



Landowner Attitudes Towards Elk in Western North Carolina



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Final Report

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Executive Summary

A quantitative study to understand western North Carolina (WNC) landowner attitudes towards elk and their management was conducted in the summer of 2022. The purpose of the study was to build upon a landowner study conducted roughly 10 years ago to assess changing views towards elk over time. The specific objectives were to assess WNC landowners' general support for and opposition to elk, opinions on possible outcomes of elk living in the area as well as possible elk management actions, and measure likelihood of participation in elk viewing, hunting, and habitat management.

A stratified random sampling design was used to survey 19,126 landowners (5,547 responses, 29% response rate). Nine strata were selected consisting of three geographic regions and three parcel size categories. Only 9% of respondents indicated that they had seen elk on their property (n=5,547). In the four counties of interest (Haywood, Jackson, Madison & Swain) roughly 20% of respondents had seen elk on their property or a neighbors' property. Forty-five percent of WNC landowners who reported that their largest tract of land was within 5 miles of the National Park (n=409) reported seeing elk on their property. Only 3% of landowners had experience elk-related property damage. Thirty percent of respondents selected that they were currently interested in managing their largest tract of land for elk, but 45% indicated that they would manage their land for elk if there were elk on or near their property.

Support for elk in WNC is high, with 88% of respondents supporting elk on public land, 75% supporting elk on private land, and 77% supporting elk on or within 5 miles of their own property. Respondents with the largest parcel sizes were slightly less in support of having elk on their property than those in the other groups and landowners who utilized their land for tourism, recreation, or as a personal residence supported the idea of elk on their property in a larger proportion (78-89%) compared to those who utilized their land for farming or other horticultural production (52-67%). Those who had experienced elk-related damage were less supportive of elk on or near their property, with only 42% in support.

Overall, more than half of respondents believed the following outcomes were positive: elk returning to their historical range (77%), people viewing elk in their community (65%), economic benefits through tourism (51%), and increased aesthetic value to the community (56%). In terms of population levels, the largest proportion of respondents preferred a scenario where elk are sometimes seen and would be most likely to complain about the population levels when elk are regularly seen.

When it came to elk management, providing information was the most acceptable option. However, in scenarios with elk-related damage, providing information became less acceptable (85% to 69%) and the acceptability of frightening elk and lethal removal increased. The highest level of concern about elk related outcomes was for landowners experiencing elk related damage to crops (54% moderately or extremely concerned). About half (54%) of respondents

had made a special trip to view elk. Forty-three percent of respondents indicated they would be likely to allow people other than members of their household or family to view elk on their land, but only 4% would be likely to charge people for that privilege.

When asked about hunting, WNC landowners generally approved of regulated hunting (70%) and regulated elk hunting (61%). Less than half (47%) approve of elk hunting on or within 5 miles of their largest tract of land and 19% approve of allowing non-North Carolina residents hunt elk. A quarter (25%) of all survey respondents indicated that they would like to participate in elk hunting, compared to three-quarters (76%) of self-identified hunters who indicated that they would hunt elk. About half (46%) of respondents indicated that they would allow family members to hunt elk on their property, but only 12% indicated that they would allow others to hunt on their property and only 5% would lease their land. Only 350 respondents stated they would charge a fee to allow access for elk hunting and the average fee was \$3,289.

Overall, western North Carolina landowners were very supportive of wild, free-roaming elk in the region, although few landowners had knowledge or experience with elk. Many landowners were interested in managing their land for elk habitat and showed an interest in elk viewing and hunting. However, there was little interest in allowing people outside of family members and friends to do either on their land and the suitability of their land for elk habitat was unclear. Additionally, the preferred elk population scenario is one where elk are sometimes seen. As such, elk and their associated recreation opportunities are generally regarded positively by WNC landowners and there is potential for support of increased populations.

Introduction

Elk (*Cervus canadensis*) were reintroduced into the Great Smoky Mountains National Park in the early 2000s. Since then, their population has expanded, and the herd has moved beyond the boundaries of the National Park into neighboring communities. In 2013, the NCWRC assessed local resident attitudes and perception towards elk in western North Carolina. At this time, relatively few residents in the area had seen elk near their properties and the majority supported having elk in the region. Roughly 10 years later, a quantitative study was proposed to understand landowner views of elk now that the population has increased and expanded. This study built upon the landowner study conducted in 2013 to provide objective information on the sociological aspects of elk management in western North Carolina. It will allow NCWRC to assess changing attitudes towards elk over time.

