

A Comparison Between Hunting License Holders and Outdoor Sports Email Subscribers



Roger Applegate, Wildlife Biologist,
Tennessee Wildlife Resources Agency

Wildlife and Forestry Division Neelam C. Poudyal, Department of Forestry, Wildlife and
Fisheries, University of Tennessee-Knoxville

Michael Butler, Tennessee Wildlife Federation, Nashville

Joy Sweaney, Wildlife and Forestry Division

Daryl Ratajczak, Wildlife and Forestry Division



Equal opportunity to participate in and benefit from programs of the Tennessee Wildlife Resources Agency is available to all persons without regard to their race, color, national origin, sex, age, disability, or military service. TWRA is also an equal opportunity/equal access employer. Questions should be directed to TWRA, Human Resources Office, P.O. Box 40747, Nashville, TN 37204, (615) 781-6594 (TDD 781-6691), or to the U.S. Fish and Wildlife Service, Office for Human Resources, 4401 N. Fairfax Dr., Arlington, VA 22203.



Do email subscribers yield responses similar to random samples? A comparison between hunting license holders and outdoor sports email subscribers

Roger D. Applegate, Wildlife and Forestry Division

Neelam C. Poudyal, Department of Forestry, Wildlife and Fisheries, University of Tennessee-Knoxville

Michael Butler, Tennessee Wildlife Federation, Nashville

Joy Sweaney, Wildlife and Forestry Division

Daryl Ratajczak, Wildlife and Forestry Division

Introduction

In the United States, wildlife resource agencies combine biological data with human dimension survey information to make key management decisions such as setting hunting seasons, bag limits, etc. (Decker and Chase, 1997). However, conducting human dimensions surveys utilizing traditional methods have in recent years been increasingly cumbersome due to a variety of issues including low response rate, time, cost, bad/ineligible addresses, slow turnaround, and a shifting of public interest to electronic communication. Rising popularity of web use among the outdoor sportspersons offers opportunities to natural resource agencies in conducting user surveys. In particular, web surveys in online communities (e.g., social media, electronic mailing lists) to solicit client input to inform management decisions could be faster and more cost efficient than traditional mail surveys and potentially reach larger numbers of respondents. In addition, online surveys could be strategically placed on resource websites that are frequented by users of interest (e.g. hunter, fishermen), who might be more informed, opinionated, and most importantly, more willing than others to offer managed input. Despite the benefits, web surveys could however suffer from a variety of issues such as self-selection, and under- or over-representation.

Very little research has been done to assess whether these web-based samples are as representative as random samples. For example, Prokopy et al. (2010) found that convenience surveys of visitors at county fairs and websites are not representative of the general population. Alessi and Miller (2010) found randomly selected samples to yield different responses than those from participants recruited at public meetings. They also found that the effect sizes (of sample type) were substantial. On the other hand, Laborde et al. (2014) found that open web survey participants provided similar responses as random mail survey participants at least in attitudinal questions. Since a handful of previous studies comparing random samples with convenience samples have shown mixed results, the study presented in this report is warranted.

Surveys were conducted in April through June 2014 to obtain data on characteristics and opinions of Tennessee white-tailed deer (*Odocoileus virginianus*) hunters. These surveys were requested by the Tennessee Fish and Wildlife Commission to help with making policy decisions relating to white-tailed deer buck bag limits. Surveys of this type are key components in the formulation of policy (Folz 1996) and to this end Tennessee Wildlife Resources Agency (TWRA) planned to develop a survey to assist the Commission in this process. During the planning stages, the Tennessee Wildlife

Federation (TWF) also offered to conduct its own survey to obtain the same information via an open-web survey. Because evidence exists to support that non-sample-based surveys do not provide reliable data to address policy questions (Duda and Nobile 2010), it was decided at that time that TWRA would replicate the TWF survey using the agency license data base to obtain a random sample of respondents and to use the same questions as those in the TWF survey to compare results and hopefully provide some insights on policy application of the two survey modes.

Methods

For the TWRA random survey 400 each of Annual Sportsman, General License Game Tags (archery and muzzleloader) licensees were selected. Total mailing was 1,600. This sample was estimated to have a margin of error of $\pm 5\%$ (equivalent to $\alpha = .05$) and based on 20% response. The survey instrument (Appendix 1) was administered in SurveyMonkey.com, an online survey administrator commonly used in marketing research. It was identical to the TWF survey except for addition of TWRA number (a unique number assigned to each purchaser of a license) and the accidental omission of one question. Each of the 1600 selected respondents was sent a card (Appendix 2) requesting their input and providing the SurveyMonkey URL that hosted the questionnaire. We asked responders to use SurveyMonkey to provide their unique license identification number (TWRA Number) to start the survey. The number was used to locate duplicate responses or responses that did not include the TWRA Number so they could be deleted. This procedure assured that responses were not being duplicated. The survey was terminated in June 2014 and the data downloaded from SurveyMonkey on 21 July 2014.

