

The Future of Wisconsin Conservation Funding: Alternatives and Options for Fishing and Hunting Licenses

Prepared for the
Wisconsin Department of Natural Resources

By
Ishmael Amarreh
Peter Braden
Stephanie Chase
Kimberly Farbota
Nathaniel Inglis Steinfeld

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Robert M. La Follette
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Foreword

Students enrolled in the Workshop in Public Affairs at the Robert M. La Follette School of Public Affairs, University of Wisconsin–Madison, prepared this report in collaboration with the Wisconsin Department of Natural Resources (DNR). The workshop provides graduate students in their last semester of the Master of Public Affairs degree program the opportunity to expand their policy analysis skills while working with a government agency and contributing to that agency's understanding of a major public policy issue.

A major responsibility of the DNR is oversight of public recreational lands. Funding for maintenance (including law enforcement) of these habitats and wildlife populations is financed largely through hunting and fishing fees. This financing is projected to diminish as the number of hunters declines. The DNR faces the dilemma of needing to maintain its revenue flow from hunting and fishing without instituting policies that would further discourage hunting. The DNR asked that a workshop team investigate this funding issue and potential policy responses. The authors lay out the funding dilemma, suggesting how the DNR can address this issue through both short-run and long-run initiatives. The authors' recommendations are based on a review of conservation funding policies in selected neighboring states and a quantitative analysis of how license fees influence the number of licenses sold and thus total revenue flows.

I am grateful to Keith Warnke, Hunting and Shooting Sport Coordinator, Bureau of Law Enforcement, Wisconsin Department of Natural Resources. He suggested the topic as one that was feasible for a one-semester workshop and a major topic of DNR policy discussions. He and others in the department were available to the students throughout the semester. The authors' acknowledgments thank other individuals who supported their work, and I extend my thanks to them as well.

Although the conclusions are addressed to the DNR, other readers may find this report useful for its overview of conservation financing in Wisconsin, its detailed discussion of the challenges faced when the major source of revenue (hunters) is declining in numbers, and its suggestions for innovative short- and long-run policy action. Most interesting perhaps is its suggestion that the DNR work with the slow food movement whose interests in naturally raised foods and conservation coincide with those of the hunting communities.

The report also benefited greatly from the support of La Follette School faculty and staff, especially that of Publications Director Karen Faster, who edited and managed production of the report. The conclusions herein are those of the authors alone and do not represent the views of the La Follette School or the client.

Karen Holden
Professor Emeritus of Public Affairs and Consumer Science
May 2012

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We would also like to thank those whom we reached out to in developing alternative policies, including Jonny Hunter of Underground Food Collective, Jeff Smoller from the Wisconsin Department of Natural Resources, and the students and hunters who responded to our questions. Finally, we would like to thank Professor Karen Holden for her valuable feedback and guidance and Karen FASTER for her excellent help with the writing and editing process.

Executive Summary

More than 90 percent of Wisconsin's fish and wildlife conservation funding comes from the sale of hunting and fishing licenses. License sales have fallen in the last decade, a trend expected to continue in the absence of policy intervention. Without changes in the revenue structure, increased participation in hunting and fishing is the only means of ensuring sustainable conservation funding in Wisconsin.

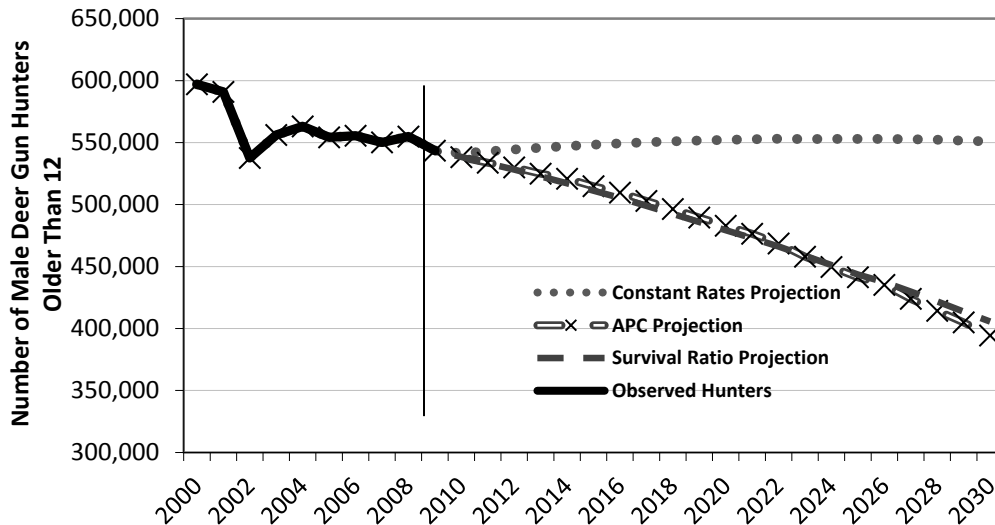
Other states have implemented a variety of strategies to combat revenue loss caused by declining participation in hunting and fishing programs. Higher license fees, increased recruitment efforts, targeted sales taxes, and modernization of hunter recruitment methods to appeal to the younger generation have all been implemented in other states to increase revenue for supporting conservation. Altering Wisconsin's license fee schedule would be a straightforward way of raising additional revenue. Based on evidence from other states and a regression analysis based on Wisconsin data, this policy is likely to be effective. We therefore recommend fee restructuring be considered a policy goal, but, given that required statutory change would likely be a protracted process, one implemented in the long term.

In the short term, we recommend that the Wisconsin Department of Natural Resources (DNR) focus immediate efforts on the recruitment and retention of hunters from underrepresented demographic groups. Based on our projections of participation and revenue streams, short-term recruitment efforts would strongly complement any long-term policy changes. Efforts to reach out to youth could include moving more services to the Internet, utilizing social media, and creating smart phone applications. Also, establishing a connection with the "slow food" movement could further the DNR's goal of sustainable conservation through increased participation by community groups.

Introduction

More than 90 percent of funding for fish and wildlife conservation efforts in Wisconsin comes from the sale of hunting and fishing licenses. Conservation efforts include the state's maintenance and improvement of fish and wildlife habitats, as well as enforcement and education programs to protect the environment. This funding is threatened by a projected 30 percent decline in the number of hunters in Wisconsin during the next 20 years (Winkler & Klaas, 2011). Figure 1 shows that two projection methods, Age-Period-Cohort and Survival Ratio, predict a sharp decline in hunters. Both models account for the effects of age, time-specific events such as chronic wasting disease, and demographic cohort on the number of licenses sold. For comparison, see the optimistic but unrealistic Constant Rates Projection (Winkler & Klaas, 2011).

Figure 1:
Projection of Gun Deer Hunter (Male) Participation in Wisconsin: 2000-2030