The specific objectives were to:

- Describe western North Carolina landowners' experiences with elk including general support for and opposition to elk in western North Carolina
- Assess landowner opinions of possible outcomes of elk living in western North Carolina and possible elk management actions
- Measure landowner likelihood of participating in elk viewing, hunting, and habitat management
- Compare results to the 2013 survey to assess changing attitudes over time

Methods

The sampling design repeated the methods described in the 2013 elk landowner survey with slight modifications. In brief, the survey targeted western North Carolina landowners via a stratified random sampling design to ensure that landowners of the three parcel sizes (0 to 2 acres, 2 to 15 acres, and >15 acres) were represented. The sample was further stratified to sample landowners from the area immediately within the current known range of elk (Haywood and Jackson counties), the likely expansion area on private land (Madison and Swain counties), and the remaining western North Carolina counties. All landowners with parcels over 15 acres in Haywood and Jackson counties were included in the sample. In addition, government landowners were excluded from the sampling frame and when landowners own more than one parcel, the record that containing the largest parcel owned by a landowner was included in the sampling frame. The data source was 2022 land parcel data collected from the individual counties and maintained by the North Carolina Department of Agriculture and Consumer Services.

A modified version of the Tailored Design Method (Dillman et al. 2014) was used to administer the survey via mixed methods. Landowners were first mailed a postcard with a link to complete the survey online. This postcard included a unique identifier code which respondents had to type to be able to begin the survey. After 2 weeks, landowners who responded to the survey online were removed from the list and the remaining landowners were mailed a survey packet including a cover letter, questionnaire, and business reply envelope. Then, a second round of postcards and survey packets were sent to those who had not responded.

Data from the mail and online survey were combined and analyzed using Stata software (Statacorp, 2021). Frequency distributions and percentages of respondents in each category for every survey question within each of the nine strata and for western North Carolina overall was collected and analyzed for the preliminary results. Extra tables and figures not fitting in the main body of the report are included in the Appendix.

Further analysis will include:

- Crosstabulations and chi-square tests (χ^2) to determine whether views of elk significantly differed between the strata and other study population variables
- Key comparisons between 2013 and 2022 elk surveys
- Further comparisons by strata and key demographic variables of interest

Results for General Population

Respondent Characteristics

The survey had a final response rate of 29% after taking into account deceased survey recipients and undeliverable mail items, with a total of 5,547 responses. The response rate by stratum is shown in Table 1. In general, the response rate exceeded expectations and, within each of the three geographic regions, landowners of parcels > 15 acres responded to the survey at a greater rate than landowners of smaller parcels. Just over half of responses (57%) came from the mailed survey, while 43% came from the online survey. The main difference between these two groups was in age, with the mean age for the online survey being 61 years old, and the mean age for the mailed survey being 67 years old.

Table 1. Response rate per strata

Strata	Population Estimate	Estimated Response Rate	Sample Size	Number of Responses	Response Rate
Haywood & Jackson (0-2 acres)	64,026	20%	1,936	481	25%
Haywood & Jackson (2-15 acres)	24,034	20%	1,898	586	31%
Haywood & Jackson (15+ acres) ^a	2,683	20%	2,683	916	34%
Madison & Swain (0-2 acres)	18,112	20%	1,902	408	21%
Madison & Swain (2-15 acres)	11,404	20%	1,875	482	26%
Madison & Swain (15+ acres)	4,839	20%	1,784	525	29%
Remaining Counties ^b (0-2 acres)	555,709	15%	2,584	542	21%
Remaining Counties ^b (2-15 acres)	195,989	15%	2,570	739	29%
Remaining Counties ^b (15+ acres)	56,634	15%	2,589	868	33%
<i>Deceased/Undeliverable</i>			695		
Total Sample:			19,126	5,547	29%

^a All landowners with >15 acres in Haywood and Jackson Counties with viable addresses were sampled
^b Remaining Counties: Alleghany, Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Graham, Henderson, Macon, McDowell, Mitchell, Polk, Rutherford, Surry, Transylvania, Watauga, Wilkes, Yancey