The TWF sent an email to each of 170,000 email addresses with a link to a web survey. The software used to enter responses was designed to prevent duplicate responses but additional screening was made to assure against multiple responses. Responses obtained from the two surveys were compared using Chi-square with $\alpha = .05$ as criteria of rejecting the null hypothesis that the two samples yielded statistically the same response to each question.

Results

For the TWRA survey, we received 270 usable survey responses. Five responses were manually entered due to inability of the respondent to access SurveyMonkey via the internet. Response rate was 17% with actual margin of error of $\pm 6\%$. Although our response rate was lower than estimated (20%), we can be 94% (as opposed to 95%) confident that our responses represent all sampled classes of Tennessee deer hunters. The results are listed in Table 1.

The TWF received 7,770 responses to the email based survey. Since the number of multiple responses to the survey is unknown, as well as the number of un-received emails, we can only calculate a raw response rate of $5\% (7,770/170,000)$. Survey results are included in Table 1.

The TWF survey received responses from significantly fewer respondents that hunted deer in Tennessee and that held a Tennessee hunting license ($p < .001$) than the TWRA survey. Significantly more respondents hunted in other states ($p < .001$).

More respondents to the TWRA survey hunted on private lands of less than 100 acres ($p=.004$) and on lands owned by friends or family ($p<.001$). TWF survey respondents hunted significantly more on private lands larger than 250 acres or land that they owned, or leased lands ($p<.001$).

Significantly more hunters in the TWRA survey hunted for meat ($p<.001$) whereas those in the TWF survey hunted more to spend time outdoors ($p<.001$).

More TWF survey respondents believed that the deer hunting season should remain the same (as of the 2013-14 season; $p=.035$). TWRA survey respondents believe that the deer season should be shortened ($p=.019$). There was no significant difference between TWRA and TWF samples in terms of perceived quality of hunting in Tennessee. A significantly higher proportion of respondents in the TWF sample seemed to be aware of the fact that deer are public resources ($p = 0.01$).

Discussion and Conclusions

Several aspects of these surveys merit discussion. First of all, the TWRA license database was sampled to obtain a mailing list of eligible participants in this survey. This sampling was conducted across all license types that permit legal deer hunting in Tennessee. The only exception is that landowners that are exempt from a license were not sampled. The TWF survey was directed to the organization email list with no prior way to determine their level of involvement with deer hunting. There is no margin of error presented for this survey, nor can one be calculated. Nevertheless, as high as 93% in the TWF email list self-identified as a Tennessee hunter. While it may not be representative of the population, the TWF email list could still prove a useful communication medium to reach out to Tennessee hunters for outreach and education purpose.

Many of the statistical differences uncovered in this survey were the result of the two different sampling frames. For example, a larger proportion of hunters in the TWF survey hunted in other states and did not have a Tennessee license. These responding hunters expressed opinions about a resource that they do not pursue (Tennessee deer). Relying solely or heavily on response from this sample in policy decisions could be problematic, because those who hunt out-of-state may not be knowledgeable enough to answer questions regarding deer in Tennessee, or may not exercise informed judgment in supporting or opposing regulations.

Since the surveys did not collect demographic data, determining whether differences in responses were due to age, income, or other demographic variables is not possible. Some differences, such as proportion hunting in states other than Tennessee and proportion of hunters hunting leased land, are possibly due to income level. Further, two samples seemed to be different in motivations as well, with more in the TWRA sample motivated by meat and more in the TWF survey motivated by outdoor opportunity. So, whether or not these two samples represent two completely different segments of demography needs further investigation.

Laborde et al. (2012) conducted a study of waterfowl hunters in Louisiana comparing random sample and open-web surveys. They concluded that while differences occurred between the random sample and open-web respondents on harvest and effort, there were no differences between

respondent on policy related questions. This contrasts with our survey in that the key questions addressing policy show significant differences across the two differing survey frames.