Source: Winkler & Klaas, 2011

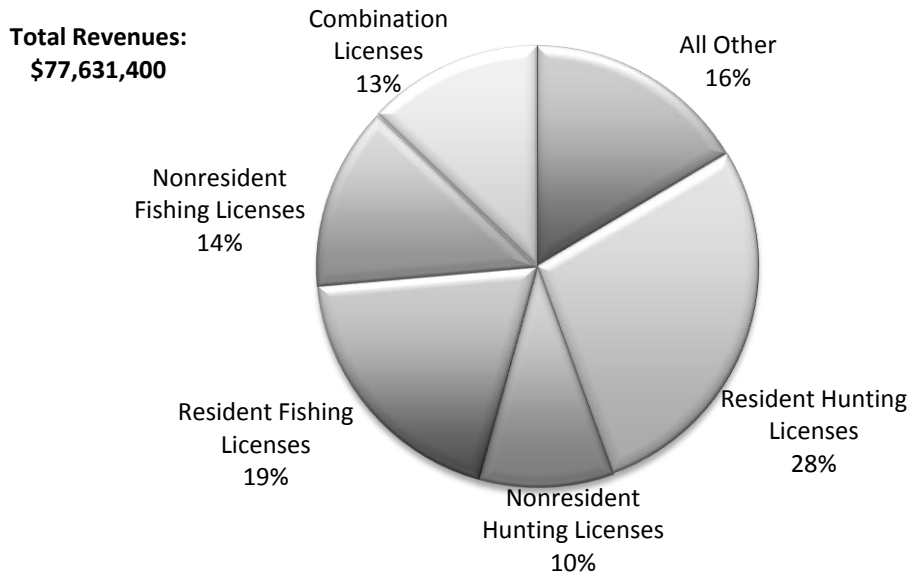
In the absence of a policy change to counter that decline, the state will experience a significant reduction in funding available for conservation efforts. We describe policy options that could help the Wisconsin Department of Natural Resources (DNR) address the projected revenue loss. These options include: creating incentives for inactive hunters by increasing put-and-take programs (raising and adding fish and animals to natural environments); increasing access to public lands; introducing a fee for antlerless deer permits; imposing a conservation sales tax modeled on those in other states; making more data about territory and game publicly available; and launching a public relations campaign to encourage hunting by younger and more urban sectors of the population, as well as by people focused on sustainable living. The preferred approach would generate new revenue and be sustainable and politically feasible. Given existing budgetary and political constraints, we recommend that the DNR pursue a combination of funding source restructuring and public relations efforts.

Current System and Funding Structure

The fish and wildlife portion of Wisconsin’s conservation fund finances the maintenance and improvement of habitats across the state. The fund allows for management of wildlife populations through law enforcement efforts, stocking and removal of fish and animal populations, and education programs. Fishing and hunting licenses consistently account for more than 90 percent of the total revenue available in this fund. With relatively small amounts of money from the general revenue fund or federal grants, conservation efforts are closely tied to hunting and fishing participation and fees. Wisconsin statutes establish and regulate most of this budgetary system by mandating activities, setting license fees, and requiring some fees to be spent on specific programs.

The sale of hunting, fishing, and combination (sport) licenses produced \$64.9 million in revenue during the 2011 fiscal year, generating 84 percent of the DNR’s 2010-2011 hunting season’s conservation budget of \$77.6 million (Figure 2). The revenue subtotals of hunting, fishing, and sport licenses were \$29.4 million, \$25.5 million, and \$10 million, respectively. Miscellaneous rents and services, fishing tournament fees, and hunting safety class fees made up the remaining \$12.7 million of the budget. Under the current structure, the most feasible way to maintain this level of conservation funding is to sustain or increase the number of hunters in Wisconsin is during the coming decades (Wisconsin Legislative Fiscal Bureau [WLF], 2011).

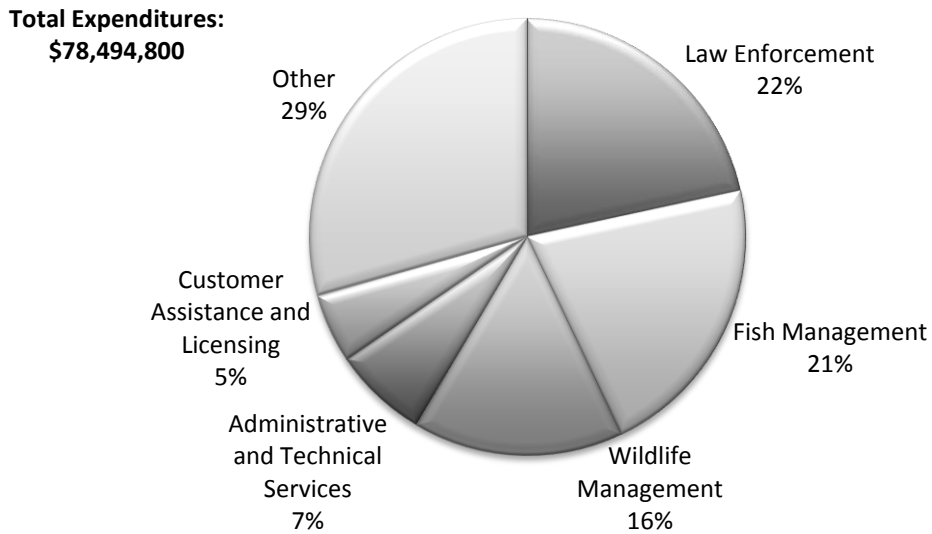
Figure 2:
Revenue Sources, Wisconsin Fish and Wildlife Fund: Fiscal Year 2010-11



Source: Polasek, 2012

Reducing expenditures is not a feasible alternative strategy. According to data from the Wisconsin Legislative Fiscal Bureau, 2011 expenditures for the Fish and Wildlife Account were \$78.4 million (Figure 3). The top categories of expenditure were law enforcement (\$17 million), fisheries management (\$16.7 million), and wildlife management (\$12.3 million). The remaining expenditures were primarily for property management, licensing, wildlife damage, and scientific services (WLFB, 2011). However, revenue from hunting and fishing licenses is not enough to cover the costs of maintaining fish and wildlife habitat (Table 1). Reducing fish and wildlife expenditures would threaten the state's ability to maintain its natural resources and, as we describe below, would likely further accelerate declines in hunting and fishing.

Figure 3: Expenditures, Wisconsin Fish and Wildlife Fund: 2011



Source: Polasek, 2012

Table 1: Conservation Fund Revenues and Expenditures, 2011

Revenues*		Expenditures*	
Total Conservation Fund	\$232	Total Conservation Fund	\$238
Fish & Wildlife	\$77.6	Fish & Wildlife	\$78.4
Forestry	\$104.1	Law Enforcement	\$17.0
Other	\$50.5	Fisheries Management	\$16.7
		Wildlife Management	\$12.3
		Other	\$32.6

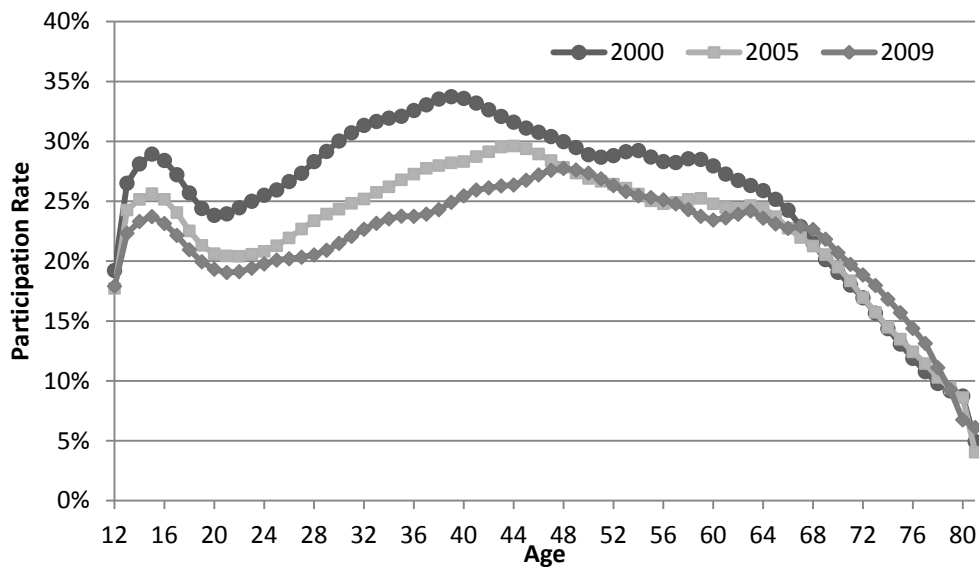
Sources: Polasek, 2012; WLFB, 2011
* All numbers in millions of dollars.