Of the 5,547 survey respondents, 99% stated that they owned land in Western North Carolina. Only 57 respondents did not and were thusly excluded from analysis. Most (84%) respondents lived in North Carolina and 60% lived on the largest track of land they own. The average age of respondents was 64 years old, with an age range from 19 to 101 years old. The majority (71%) of respondents were male, 97% identified as white, 54% had a bachelor’s degree or higher, and 58% percent indicated having a gross household income of \$80,000 or higher. A breakdown of the above socio-demographic variables may be found in Appendix A (Table 1). Additionally, 84% of WNC landowners participated in some type of outdoor activity (Appendix A, Table 2).

Ninety percent (n = 4,724) of respondents described their largest tract of land as a rural area outside city or town limits. Of the remaining 10%, 6% described their land as in a small city or town and 4% in a medium to large city. Many respondents reported that their largest tract of land was near some type of public land, with 34% reporting being within 5 miles of a National Forest and 32% being 5 miles from a Game Land. Comparatively, only 21% were within 5 miles of a State Park and only 15% were within 5 miles to the National Park (Appendix A). The breakdown of land use types is shown in **Figure 1**. The majority of respondents used their largest tract of land as a residence, with hay or pastureland, and timber production as the second and third most frequently listed use.

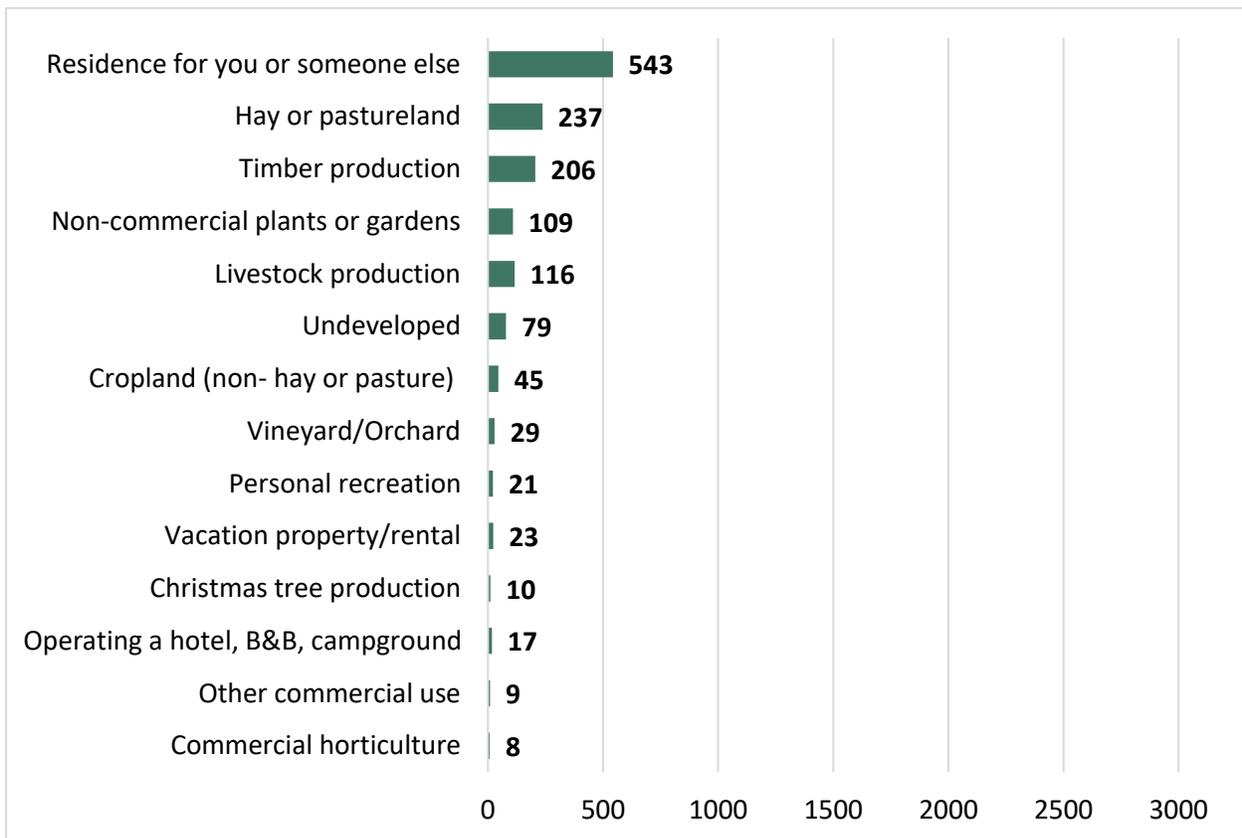


Figure 1. Reported land uses for largest tract of land owned (n = 5,490)

