	142		47	213		30	145	383.3%
COLORADO	NOS	80		7	82	1071.4%	NSI	212		NSI	212		30	160	433.3%
CONNECTICUT	NOS	85		35	45	28.6%	35	195	457.1%	61	165	170.5%	30	188	526.7%
DELAWARE	47	76	61.7%	NSI	NP		48	145	202.1%	47	97	106.4%	30	152	406.7%
FLORIDA	88	114	29.5%	NOS	NP		88	114	29.5%	NSI	365		30	98	226.7%
GEORGIA	102	108	5.9%	NOS	137		107	198	85.0%	NSI	108		30	83	176.7%
HAWAII	61	22		NSI	22		NSI	NP		NSI	NP		120	NOS	
IDAHO	LS	136		LS	155		NSI	NOS		NSI	181		30	132	340.0%
ILLINOIS	30	71	136.7%	NOS	NOS		122	205		52	78		30	127	323.3%
INDIANA	41	72	75.6%	NOS	92		LS	170		62	138	122.6%	30	144	380.0%
IOWA	31	94	203.2%	NSI	122		62	150	141.9%	213	178	-16.4%	30	120	300.0%
KANSAS	11	82	645.5%	NOS	105 (PC)		154	243		NSI	365		30	146	386.7%
KENTUCKY	47	100	112.8%	NOS	118		122	196	60.7%	47	100	112.8%	30	85	183.3%
LOUISIANA	83	101	21.7%	NSI	NP		107	173	61.7%	152	150	-1.3%	30	90	200.0%
MAINE	NOS	92		46	92	100.0%	31	92	196.8%	151	182 (SH)	20.5%	30	142	373.3%
MARYLAND	47	102	117.0%	47	122	159.6%	15	178	1086.7%	47	115	144.7%	30	140	366.7%
MASSACHUSETTS	32	43	34.4%	32	43	34.4%	32	111	246.9%	105	136	29.5%	30	147	390.0%
MICHIGAN	NOS	26		29	93	220.7%	NOS	168		123	198	61.0%	30	146	386.7%
MINNESOTA	15	107	613.3%	NOS	107		79	164	107.6%	NSI	164		30	108	260.0%
MISSISSIPPI	53	101	90.6%	NOS	NOS		123	157	27.6%	73	136	86.3%	30	100	233.3%
MISSOURI	52	78	50.0%	NOS	NOS		183	270	47.5%	NSI	138		30	121	303.3%
MONTANA	NOS	NP		5	123	2360.0%	NSI	365		NSI	365		30	105	250.0%
NEBRASKA	NOS	94		NOS	136		92	184		NSI	181		30	140	366.7%
NEVADA	2	123	6050.0%	2	122	6000.0%	NSI	NSI		61	181		30	150	400.0%
NEW HAMPSHIRE	31	92		61	92		31	122	293.5%	123	182 (SH)	48.0%	30	117	290.0%
NEW JERSEY	36	99	175.0%	36	63	75.0%	36	141	291.7%	36	141	291.7%	30	159	430.0%
NEW MEXICO	31	93	200.0%	7	61	771.4%	15	91	506.7%	NSI	365		30	129	330.0%
NEW YORK	61	151		75	162	116.0%	75	181	141.3%	106	171	61.3%	30	174	480.0%
NORTH CAROLINA	88	101	14.8%	26	134	415.4%	107	134		88	101	14.8%	30	146	386.7%
NORTH DAKOTA	NOS	NP		9	114	1166.7%	NSI	114		NSI	365		30	115	283.3%
OHIO	NOS	24		NOS	115		16	153	856.3%	48	120	150.0%	30	125	316.7%

**Table F1. (cont'd)**

	Quail			Grouse			Tree Squirrel			Rabbit			Waterfowl - ALL		
	1937	2010	% Incr	1937	2010	1937	2010	% Incr	1937	2010	1937	2010	% Incr	1937	2010
	OKLAHOMA	43	95	120.9%	NSI	NP		231	260		NSI	166		30	146
OREGON	17	153		LS	122		36	39	8.3%	NSI	365		30	159	430.0%
PENNSYLVANIA	13	32	146.2%	13	72	453.8%	25	90	260.0%	25	102	308.0%	30	151	403.3%
RHODE ISLAND	61	44	-27.9%	61	44	-27.9%	61	135		61	135		30	157	423.3%
SOUTH CAROLINA	97	100	3.1%	NOS	97		182	152	-16.5%	182	97		30	105	250.0%
SOUTH DAKOTA	NOS	79		NOS	107		NSI	181		NSI	181		30	161	436.7%
TENNESSEE	62	108	74.2%	62	143	130.6%	215	215	0.0%	62	108	74.2%	30	134	346.7%
TEXAS	47	149	217.0%	NOS	NOS		184	365	98.4%	NSI	365		30	121	303.3%
UTAH	NOS	56		NOS	112		NSI	Restricted		NSI	171		30	142	373.3%
VERMONT	77	365	374.0%	45	98	117.8%	31	122	293.5%	151	170		30	109	263.3%
VIRGINIA	71	87	22.5%	71	112	57.7%	146	166	13.7%	71	122	71.8%	30	173	476.7%
WASHINGTON	8	109	1262.5%	5	122		31	NOS	NA	128	196		30	140	366.7%
WEST VIRGINIA	15	57	280.0%	34	136	300.0%	34	115	238.2%	15	115	666.7%	26	108	315.4%
WISCONSIN	NSI	54		NOS	137		LS	137		LS	164		30	121	303.3%
WYOMING	NOS	P		11	91	727.3%	NSI	182		NSI	182		30	144	380.0%

ALL -- Ducks, geese, brant and coots. The 1937 figure includes jacksnipe.  
 NSI = No season identified  
 NP = Not present  
 NOS = No Open Season  
 LS: Local Seasons  
 ZS: Zone Seasons

X / X: 2 Seasons  
 \*\*= Open year round on private land; seasons on public lands vary  
 P= pen raised only  
 SH = Showshoe Hare  
 PC = Prairie Chicken