The Cultural Shift

Hunting is a social activity that can foster relationships within a community. Understanding the community and cultural elements of hunting is critical to identifying strategies to ensure hunting participation remains stable. Wisconsin’s hunting culture means friendship and bonding, connection with nature and stewardship of the land, and pride in a rustic, rural lifestyle (Leopold, 1986). Over time, many aspects of this culture have been jeopardized. As Wisconsin urbanizes, young people move farther away from home in pursuit of work and education (Poudyal, Cho, & Bowker, 2007). As a result, fewer Wisconsin residents share with their family and longtime friends an intimate and continuing connection with the land and an ethic of protection of the state’s natural heritage based on their hunting experiences. As residents are less likely to live where hunting can be shared with friends and family across generations and ages, funding for conservation programs directly tied to hunting license sales is jeopardized.

Actual and projected declines in deer hunting license sales demonstrate that conservation revenue will likely continue to decrease from year to year. While the number of hunters in all age groups has fallen, the decline in participation is disproportionately concentrated among people 40 and younger (Winkler & Klaas, 2011). Figure 4 illustrates the changes in hunting participation rates among Wisconsin males of different ages from 2000 to 2009. Participation rates for people 40 and younger dropped 5 to 10 percent during this time period. This trend bodes poorly for hunting and fishing license revenue in Wisconsin and underscores the growing threat to Wisconsin’s ability to maintain its valuable natural resources. Even a conservative estimate of a 20 percent decline over the next 20 years in overall participation would be financially devastating to the state’s conservation efforts, particularly as alternative funding sources for the DNR remain unlikely.

Figure 4: Male Gun Hunter Participation Rates, 2000, 2005, and 2009



Source: Winkler & Klaas, 2011

Figure 4 shows how the numbers of men who participate in deer gun hunting have declined since 2000. Rates of hunting have declined among younger and older segments of the male population, implying fewer first-time hunters entering at the critical younger and middle years. In addition, the participation rates for men ages 28 to 44 show a decrease for the 2009 estimates. Thus, the later peak of age 48 in 2009 compared to age 39 in 2000 reflects a lower retention in hunting as male hunters age. Although deer hunting is the only category for which demographic participation rates are available, the DNR can reasonably expect equivalent participation declines in other realms of hunting and fishing given the common cultural influences (Veroff & Klaas, 2012).

Political Climate and Financial Constraints

Wisconsin fiscal policy appears to prioritize more efficient use of existing resources and budgetary stability. These policy constraints may reduce the ability of the DNR to change how conservation fund revenue is generated. Although some general fund revenue is allotted to conservation efforts, it could decline or be reallocated to other budgetary priorities. This possibility makes addressing the decline in hunting license revenues even more vital. This report generates a blueprint for sustainable conservation in Wisconsin, a goal that goes far beyond the immediate political conditions. Still, the political situation will influence the scope of alternatives that can be enacted in the short term. Additionally, as with any government agency, the DNR budget is limited. These constraints will in turn limit the amount of initial funding available to plan for and implement our recommended initiatives and may necessitate separate steps for short- and long-term resolution of conservation funding issues.

Attitudes About Hunting

For more than 100 years, Americans have debated and disagreed on the moral and scientific merits of hunting as a means of providing food and pleasure, and of maintaining balance in the ecosystem. For some, hunting and fishing are community-building activities that promote connection with nature and a fuller understanding and appreciation of one's food. For others, hunting is a cruel activity that turns public lands into "private butcher shops, scenes of mayhem and horror" (Reiger, 1986). Hunting and fishing invoke emotional reactions from many sides.

In the last quarter century, Americans' attitudes toward hunting and fishing have changed in subtle ways. Writers like Michael Pollan (2008, 2006) have helped to popularize hunting as an alternative to factory-farmed meat. Still, many Americans view killing wild animals with disfavor. Changing people's closely held beliefs is beyond the power of this paper and the DNR. Instead, we suggest considering the values that hunters and their opponents share. These include love of nature, respect for animals, and the desire for healthy and humanely obtained food. The compassionate, respectful, and ecological justifications for hunting include less reliance on factory-farmed meat, herd control to prevent game animals from dying of starvation, and the funding of the DNR's many important conservation projects by the sale of

licenses. In developing new recruitment strategies, it would be beneficial for the DNR to emphasize how hunting relates to sustainability and respect for human and animal life.

Lessons from Other States

Other states with similar concerns about maintaining conservation funds provide informative examples of policy alternatives for Wisconsin. In this section, we examine policies of Minnesota, Michigan, Illinois, and Ohio as well as states with alternative funding mechanisms (Missouri and Arkansas) that might be informative to Wisconsin policymakers. We compare sources of revenue for conservation, the variation in license fees across resident and nonresident hunters, and characteristics of deer and hunting circumstances. With respect to hunting and fishing license sales in Wisconsin, the most relevant examples are from two other states in the upper Midwest, Minnesota and Michigan, which have similar demographics, hunting cultures, and terrains. The DNR could consider whether either of these states' measures are suitable for Wisconsin: Are they consistent with the mission of the DNR, its desire to increase conservation funding, its goals of equity and sustainability, and the political atmosphere of the state?

Minnesota and Michigan differ in their policies on the hunting of antlerless deer, i.e. "any deer without antlers, or any deer with both antlers less than three inches in length" (DNR, 2011). States encourage hunters to take these deer as a means of herd control. In Wisconsin and Minnesota, initial antlerless deer permits are provided at no charge, whereas Michigan offers lower-priced antlerless tags for some areas and regular deer permits, regardless of antler status, in others. In Wisconsin, more than 800,000 of these free permits are issued each year when the first deer hunting license is purchased. In Michigan the fee is \$4 (Michigan Department of Natural Resources, 2011). Since Wisconsin incurs some expense in issuing these licenses, charging even a modest permit fee would represent a substantial source of additional income. No evidence suggests that Michigan's fee has reduced the number of regular deer permits issued.

There are three other notable differences among states' hunting and fishing license fee structures. These include a no-charge permit and license for resident landowners in Missouri and Arkansas (where revenue comes from a general sales tax); higher nonresident deer hunting license fees in Illinois (\$325 compared to Wisconsin's \$157 and Minnesota's \$141); and identical permit fees for resident and nonresident deer hunters in Ohio (Table 2).

Table 2: License Fees and Conservation Funding in Other States

State	Primary Funding Source		Primary License Fee ¹		Number Sold to	
			Deer Hunting	Fishing	Deer Hunters	Fishers
Wisconsin	License	Resident	\$24	\$19	501,000	1.35 million
		Nonresident	\$157	\$49		
Minnesota	Licenses	Resident	\$26	\$17	600,000	683,000
		Nonresident	\$141	\$40		
Missouri	0.125% Sales Tax ²		\$17	\$12	*	*
Arkansas	0.125% Sales Tax		\$11	\$11	*	*
Illinois	Licenses	Resident	\$26	\$15	338,235	*
		Nonresident	\$325	\$32		
Ohio	Licenses & Other Funds	Resident	\$24	\$19	609,417	873,727
		Nonresident	\$24	\$40		
Michigan	Licenses	Resident	\$15	\$15	656,500	1.1 million
		Nonresident	\$138	\$34		

Sources: Authors' Research of States' Websites
 * No data available.
¹ Numbers rounded to nearest dollar.
² In 2007, the sales tax accounted for 60 percent and the license fees made up 18 percent of the budget of the Missouri Department of Conservation. (Missouri Department of Conservation, 2008).

The Minnesota DNR is seeking hunting and fishing license fee increases this legislative session. As in Wisconsin, fees cannot be changed without action by the Legislature, last taken in 2001. Most of the proposed changes would increase the license fees but lower-cost license options would remain available to youth and senior citizens. See Appendix A for the full Minnesota legislative proposal. New products also will be introduced to cater to the needs of most fishing and hunting license buyers (Minnesota Department of Natural Resources, 2012a). Because its hunting culture and fee structure are similar to those of Wisconsin, Minnesota policies warrant particular attention. The Wisconsin DNR may be well served by closely monitoring how license fee structure changes affect total revenue in Minnesota.