Elk on or within five miles of landowners' largest tracts of land

Across all survey responses, 9% indicated that they had seen elk on their property. A much larger proportion (51%) had seen elk in WNC, but 33% indicated that they had not seen elk at all in the area. When divided by strata (**Table 2**), the largest proportion of landowners who had seen elk on their property had a parcel of land over 15 acres in Haywood or Jackson counties. In the four counties of interest (Haywood, Jackson, Madison & Swain) roughly 20% of respondents had seen elk on their property or a neighbors' property. Of note, 45% of WNC landowners who reported that their largest tract of land was within 5 miles of the National Park (n=409) reported seeing elk on their property.

Table 2. Percentage of WNC landowners who have seen elk

Strata	On their property	On neighbors' property	In WNC	Not seen in WNC	n
All Sample	9%	8%	51%	33%	5,547
Haywood & Jackson (0-2 acres)	9%	9%	58%	24%	481
Haywood & Jackson (2-15 acres)	12%	11%	54%	25%	586
Haywood & Jackson (15+ acres)	14%	10%	54%	24%	916
Madison & Swain (0-2 acres)	11%	9%	53%	27%	408
Madison & Swain (2-15 acres)	9%	8%	54%	32%	482
Madison & Swain (15+ acres)	10%	9%	51%	33%	525
Remaining Counties (0-2 acres)	5%	6%	46%	40%	542
Remaining Counties (2-15 acres)	5%	4%	48%	40%	739
Remaining Counties (15+ acres)	4%	2%	48%	42%	868

Only 3% (146) of the 5,255 WNC landowners who responded to this question indicated that elk had damaged fences, crops, gardens, trees or other property on the largest tract of land they owned in western North Carolina. Of those, 51% were in Haywood and Jackson counties and 28% were in Madison and Swain counties.

Out of 5,181 respondents, 30% selected that they would be interested in managing their largest tract of land for elk. Of those, 1,146 respondents gave their email address or phone number to be contacted about learning how to manage their land for elk. Forty percent of respondents selected that their land was not suitable for elk habitat management. When asked later in the survey if they would manage their land for elk habitat if there were elk on their largest tract of land, 45% of respondents selected that they would be likely or very likely to do so, compared to only 32% who selected unlikely or very unlikely (n=1,388).

WNC landowner support and opposition for elk

WNC landowners were asked whether they supported or opposed elk living in three different areas in western North Carolina: on publicly owned lands, private lands, and on or within 5 miles of their largest tract of land (**Figure 2**). The highest support was for elk on public lands, with 88% of respondents showing support. When it came to private land, 77% of respondents were in support of elk on their own property, compared to 75% who were in support of elk on private land more generally. However, a larger proportion of respondents opposed elk on their property (13%) compared to on private land more generally (11%).