We agree that the random sample TWRA survey approach is the gold standard in conducting opinion surveys. The primary purpose of this particular survey was to assess deer hunter's opinions on bag limits and season length. In these two particular surveys, many of the question responses were similar. A weakness is not having demographic data to help serve as explanatory variables in making contrasts. The surveys could also have benefitted from improvements to question wording. We conclude that the TWRA random sample survey provided results that were more useful in this instance in developing management programs for deer because survey parameters could be calculated and the sample better represented all Tennessee deer hunters. With that said, the TWF survey would also have led to the same conclusions on the issue of bag limit preference and season length. Considering the increasing cost of implementing mail surveys, and declining response rates in traditional survey modes, electronic mailing lists of user groups could prove instrumental in soliciting public inputs, especially when time and budget are limited. The key to having this work is question wording and acquisition of some demographic data. This will come with the understanding that it will not be possible to derive confidence limits for these data but the benefits of speed and lower cost could outweigh this limitation..

Table 1. Results of TWRA random sample survey and TWF convenience survey results. *denotes significance of Chi-square statistics at the 5% level.

Variable	Random	Convenience	Chi-square
Hunts deer in Tennessee	99.6	92.5	<0.001*
Hunts in other states	22.8	34.6	<0.001*
Tennessee hunting license	98.9	88.3	<0.001*
Regular license with additional big game	49.3	19.5	<0.001*
Sportsman's license	45.9	48.3	0.480
Supports no license to hunt on own land	84.7	82.8	0.436
Archery	75.2	73.0	0.468
Muzzleloader	77.8	78.6	0.805
Rifle/shotgun	92.2	92.4	0.999
Harvests less than one buck on average	24.6	27.1	0.369
Harvests one buck	36.9	36.5	0.908
Harvests two bucks	28.0	24.4	0.182
Harvests three bucks	3.0	4.8	0.211
Checks deer every time	97.8	96.5	0.337
Harvests zero does	23.9	21.0	0.255
Harvests one doe	31.0	31.8	0.863
Harvests two does	27.2	25.7	0.673
Harvests three does or more	17.9	21.5	0.164
Hunts in West TN	23.7	25.7	0.504
Hunts in Middle TN	30.8	35.5	0.123
Hunts on the Cumberland Plateau	22.6	18.2	0.079
Hunts in East TN	22.9	20.6	0.388
Hunts on public land	7.1	7.5	0.866
Hunts on private land	57.9	61.6	0.229
Hunts on public and private land	35.0	30.9	0.153
Public land hunter – rate public as good or excellent	35.2	34.0	0.736
Private hunting land is less than 100 acres	56.9	46.8	0.001*
Private hunting land is greater than 250 acres	24.0	35.1	<0.001*
Private land hunter – hunts on own land	10.4	23.9	0.004*
Private land hunter – leases land	16.7	24.6	<0.001*
Private land hunter – hunts on friend or family land	66.5	46.6	<0.001*
Hunting motivation – trophy animals	17.7	21.0	0.228
Hunting motivation – meat	53.4	40.5	<0.001*
Hunting motivation – spend time outdoors	14.3	22.7	0.002*
Hunting motivation – spend time with family/friends	14.3	15.0	0.867
Keep buck limit at three	49.6	46.2	0.295
Keep buck limit at three but with restrictions	10.2	9.8	0.835
Reduce buck limit to two	22.9	24.1	0.719
Reduce buck limit to one	11.3	14.0	0.277
Hunting season should stay the same	49.2	55.5	0.049*
Hunting season should be shortened	38.7	31.4	0.016*
Hunting season should be lengthened	12.0	13.1	0.612
Supports the use of crop degradation tags	64.4	59.7	0.134
Opinion of deer hunting in Tennessee is excellent or good	65.5	62.3	0.307
Aware that deer are a public resource	81.8	87.3	0.011*
Primary resource is TWRA materials	62.4	64.1	0.569

Literature Cited

- Alessi, M. G. and C. A. Miller .2012. Comparing a convenience sample against a random sample of duck hunters. *Human Dimensions of Wildlife* 17: 155-58.
- Decker, D. J. and L. C. Chase. 1997. Human dimensions of living with wildlife- A management challenge for the 21st century. *Wildlife Society Bulletin*. 25: 788-95.
- Duda, M. D., and J. I. Nobile. 2010. The fallacy of online surveys: no data are better than bad data. *Human Dimensions of Wildlife* 15:55-64.
- Folz, D. H. 1996. *Survey research for public administration*. Thousand Oaks, CA: Sage.
- Laborde, L. P., Jr., F. C. Rohwer, M. D. Kaller, and L. Reynolds. 2012. Contrasts of waterfowl hunter surveys: open web and random mail surveys produce similar policy results. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies* 66:140-145.
- Laborde, L.P., Jr., F.C. Rohwer, M.D. Kaller, and L. Reynolds. 2014. Surveying Louisiana waterfowl hunters: open web and random mail surveys produce similar responses to attitudinal questions. *Wildlife Society Bulletin* 38:821-826.
- Prokopy, A. Molloy, A. Thompson, and D. Emmert. 2010. Assessing awareness of water quality: comparing convenience and random samples. *Journal of Extension* 48 (3).