Missouri and Arkansas loosened their formerly tight link between hunting revenue and conservation funding by passing a targeted statewide sales tax. Restructured conservation funding provided a larger and more stable revenue stream that enabled greater wildlife preservation and habitat improvement efforts (Missouri Department of Natural Resources, 2012; Arkansas Game and Fish Commission, 2008). Both states implemented a 1/8th percent sales tax (0.125 percent charged on all sales) after lengthy political campaigns led by state natural resource departments and conservation advocacy groups (Griffie, 1999). Missouri implemented the tax in 1976, and Arkansas did so in 1996. In both states, the economic recession has reduced sales tax proceeds and yielded less funding than projected for conservation programs. Nevertheless, these taxes have been

important sources of conservation revenue and, despite general opposition to tax increases, proposals to repeal the sales tax have failed in both Missouri and Arkansas (Cauthorn, 2011; “Ark. AG Certifies,” 2012). In these states, citizens are willing to pay for conservation through a general sales tax.

Illinois has some of the highest nonresident hunting and fishing license fees among the states we examined. In contrast to Wisconsin, Illinois’ resident license fee structure has little variation based on deer gender, method of pursuit, and season—and even less of a price discount for hunters pursuing deer on their own property (Illinois Department of Natural Resources, 2012). For nonresident hunters, Illinois charges \$325 for gun deer hunting licenses, more than 17 times as much as resident hunter licenses. The Illinois fee structure favors resident and property-owning hunters, which may be a factor in reducing the number of out-of-state hunters buying permits. Of 338,000 hunters, 5.7 percent were nonresidents in 2011. This percentage is almost identical to the 5.6 percent of deer licenses and permits sold in Wisconsin to nonresident hunters, where nonresident licenses cost less than half as much (\$160). This difference may be evidence of inelasticity in demand (or the non-responsiveness of buyers to small price changes) for nonresident licenses.

Michigan has faced a strong downward trend in hunting numbers. Compared to 2000, the total number of hunting licenses issued during the 2009 deer-hunting season was down 9 percent, as were the number of days afield (Frawley, 2010). This pattern parallels Wisconsin’s situation. To address decreasing sales, nonresident licenses were priced more than nine times higher than resident licenses. Michigan has also implemented a regular statistical survey and analysis of hunting patterns. In recent years, this study used statistical estimates to suggest improvements in four areas to increase hunting numbers: (1) access and supply of hunting opportunities, (2) companion and mentor networks, (3) education, public relations, and outreach, and (4) regulations and enforcement (Michigan Department of Natural Resources, 2006). These programs began in March 2012, and so the state has not yet reported the results.

Ohio established hunting and fishing license fees that do not discriminate based on residency. Lower fees for in-state hunters are available only for antlerless deer permits and for hunters who are younger than 18 or 65 and older. Ohio also raises revenue through a state income tax line item that allows filers to make donations to preserve the state’s natural areas and wildlife and special automotive license-plate sales. These donations are to the Division of Wildlife or the Division of Natural Areas and Preserves (Ohio Department of Natural Resources, 2012).

Another difference between Wisconsin and neighboring states is the extent to which licensing and information has moved to the Internet. In Wisconsin, tagging (the process of reporting and paying for a harvested animal) still must be done on the phone or in person. Illinois, Ohio, Michigan, and other states have moved the tagging system online. Hunters have expressed satisfaction with the ease of this option. Ohio implemented a customer relationship management program to handle the majority of interactions with customers and is phasing out in-person transactions as hunters become familiar with the new system.

This program takes advantage of new technologies and strives to make the licensing process “cost-efficient and user-friendly” (Ohio Department of Natural Resources, 2012). Michigan has online harvest maps that show hunters where deer and other game have recently been harvested and tagged (Michigan Department of Natural Resources, 2012). These maps assist individuals who have moved and do not know where to hunt in their new locale. Overall, the online elements of these programs can reduce information barriers for hunters and anglers, helping them adjust to the hunting and fishing conditions near their new homes (Ervin, 2012).

This review of state policies shows that although all states depend on hunting fees for natural resource and wildlife preservation, they vary in their complementary fund-raising strategies. Targeted taxes, income tax form donations, greater use of online licensing and information, and higher license and permit fee have all been employed. In addition to developing online systems and changing fee structures, several natural resource departments have launched efforts to attract new hunters through recruitment programs and by increasing the appearance of inclusiveness. For example, women are a demographic group in which hunting rates are low. To encourage more women to hunt, many pages of the Michigan Department of Natural Resources’ website feature pictures of women or girls hunting, implicitly demonstrating that women and girls enjoy this activity. Some states provide information and materials in languages other than English on their websites. We note the growing importance of hunting in some minority ethnic groups and the potential gain in hunting revenue if Wisconsin provided online information in Spanish and Hmong, opening hunting to underrepresented demographic groups.

Responding to ever-changing conditions and adapting hunting culture to the modern age are critical if conservation practices are to be sustained. Online tools, fee restructuring, and outreach efforts could all be used to reach this goal. Other states’ efforts provide valuable examples for Wisconsin on complementary long-run fund-raising strategies and short-run recruitment efforts.

Policy Alternatives & Evaluations

To address conservation funding issues due to declining license fees, the DNR has a range of options that merit careful consideration. We evaluated the options based on (1) revenue generation potential, (2) probable sustainability over time, and (3) equity. Revenue generation potential is the most important criterion in this analysis. We evaluate each alternative in terms of initial costs of implementation, likelihood of increasing participation and retention in hunting, and capacity to generate net revenue over expenditures. We also consider sustainability of the funding stream. Measures that may initially generate significant additional revenue but are not likely to produce a predictable, steady inflow of annual funds, are considered inferior to measures that will garner a less variable revenue stream into the future even if initial revenue is somewhat less. Finally, we consider the effects of various options on different segments of Wisconsin's population.

Alternative 1: The Current System

Under the current system, revenue is likely to steadily decline as the number of hunters is predicted to drop by more than 25 percent during the next two decades (Winkler & Klaas, 2011). As seen in Figure 1, the decline is projected to continue for 30 years. This decline will lead to equivalent reductions in the license revenue available for the conservation budget, with negative consequences for Wisconsin's wildlife and public lands. Although leaving the system unaltered is politically feasible in the short run, the immediate and long-term financial consequences make this policy option undesirable for the Wisconsin DNR.

In addition to maintaining the system, the Wisconsin Legislature has considered measures to reduce hunting license fees to incentivize hunting participation among Wisconsin's youth. Although increasing the number of hunters could help protect conservation funding generated by these licenses, research indicates that reducing fees is unlikely to achieve this end, probably because the license fee is a small portion of the true cost of hunting. Equipment, transportation, accommodations, and time represent far greater costs to hunters than the actual license fee (Poudyal, Cho, & Bowker, 2007). Even a large decline in license fees represents a small percentage decline in total hunting costs. For this reason, as well as the importance of hunting as a community activity, evidence indicates that demand for hunting and fishing licenses is what is termed relatively inelastic, meaning that changes in price have small, if any, effects on the number of licenses purchased (Teisl, Boyle, & Record, 1999).

Changing license fees could send a signal to individuals that the DNR and the Legislature are paying attention to and promoting hunting and fishing. Of particular relevance, creating a new category of reduced license fees for Young Outdoor Leaders (16-25 year olds) would target the group that has the lowest participation rates, whose hunting rate declines are of particular concern, and is likely most sensitive to price barriers. However, given the inelasticity of demand for licenses, lowering fees is likely to reduce, rather than augment, revenue generated by license fees in the short run. Only if lower fees lead to increased retention of hunters would this policy have a beneficial effect on total revenues (as shown in Figure 2).

Alternative 2: Retention Efforts

Efforts to improve retention of hunters may help to keep hunting participation rates steady. One effort that may ensure greater hunter retention is returning put-and-take programs to their previous levels. Such programs are commonly used for pheasant hunting and fishing programs. For example, pheasant hunting and walleye fishing require that chicks and fish be raised in captivity until harvestable age. Then these species are released on public hunting grounds to sustain sport opportunities. These programs supplement naturally occurring wildlife and fish populations to fulfill demand for hunting of these species. Although deer hunting does not depend on put-and-take programs for species sustainability, other hunting and fishing opportunities rely on such programs to continue. In recent years, such put-and-take stocking programs have been dramatically reduced due to budgetary restrictions (Keefer, 2009). This change has likely resulted in less successful hunting and fishing, which may discourage some hunters and anglers.