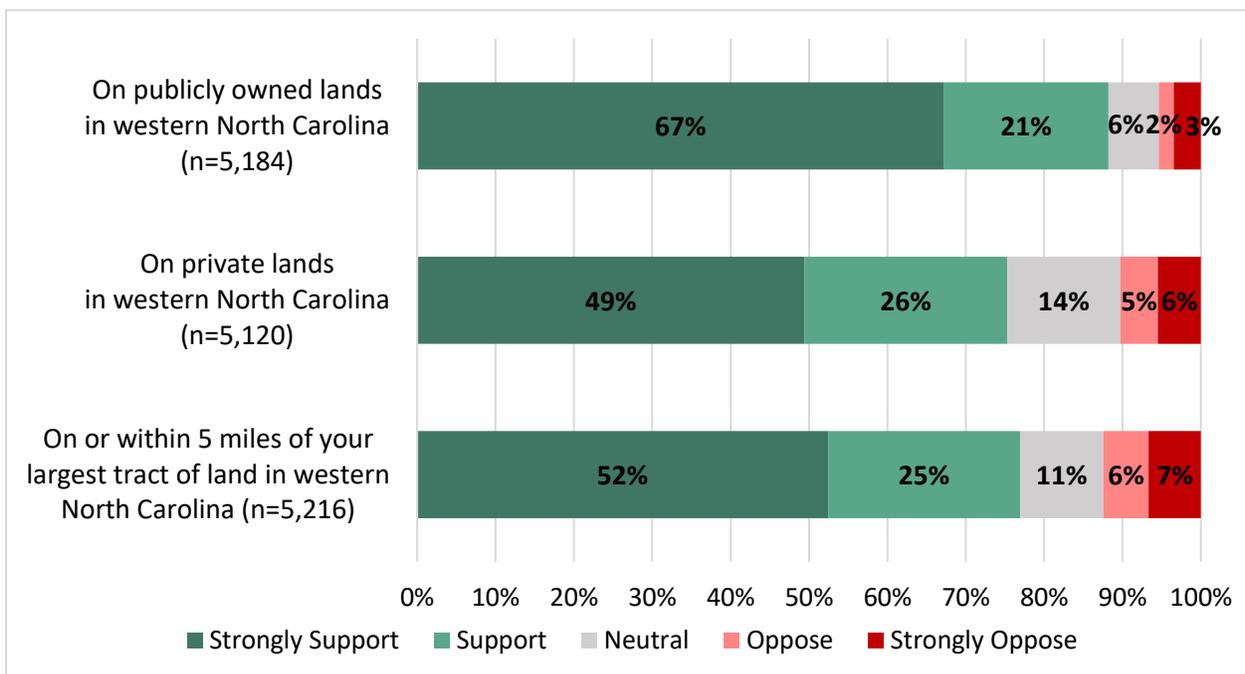


Figure 2. Percentage of WNC landowner support or opposition to elk in the area

When dividing WNC landowners by the sampling strata, differences between groups became apparent. **Table 3** shows the percentage of respondents in support of wild, free-roaming elk on various land types per strata group. Respondents with the largest parcel sizes were slightly less in support of having elk on their property than those in the other groups (75% compared to 76% for those with 0-2 acres and 80% for those with 2-15 acres). However, support for elk on all types of land in WNC was high, with over 70% of respondents in support, regardless of land parcel size or location.

Table 3. WNC landowner support for elk on various land types by parcel size and location

Strata	Support on or near their land	Support on private land	Support on public land
<i>All Sample</i>	77%	75%	88%
0-2 acres	76%	75%	89%
2-15 acres	80%	78%	89%
>15 acres	75%	74%	87%
Haywood & Jackson (0-2 acres)	76%	74%	90%
Haywood & Jackson (2-15 acres)	81%	78%	90%
Haywood & Jackson (15+ acres)	76%	73%	87%
Madison & Swain (0-2 acres)	74%	73%	89%
Madison & Swain (2-15 acres)	79%	79%	89%
Madison & Swain (15+ acres)	78%	76%	89%
Remaining Counties (0-2 acres)	76%	78%	89%
Remaining Counties (2-15 acres)	80%	77%	89%
Remaining Counties (15+ acres)	73%	75%	86%

*Support – those who selected support or strongly support on a 5-point Likert scale (1-strongly support, 5- strongly oppose) to the question “In general, do you support or oppose wild, free-roaming elk living in the following areas”

Differences were also apparent when dividing WNC landowners by land use type, especially between those who use their largest tract of land for commercial farming or production purposes and others (**Figure 3**). Landowners who utilized their land for tourism or as a personal residence or recreation area supported the idea of elk on their property in a larger proportion compared to those who utilized their land for cropland, Christmas tree and livestock production, or commercial horticulture.