Appendix 1. Survey questionnaire that was posted on Survey Monkey.

This is a survey being conducted by the Tennessee Wildlife Resources Agency. A random sample of current Tennessee deer hunters were sent an invitation to participate in this survey. Only those selected by invitation will be considered in the following survey. Multiple entries by the same individual will not be accepted. Thank you for assisting TWRA in its management of a healthy deer herd.

Note: * questions require an answer in order to move forward in the test

1. What is your TWRA identification number? (Please do not include any dashes or spaces)

***2. Do you hunt deer in Tennessee?**

- Yes
- No

3. If you answered "no" to question #1, what is the primary reason you have stopped deer hunting in Tennessee? Please choose one.

- No place to hunt
- Quality of hunting experience has declined
- No one to hunt with
- I cannot get outdoors anymore
- Too expensive
- I hunt other states for deer
- I no longer have time
- I have just quit hunting altogether
- I am not a deer hunter

- I am not successful enough when I hunt in Tennessee
- Other (please specify) _____

***4. Do you purchase a Tennessee deer hunting license?**

- Yes
- No

***5. Do you hunt deer in other states?**

- Yes
- No

6. Please list all states you hunt deer in.

***7. Under what license do you deer hunt in Tennessee? Please choose one.**

- Under what license do you deer hunt in Tennessee? Please choose one. Lifetime license
- Sportsman's license
- Regular hunting license (Type 001) with additional big game (Type 009 gun, Type 010 archery and Type 011 muzzle)
- Senior citizen license (Type 166), and Type 094 if you wish to shoot does
- Active military with copy of leave papers
- Landowner (do not need license if hunting your own land)

***8. In Tennessee, resident landowners, their spouses and their children are not required to purchase a hunting license to deer hunt on their own land. Do you support or oppose this policy?**

- Strongly Support
- Moderately Support
- Neither support or oppose
- Moderately oppose
- Strongly Oppose
- Don't Know

9. Why do you support or oppose the landowner license exemption discussed in question #8?

***10. What type of weapon do you use to deer hunt? Please select all that apply.**

- Archery
- Muzzleloader
- Rifle/Shotgun

***11. How many bucks (male deer) do you harvest per season on average? Please choose one.**

- Zero (0)
- Less than one (when averaged over multiple seasons)
- One (1)
- Two (2)
- Three (3)
- More than three (3)

12. How often do you check your deer? Please choose one.

- Every time
- Never
- About half the time

***13. How many does (female deer) do you harvest per season on average? Please choose one.**

- Zero (0)
- One (1)
- Two (2)
- Three (3)

- 4-10
- More than 10

***14. How many days do you deer hunt in an average year?**

***15. Where do you primarily deer hunt in Tennessee? Please choose one.**

- West Tennessee - Benton, Carroll, Chester, Crockett, Decatur, Dyer, Fayette, Gibson, Hardeman, Hardin, Haywood, Henderson, Henry, Houston, Humphreys, Lake, Lauderdale, McNairy, Obion, Perry, Shelby, Stewart, Tipton, Weakley - TWRA Region 1
- Middle Tennessee - Bedford, Cannon, Cheatham, Coffee, Davidson, Dickson, Franklin, Giles, Hickman, Lawrence, Lewis, Lincoln, Macon, Marshall, Maury, Moore, Montgomery, Robertson, Rutherford, Smith, Sumner, Trousdale, Wayne, Williamson, Wilson - TWRA Reg 2
- Cumberland Plateau - Bledsoe, Bradley, Clay, Cumberland, Dekalb, Fentress, Grundy, Hamilton, Jackson, Marion, McMinn, Meigs, Monroe, Morgan, Overton, Pickett, Polk, Putnam, Rhea, Roane, Sequatchie, Van Buren, Warren, White - TWRA Region 3
- East Tennessee - Anderson, Blount, Campbell, Carter, Claiborne, Cocke, Grainger, Greene, Hamblen, Hancock, Hawkins, Jefferson, Johnson, Knox, Loudon, Scott, Sevier, Sullivan, Unicoi, Union, Washington - TWRA Region 4

***16. What type of land do you primarily hunt? Please choose one.**

- Public lands
- Private lands
- Both public and private lands

***17. If you hunt public lands for deer in Tennessee, please rate your hunting experience.**

- Excellent
- Good

- Average
- Below Average
- Poor
- I don't hunt public lands

***18. If you hunt private lands for deer in Tennessee, what size of property do you hunt? Please choose one.**

- 0-50 acres
- 50-100 acres
- 100-250 acres
- 250-500 acres
- 500-1,000 acres
- More than 1,000 acres