Analyses of other states' programs have demonstrated that put-and-take programs do not generate revenue but do increase hunting participation and satisfaction (Schulz, Millspaugh, Zekor, & Washburn, 2003). The costs necessary to raise and release the animals (estimated at \$6-\$14 per pheasant, for example) are not completely offset by the sale of licenses (\$9.75 per pheasant license). Given the inelasticity of demand for licenses, the DNR could safely increase the fees for game from the put-and-take program without much risk of losing revenue. To cover operational costs and produce a net gain, however, such an increase would need to be substantial.

People who quit hunting have often complained about insufficient access to public land. However, a 2009 report indicates that reduced land access has not impeded most Wisconsin hunters' enjoyment (Responsive Management, 2009). The perception of reduced land access is likely due to lack of knowledge about accessibility and availability of game, which, we noted earlier, is a greater problem as Wisconsin's population becomes more mobile and less connected to traditional hunting communities. One solution would be to make information concerning the location and game success rates of public lands readily available on the DNR website. Minnesota has easily accessible data on its website concerning the full breadth of hunting grounds available. A similar update to Wisconsin's website may alleviate some perceived access issues. Although this effort alone would not generate new revenue, it may prevent some reductions in hunting participation, which would prevent revenue losses.

Alternative 3: Funding Source Restructuring

In addition to retention of hunters, increasing revenue through changes in the fee structure for hunting and fishing is another viable alternative. First, moderate fee increases for different license types, particularly for nonresident hunters, still leave Wisconsin below the median fees charged by neighboring states. Due to the measured inelasticity of hunting license demand, such policy changes would likely lead to increases in revenue. Second, a statewide sales tax could provide an alternative revenue structure that would increase the base and more broadly

spread the responsibility for conservation. Finally, the overall fee structure should be analyzed for possible inefficiencies and cost-savings that can be executed with minimal change. The following section discusses this alternative's three components in more depth.

(1) License Fee Increases

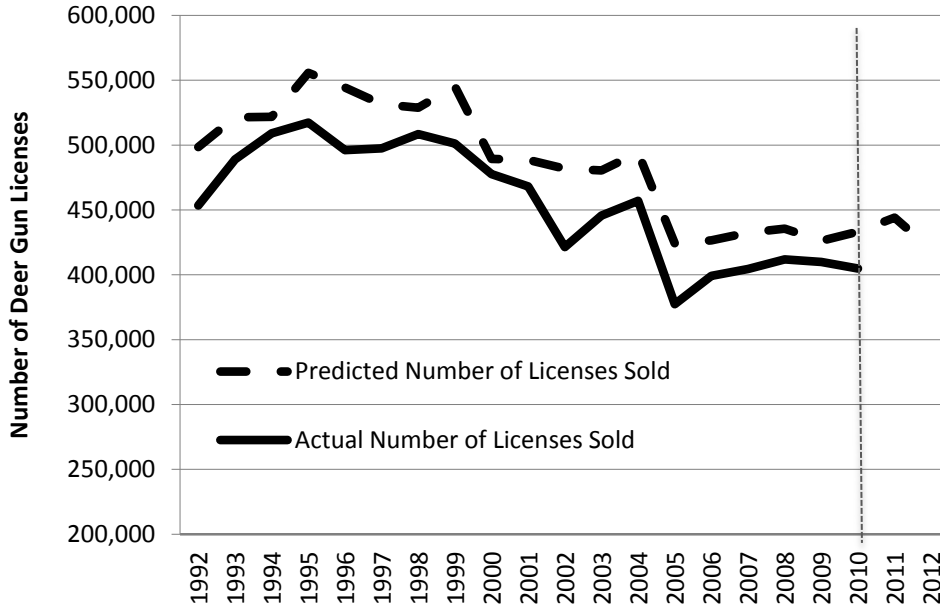
To explore the effects of price changes on hunting license sales in Wisconsin, we conducted a quantitative analysis. Although license fees are under the control of the Wisconsin Legislature, the DNR could propose changes and thus should be well informed about the effects of license fee changes in the event of a future political opportunity. The effects of past changes in license fees on the number of licenses sold can be used to predict whether the DNR's revenue from license sales are likely to increase or decrease in response to price increases. This analysis uses sales data (1987 through 2011) for select hunting and fishing licenses to forecast how changes in license fees are likely to affect revenue and license sales. We produced separate models for two license types, the Resident Angling and Resident Deer Hunting licenses, that together generate 25 percent of the total revenue of the Fish and Wildlife Fund.

Building on a report for Minnesota Department of Natural Resources, we created a model that explores this relationship to forecast how changes in license fees would affect the number of licenses sold. We included variables for previous year sales, population, license fees, per-capita income, the unemployment rate, gasoline prices, and weather during the hunting season in question. The explanation of variables and estimation results can be found in Appendix B. To confirm the predictive ability of our model, we compared the license sales our model predicts with actual sales of licenses.

The model for resident fishing did not show a good fit to actual sales. Therefore, we can neither explain variations in license sales nor use this model to predict how sales would respond to price changes. A possible reason the predicted model did not show a good fit is because of the fluctuations in the number of licenses sold from year to year, which may be due to factors that cannot be easily identified. A steep rise in the number of licenses sold in 1998 could have skewed the model results. Still, this unpredictability persists even when omitting 1998 from the analysis. This lack of predictive power is evidence for a disconnection between license fees and the number sold. In other words, in 1998 without a price change, fishing licenses still increased by roughly 18 percent.

The model for estimating sales of resident deer hunting licenses, however, had much better predictive value (Figure 5). Data show that sales of individual resident deer hunting licenses have been falling steadily in the previous 25 years. In 1987, sales of these licenses were around 450,000. Sales increased in following years and the total number of licenses sold reached 517,000 in 1995. After 1995, sales started to drop steadily each year. The total licenses sold of this type were just over 400,000 in 2011. Our model predicts all of these changes with a high degree of accuracy.

Figure 5: Actual and Predicted Sales of Resident Deer Hunting Licenses

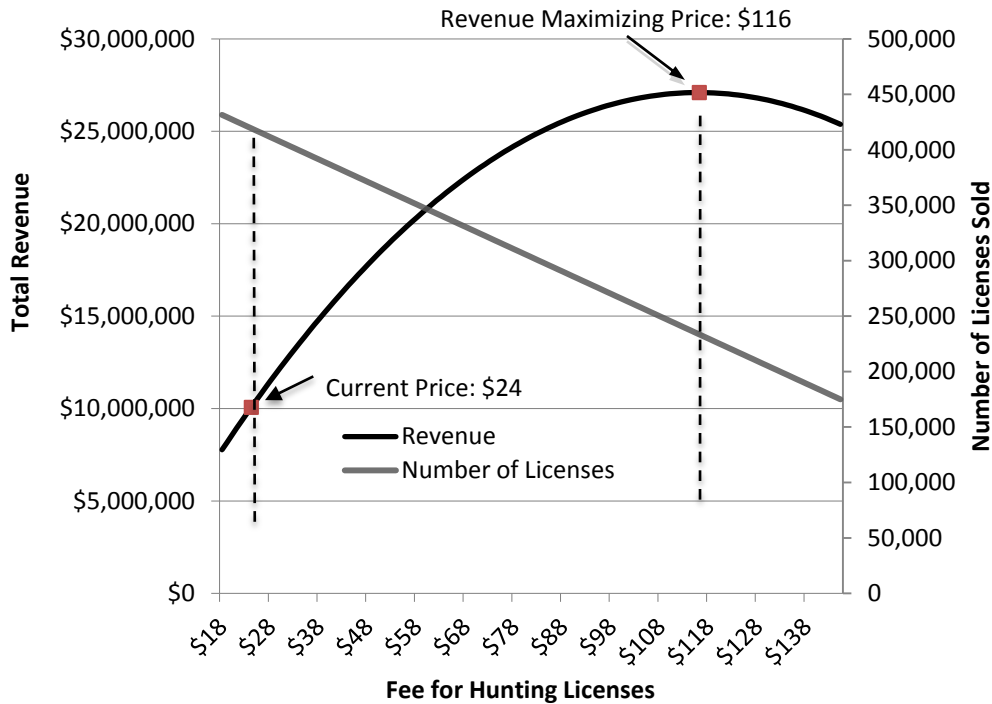


Source: Authors' Calculations

Given the predictive accuracy of our model, we forecast how changes in license price might influence license sales and revenue in 2012 (Figure 6). The black line shows the total revenues from license sales at each license price. The downward sloping demand line shown in grey represents the number of licenses sold as the license fee increases. This estimated demand curve indicates that for every dollar increase in price, the number of licenses sold would decrease by 2019 if all other factors are held constant. However, the total revenue rises even as the number of licenses sold decreases.

Assuming no price increase and a roughly linear trend in all other factors, the model estimates that 419,000 resident deer hunting licenses would be sold at the price of \$24 in 2012, a decline of more than 25,000 licenses from 2011. The estimated revenue resulting from these sales is almost \$7 million. The price at which license revenue is maximized in the model is \$116 per license. At this price, an estimated 233,000 licenses would be sold, a decline of 186,000 from 2011. Total revenues would be around \$27 million.

Figure 6: Predicted 2012 Sales and Revenues at Various Prices, Resident Deer Gun Hunting Licenses



Source: Authors' Calculations

(2) Sales Tax Option

In addition to fee restructuring, a targeted tax may be another way to support Wisconsin's conservation programs. A conservation sales tax has increased revenue in Missouri and Arkansas. A tax would relieve some of the financial pressure on sportsmen and women by more fairly distributing the cost of conservation among all the people of the state. Under Missouri's Design for Conservation, in place since 1976, "[f]or every \$8 spent on taxable items, one penny goes to conservation efforts managed by the Missouri Department of Conservation" (Missouri Department of Conservation, 2008, p.12). Arkansas' tax, modeled after Missouri's, has been in place since 1996. Both states report that the tax has given them a welcome source of revenue for environmental programs.

Wisconsin reports an estimated \$2.2 billion in economic activity from local and nonresident hunting- and fishing-related business, and \$1.7 million in related retail sales (Warnke, 2012). A broad sales tax could be advocated as an investment in the sustainability of the state's environment. Just as private companies must invest in their own facilities and workers to remain competitive, so too must states invest in natural resources so that they remain vibrant, pleasant places for residents to live and work. Money spent on preserving the state's land and water today may pay for itself many times over in returns from tourism, sporting equipment sales, and the hospitality industry.

Conservation sales taxes often encounter resistance when they are introduced. Merchants are concerned that higher taxes will reduce their sales, and

many voters are simply opposed to taxes. Missouri's conservation tax took seven years from inception to enactment (Missouri Department of Conservation, 2008), and Arkansas' plan passed after a 10-year legislative effort (Griffie, 1999). Both bills required considerable time and resources from broad coalitions of environmentalists, hunters, and activists. Although many at the national and local levels are skeptical about taxes, a few points deserve mention. First, compared with other states, Wisconsin's sales tax rate is low: at 5 percent, it is between Missouri at 4.225 percent and Arkansas at 6 percent. On a ranking that combines state sales tax rates and average local taxes, Wisconsin has the 41st highest sales taxes, compared with Arkansas at 7th and Missouri at 14th, which both have higher average local taxes (Drenkard, 2011). Even after an increase of 0.125 percent, Wisconsin would still keep its low-sales-tax status.

Furthermore, the sales tax would be a way for all Wisconsinites to share responsibility for a cherished value: protecting the natural environment. If someone spent \$30,000 on goods covered by the 0.125 percent sales tax over the course of a year, \$37.50 would go to the conservation fund. Since Wisconsin's parks and lakes benefit the entire state, asking all Wisconsinites to contribute to their maintenance is reasonable.

(3) Reduce Inefficiency

We also urge the DNR to take a careful look at the current funding structure to eliminate inefficiencies in fees. One is licenses for antlerless deer, now provided at no fee with the purchase of a deer hunting permit. These licenses cost the state 50 cents on each of the 800,000 permits distributed annually, resulting in a loss of \$400,000 per year. Although the antlerless provision is important for total herd management, other fee structures could achieve both objectives. Perhaps the first permit could have a small fee and be bundled with all deer licenses. Given the demand inelasticity of hunting licenses and the small proportion of total hunting costs that license fees represent, a modest increase in the price of these permits is not likely to significantly alter the number sold. The probable minimal effect on sales would not significantly change the number of antlerless deer harvested, thereby minimizing concerns about overpopulation.

This increase would allow what is now a net expenditure to become a source of revenue. Imposing a modest fee, perhaps \$5, on each of these permits would generate upward of \$3.6 million in revenue and add a net increase of up to \$4 million (5.7 percent) to the DNR's conservation budget each year. Data from neighboring states indicate that, with the exception of Minnesota, charging a modest fee for antler-less deer permits is more the norm. In parts of Michigan, no difference exists between pricing for antlered and antlerless deer permits. Although the Wisconsin DNR does not have complete control over its pricing structure, efficiency measures such as this small fee increase likely remain politically feasible because they do not represent an extra expenditure for the state government.

Alternative 4: Public Relations Efforts

In states with demographics similar to Wisconsin's, public relations efforts have played a critical role in sustaining a large population of active hunters. Public relations efforts could target two primary groups: (1) people who move as young adults and lose touch with the hunting community in which they grew up, and (2) people living in urban areas who are interested in sustainable living, environmental efforts, and local, organic food. Research indicates that the former group represents a large portion of hunters being lost in Wisconsin (Winkler & Klaas, 2011). The second group, urbanites, represents individuals who share many of the values of Wisconsin's hunting community. Exploiting this overlap of philosophies to fortify the hunting community and maintain conservation efforts would benefit all stakeholders.

(1) Young Individuals Who Move

Wisconsin's Learn to Hunt programs enroll more than 2,000 residents each year in a first-time hunting experience. These programs are free for participants and include all necessary equipment. Despite these programs' positive reception, participants tend to be children of hunters who are likely to have taken up the sport even in the absence of DNR-sponsored events. To make Learn to Hunt a true recruitment program that increases the number of lifelong hunters in Wisconsin, new marketing strategies are necessary to expand beyond hunting families' children. Wisconsin's geographically extensive university system, along with the technical colleges, could expand awareness and reach new audiences. Campus partnerships in which student liaisons promote Learn to Hunt events through the University of Wisconsin, Extension, and technical college systems could increase the recruitment potential of these events.

Another way to reach out to the younger generation is by using modern technology to make information on hunting more easily accessible. Facebook groups for local hunters to organize events could facilitate the inclusion of new hunters and make current hunters more likely to connect with one another and continue hunting. Smart phone applications (apps) or programs that provide information about local hunting grounds and game season dates, display harvest maps, and allow for easy game tagging would modernize the sport and encourage young adults to participate. Minnesota and Washington state have created apps at the request their hunters. Wisconsin hunters would likely respond positively to their own state-specific smart phone app (Washington Department of Fish and Wildlife, 2012).

(2) Urban Populations and "Foodies"

With respect to promoting hunting among urban populations, several approaches are possible. Perhaps most innovative would be the DNR connecting with the growing ethical-food movement. Wildlife and hunting are ideal ways to access local and non-processed food. In contrast to antibiotics in livestock production or the cramped condition of mass-processed beef and pork, hunting and fishing offer free-range, organic food options. In addition, this connection would make a group

interested in environmental issues aware that hunting is critical to conservation in Wisconsin. We suspect, based on our own personal inquiries, that few non-hunters know that proceeds from hunting and fishing licenses are the major source of funding for the protection of wild animals and public lands. Simply making that connection known to the public is likely to promote interest in these activities. Collaborations with public television or other local television stations and independent operations like *Wisconsin Foodie*, an Emmy-nominated independent television series, could create and air short pieces that explore the connections among hunting, conservation, and sustainability of Wisconsin's public lands.