***19. If you hunt private lands for deer in Tennessee, how do you access this land? Please choose one.**

- I lease private land for deer hunting
- I own private land for deer hunting

- I do not have to pay to hunt private land
- I hunt on a friend or family member's land

***20. What is your primary motivation for deer hunting? Please choose one.**

- I like to hunt for mature bucks with nice antlers
- I hunt for meat and enjoy venison
- I hunt purely to help control our state's deer population
- Deer hunting is how I choose to experience Tennessee's great outdoors
- Deer hunting allows me to spend time with family and friends

***21. Currently in Tennessee deer hunters are allowed to harvest three (3) bucks per deer season. What is your opinion on deer buck limits? Please choose one.**

- I like it where it is, keep the limit at three (3) bucks
- I would like to see the buck bag limit reduced to two (2) bucks
- I would like to see the buck bag limit reduced to one (1) buck
- I would like to see the buck bag limit stay at three (3) bucks, but only allow one buck per weapon type (e.g., one for archery season, one for muzzleloader season, and one for rifle season)
- I would like to see the buck bag limit increased to more than three (3) bucks

***22. Currently, Tennessee's deer season has 95 days for archery hunting, 56 days for muzzleloader hunting and approximately 43-51 days for gun hunting depending upon how the calendar falls.**

What is your opinion regarding the length of Tennessee's deer season? Please choose one.

- I think it is just about right
- I think the season should be lengthened
- I think the season should be shortened

***23. If you answered that the season should be "lengthened" or "shortened" in the previous question (#22), please indicate your preferences below by clicking all that apply.**

- Increase the number of days in the gun season
- Decrease the number of days in the gun season
- Increase the number of days in the muzzleloader season
- Decrease the number of days in the muzzleloader season
- Increase the number of days in archery season
- Decrease the number of days in the archery season

24. What are the main reasons you would like to increase or decrease any of the deer hunting season segments mentioned in the questions above?

***25. Tennessee offers farmers the option to receive crop depredation tags to shoot deer out of season in order to lessen crop damage. These depredation tags are issued by TWRA officers after they have inspected crops for damage and see positive proof of damage. In general, do you support or oppose the use of crop**

depredation tags for this purpose?

- Strongly Support
- Moderately Support
- Neither Support or oppose
- Moderately oppose
- Strongly Oppose
- Don't Know

26. Why do you support/oppose the use of crop depredation tags?

***27. How would you rank your opinion of Tennessee's deer hunting overall?**

- Excellent
- Good
- Average
- Below Average
- Poor

***28. Are you aware that wild deer in Tennessee are a public resource?**

- Yes
- No

***29. Where do you go to find information on deer hunting and/or management? Please select all that apply.**

- TWRA website
- TWRA personnel
- TWRA publications
- University of Tennessee Wildlife Extension Services
- Natural Resources Conservation Service (NRCS)
- Deer hunting/management websites
- Deer hunting/management magazines
- Deer hunting television shows
- Private organizations and groups focused on deer
- Private wildlife consultant
- Universities and/or collegiate wildlife programs
- Friends
- None, I do not look for information on deer hunting and management
- Other (please specify) _____

***30. Of the sources for deer hunting and management listed above, please select the primary source you use for deer hunting/management information. Please choose one.**

- TWRA website
- TWRA personnel
- TWRA publications
- University of Tennessee Wildlife Extension Services
- Natural Resources Conservation Service (NRCS)
- Deer hunting/management websites
- Deer hunting/management magazines
- Deer hunting television shows
- Private organizations and groups focused on deer
- Private wildlife consultant
- Universities and/or collegiate wildlife programs
- Friends
- None, I do not look for information on deer hunting and management
- Other (please specify)

31. If you had to pick one thing you would want to change about deer hunting or management in Tennessee, what would that one thing be?

32. Please use this space to offer any other comments you wish to make

Appendix 2. Card sent to randomly selected Tennessee license holders.

Dear Tennessee Deer Hunter:

You have been selected to assist the Tennessee Wildlife Resources Agency in making decisions about deer hunting. You can assist us by taking an online survey. To access the survey go to:

<https://www.surveymonkey.com/s/tndeerhunter>

You will need your TWRA id number to take the survey. This number is located on your hunting license.

If you are unable to participate by computer please call 615-781-5262 to complete the survey over the phone.

Thanks for your important input.

Sincerely,

Daryl Ratajczak

Chief, Wildlife and Forestry Division