Wisconsin has a growing reputation for ethical, local eating. Stemming from such traditions as food cooperatives, farmers markets, and dairy production, local foods have deep roots in this state. Even the DNR's mission statement emphasizes this tradition: "Throughout Wisconsin's history, the well-being of its people has been tied to the well-being of its natural resources. The fresh water, fertile soil, clean air, vast forests, flourishing and abundant wildlife constituted the basis of life, livelihood, and recreation for many generations of native and newly arrived Wisconsinites" (DNR, 2012). This culture also exists in meat production: Wisconsin has more than 250 state-inspected (and the second-most licensed by the U.S. Department of Agriculture) meat processors of any state (Wisconsin Department of Agriculture, Trade and Consumer Protection, 2011; U.S. Department of Agriculture, 2012). Local food groups have capitalized on this market, creating a robust business model of foraged and ethically produced food for consumers. Interviews with businesses suggest a significant interest in combining local harvesting and foraging with hunting and fishing. Although these connections may not translate into business opportunities because of regulations on hunted food being sold commercially, local food leader Jonny Hunter (2012) suggested that the wild and local food gathered from hunting that "matches the brand of rustic, natural, Wisconsin-local eating" adds a new "ethical response to the food system."

A prime example of possible partnerships is the Northland College programs in Ashland County. The college offers a "distinctive environmental liberal arts curriculum" that focuses on fostering sustainable and ethical relationships with the local environment (Northland College, n.d.). The school's dining practices and local-eating partnerships have become a model for liberal arts colleges and universities around the upper Midwest. Through such well-connected leaders, the DNR could increase its reach to young outdoorsmen and women who may not otherwise learn of the benefits and availability of food derived from hunting and fishing. Such leaders could include Madison groups like Slow Food UW, F.H. King Student Farms, the Underground Food Collective, and others. These organizations offer cooking classes, community-supported agriculture programs, and ethical-food information. Targeted information could reach audiences unaware of DNR programs.

Brief discussions with representatives of some of these groups indicate significant interest in building connections, providing educational resources, and learning of new ethical-food opportunities. Responses from interviews included "very interested," "sounds awesome," and "ridiculous amount of interest from the

younger generation” (Blohoweak, 2012; Kreier, 2012; Loker, 2012). Slow Food UW suggested hosting wild-meat dinners with a guest chef, making presentations to leadership councils, and working with the groups to add wild-game foods into their mission statements (Young, 2012). All of those interviewed were enthusiastic about outdoor activities combined with sustainable and ethical-food aspects of hunting. Despite the interest, some non-hunters mentioned that the barriers to beginning to hunt when they were not part of a community of hunters seemed insurmountable. They suggested the DNR create easy, three- to five-step checklists on how to get equipment, licenses, and training so they could begin hunting.

The DNR needs to reach potential hunters and fishers through new outreach strategies. The method of outreach could be traditional (speaking with community leaders and creating media advertisements) or using modern technology, such as through social media venues (Facebook and Twitter messages, and YouTube videos). The traditional message of conservation, nature, and healthy sustainability resonates with and parallels the ethical-food movements’ emphasis on local foods, responsible practices, and connecting organizations with communities and the environment. Offering press releases and interviews with the online community through venues such as Hunter Angler Gardener (<http://honest-food.net>), Foraging Family (<http://foragingfamily.blogspot.com/>), and others could add to Wisconsin’s branding as a sustainability-focused outdoor sports state, build excitement, and nurture the DNR’s experience with this growing community. The sustainable food aspect of hunting, along more favorably viewed lives of hunted animals compared to those commercially raised and processed, can be developed into new messages that lead to increased hunting in Wisconsin.

Recommendations

We recommend the DNR pursue a combination of funding source restructuring and public relations efforts. Our analyses suggest that the DNR could raise revenue by increasing the price of individual resident deer hunting licenses. Other licenses sold by the DNR also are likely to have revenue generating potential that is underutilized in the current fee schedule. A nominal state sales tax similar to those in Arkansas and Missouri could also provide considerable additional revenue. Both of these measures may raise equity concerns, that is who pays for and receives the benefits of conservation services. Raising license fees would increase revenue because of the estimated small effect of a price increase on total license sales. Nevertheless, the DNR should monitor whether low-income people are more sensitive to price changes and adapt fees accordingly. Low-income individuals are likely to be more sensitive to even small changes in license fees, an issue we suggest the DNR examine. Likewise, sales taxes tend to be regressive, meaning the tax falls disproportionately on the poor, although this may be offset by low-income families being more likely to access DNR recreational lands (Davis et al., 2009). Second, the process of enacting statutory change necessary to implement these actions is arduous and uncertain. Despite these drawbacks, legislative action should be pursued because both increased license fees and a sales tax have high potential for generating sustainable revenue. We recommend the DNR pursue these measures as long-term goals.

We also recommend that the DNR focus its most immediate efforts on the recruitment of new hunters and fishers. In previous generations, Wisconsin parents introduced their children to the world of hunting and fishing, and the tradition continued naturally. Today, many Wisconsin residents move away from the towns where they grew up and lose their connection to hunting. By reaching out to a portion of the younger generation through the university system, and through the use of social media, online tagging, and smart phone apps, the DNR may be able to raise the number of hunters (and therefore conservation funding) and to limit the dips that occur in hunting activity as individuals move first for jobs and school and later in retirement. Urban dwellers are a largely untapped demographic in terms of hunting recruitment. The interest in environmental sustainability that has taken root in Wisconsin provides a new relevance for hunting and fishing. Helping residents to discover the relevance of hunting and fishing to their personal goals and philosophies could benefit a variety of stakeholders. If not becoming hunters themselves, these individuals would be more likely to support DNR efforts to support hunting or raise conservation revenue through other means. Therefore, we recommend that the DNR investigate the possibilities of restaurant and food co-op partnerships and pursue contact with environmentally conscious urban residents via relevant local media.

Wisconsin has a long history of admirable conservation efforts. Conservation is critical for the future of public lands and wildlife habitats, and to the state's identity. Under the current system, the sale of hunting and fishing licenses is the principal funding mechanism for conservation. This revenue pool is shrinking. Without change, conservation efforts will diminish in turn. By pursuing a combination of funding source restructuring and new efforts to recruit and retain hunters and fishers, the DNR can ensure that funding levels meet or exceed previous levels and that conservation will sustainably continue.

Appendix A: Minnesota Proposal to Raise Prices

The Minnesota DNR is seeking hunting and fishing license fee increases because the state's Game and Fish Fund is in "dire condition" (Minnesota Department of Natural Resources, 2012a). Fees in the state cannot be changed without legislative action. Below are tables with Minnesota's proposed changes.

Table A1: Minnesota Resident Hunter License Proposal

Resident Hunting Only Licenses				
		Current Price	Proposed Price	Status
Individuals 18 Years and Older	Small Game with Stamps Purchased Separately	\$19	\$22	Increase
	Three-Day Small Game	NA	\$19	New Option
	Small Game Annual (Stamps Included)	NA	\$37	New Option
	Walk-in-Access Validation	NA	\$15	New Option
	Deer (Archery, Firearm, Muzzleloader)	\$26	\$30	Increase
	Turkey	\$23	\$26	Increase
	Deer – Bonus Permit	\$14	\$16	Increase
	Deer – Early Season Antlerless Permit	\$6.50	\$7.50	Increase
	Moose (Per Party of Two, Three, or Four)	\$310	\$356.50	Increase
	Elk	\$250	\$287	Increase
	Bear	\$38	\$44	Increase
	Senior Citizen Small Game (65 and Older)	\$12.50	\$13.50	Increase
	Prairie Chicken	\$20	\$23	Increase
	Apprentice Validation	\$3.50	\$3.50	
	State Migratory Waterfowl Stamp Validation	\$7.50	\$7.50	
	State Pheasant Stamp Validation	\$7.50	\$7.50	
	Special Canada Goose Seasons Permit	\$4	\$4	
	Sandhill Crane Permit	\$3	\$3	
	Trapping (Small Game License Required)	\$20	\$23	Increase
	Senior Trapping	\$10	\$11.50	Increase
Wild Rice Harvest (Seasonal)	\$25	\$25		
Wild Rice Harvest (One-Day)	\$15	\$15		

Resident Hunting Only Licenses				
		Current Price	Proposed Price	Status
Youth 17 Years and Younger	Junior Trapping (13 to 17 Years Old, 16 to 17 Requires Small Game License)	\$6	\$7	Increase
	Youth Deer (13 to 17 Years Old) (Archery, Firearm, Muzzleloader)	\$13	\$15	Increase
	Youth Turkey (13 to 17 Years Old)	\$12	\$13	Increase
	Youth Walk-in-Access (16 to 17 Years Old)	NA	\$7.50	New Option
	Youth Walk-in-Access (Younger than 16)	NA	Free	New Option
	Youth Small Game (16 and 17 Years Old)	\$12.50	\$11	Decrease
	Youth Deer and Turkey (12 and younger)	Variable	Free	New Option
* Small game license price shown for residents includes \$6.50 surcharge. Prices shown do not include license agent fee for issuing license.				

Source: Minnesota Department of Natural Resources, 2012b

Table A2: Minnesota Resident Angler License Proposal

Resident Angling Only Licenses				
		Current Price	Proposed Price	Status
Individuals 18 Years and Older	Annual Individual Angling	\$17	\$24	Increase
	24-Hour Individual Angling (no Trout Stamp Needed)	\$8.50	\$10	Increase
	90-Day Individual Angling	NA	\$18	New Option
	Three-Day Individual Angling (72-Hour – no Trout Stamp Needed)	NA	\$12	New Option
	Three-Year Individual Angling 18 and Older	NA	\$69	New Option
	Annual Individual Dark House Spearing Validation (Angling License Required – People Younger than 18 Exempt)	NA	\$5	New Option
	Conservation Individual (1/2 bag)	\$11	NA	Eliminated
	Trout and Salmon Stamp	\$10	\$10	
	Annual Fish House, Dark House, Shelter Left Unattended Overnight	\$11.50	\$15	Increase
	Three-Year Fish House, Dark House, Shelter Left Unattended Overnight	\$34.50	\$42	Increase
	Whitefish and Cisco Netting	\$10	\$18	Increase
	Rental Fish House, Dark House, Shelter Left Unattended Overnight (Annual)	\$26	\$30	Increase
	Rental Fish House, Dark House, Shelter Left Unattended Overnight (Three-Year)	\$78	\$87	Increase
	Recreational Turtle License	\$25	\$25	
	Sturgeon Tag	\$5	\$5	
Walleye Stamp Validation (Voluntary)	\$5	\$5		
Youth (16- and 17-Year-Olds)	Youth Annual Individual Angling	\$17	\$12	Decrease
Married Couple	Annual Married Couple Angling	\$25	\$40	Increase
	Conservation Combination (1/2 Bag)	\$17	NA	Eliminated

Source: Minnesota Department of Natural Resources, 2012c

Appendix B: License Sales Regression Analysis Equations

Data (1987-2011) were used to estimate predictors of license sales. We use the resulting demand equation to predict how price increases would change sales of deer hunting licenses (Table B1) and fishing licenses (Table B2). The Wisconsin Department of Natural Resources provided license sales and fees for Wisconsin. Population, per-capita income, and unemployment measures were obtained from the U.S. Bureau of the Census, the U.S. Bureau of Economic Analysis, and the U.S. Bureau of Labor Standards, respectively. Climate data were obtained from the National Oceanographic and Atmospheric Administration, and gasoline prices were obtained from the U.S. Energy Information Office.

Individual Deer Licenses

Model: Number of licenses =

$$\beta + \beta_1 * Year + \beta_2 * Population + \beta_3 * Price \text{ hunting} + \beta_4 * Price \text{ of sports license} + \beta_5 * Per\text{-capita income} + \beta_6 * Unemployment + \beta_7 * Gasoline \text{ price} + \beta_8 * Septemp$$

Where:

$\beta_1 - \beta_8$ are coefficients to be estimated. These measure the effect of one unit change in the independent variable on the number of licenses sold.

Number of licenses is the number of resident individual deer licenses sold in year t.

Year is a number that increases by one for each year from 1987 to 2011.

Population is the population of Wisconsin in year t.

Price hunting is the inflation-adjusted price of the Resident Individual Deer License in year t.

Price of sports license is the inflation-adjusted price of the Resident Individual Sports (Combination) License.

Per-capita income is the per-capita personal income in Wisconsin adjusted for inflation in year t.

Unemployment is the annual average unemployment rate in Wisconsin in year t.

Gasoline price is the inflation-adjusted price of a gallon of regular gasoline in the United States in year t.

Septemp is the average temperature for the month of September in year t.

Table B1: Hunting Variables Table

	Estimate	Std.Error	tvalue	Pr(> t)
Year	28,000.00	9,839.00	2.844	0.0174*
Population (Thousands)	-0.42	0.24	-1.772	0.1068
Price of Deer Hunting License (in Dollars)	-2,020.00	13,200.00	-0.153	0.8815
Price of Sports License (in Dollars)	-3,960.00	3515.00	-1.127	0.2859
Per-Capita Income 2012 (in Thousand of Dollars)	-18.70	12.43	-1.504	0.1636
Unemployment (Percent)	-23,000.00	8,379.00	-2.748	0.0206*
Gasoline Price (in Dollars)	-42,300.00	16,000.00	-2.644	0.0246*
September Temperature (Degrees Fahrenheit)	-1,450.00	2,818.00	-0.513	0.619
Multiple R-squared: 0. 9174	Adjusted R-squared: 0.8513			

Source: Authors' Calculations

Individual Angling Licenses

Number of Licenses =

$$\beta + \beta_1 * Year + \beta_2 * Population + \beta_3 * Price\ angling + \beta_4 * Price\ of\ sports\ license + \beta_5 * Per\text{-}capita\ income + \beta_6 * Unemployment + \beta_7 * Gasoline\ price + \beta_8 * Jantemp$$

Where:

$\beta_1 - \beta_8$ are coefficients to be estimated. These measure the effect of one unit change in the independent variable on the number of licenses sold.

Number of Licenses is the number of Resident Individual Angling Licenses sold in year t.

Year is a number that increases by one for each year from 1987 to 2011.

Population is the population of Wisconsin in year t.

Price angling is the inflation-adjusted price of the Resident Individual Angling License in year t.

Price of sports license is the inflation-adjusted price of the Resident Individual Sports License.

Per-capita income is the per-capita personal income in Wisconsin adjusted for inflation in year t.

Unemployment is the annual average unemployment rate in Wisconsin in year t.

Gasoline price is the inflation-adjusted price of a gallon of regular gasoline in the United States in year t.

Jantemp is the average temperature for the month of January in year t.

Table B2: Fishing Variables Table

	Estimate	Std.Error	tvalue
Year	13,500.00	28,800.00	0.468
Population (in Thousands)	-0.47	0.60	-0.781
Price Angling (in Dollars)	9,380.00	15,200.00	0.619
Price of Sport License (in Dollars)	-1460.00	6,810.00	-0.214
Per-Capita Income 2012 (Thousand of Dollars)	11.00	25.00	0.441
Unemployment (percent)	-2,280.00	22,200.00	-0.103
Gasoline Price (Dollar)	-34,100.00	50,700.00	-0.672
January Temperature (Degrees in Fahrenheit)	199.00	526.00	0.377
Multiple R-squared:0. 2736	Adjusted R-squared: 0.3075		

Source: Authors' Calculations

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