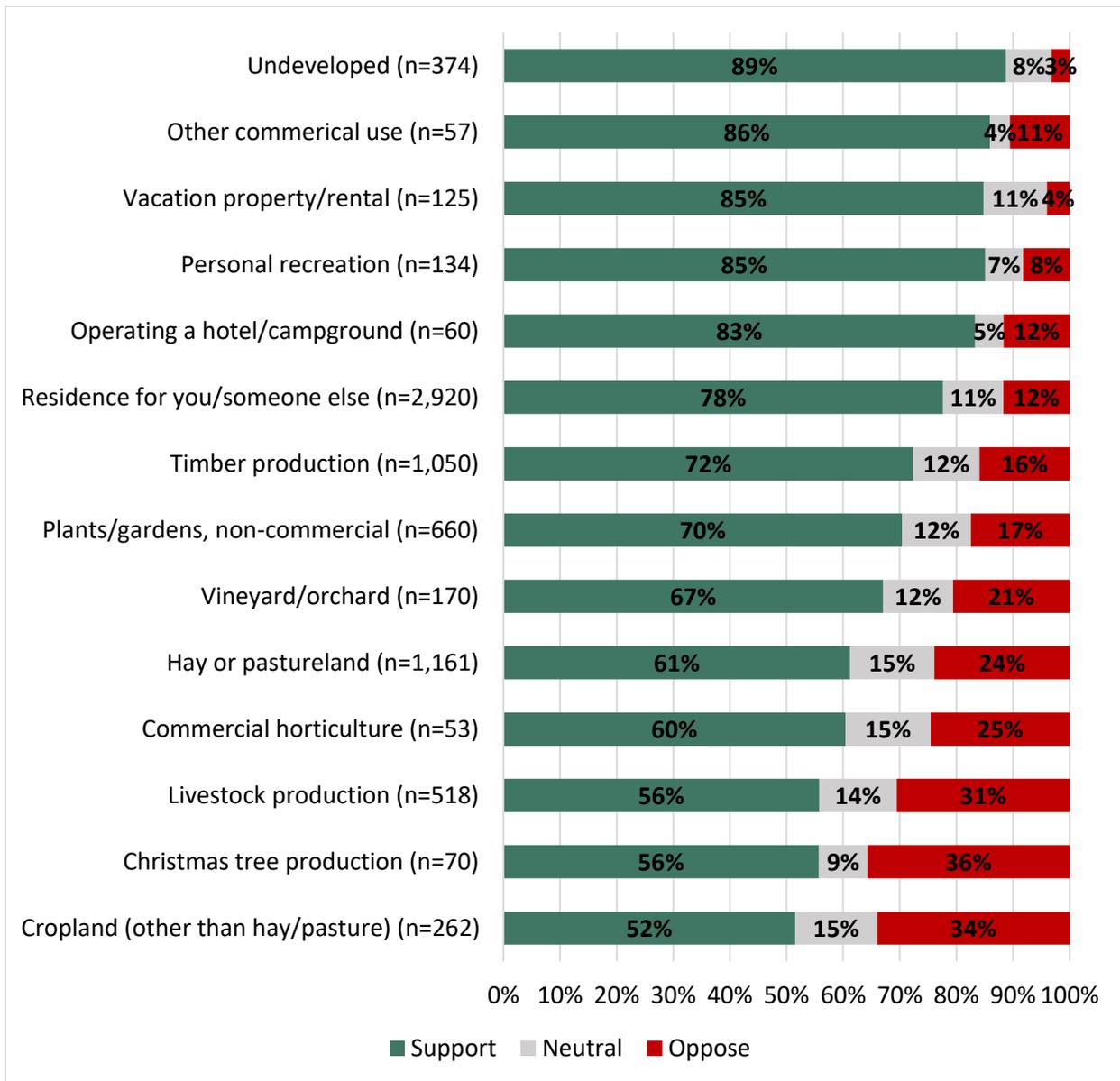


Figure 3. WNC landowner support or opposition for elk on their property by land use type

WNC landowner levels of support for elk were also compared by whether or not they had experienced elk-related damage on their property. Of the 143 respondents who had experienced elk-related damage, only 42% strongly supported elk on or within 5 miles of their land, compared to 78% for those who had not experienced damage. Additionally, 45% of those landowners who had experienced damage opposed elk on or within 5 miles of their land, compared to only 12% for those who had not experienced damage. This difference was not found between those who had simply seen elk on their property and not. When comparing those two groups, 72% of respondents in each were in support of elk on or within 5 miles of their land (seen elk on property n= 267; not seen elk on property n=2,716).

WNC landowner opinions on elk outcomes and population

WNC landowners were asked to indicate how positive or negative they believed several outcomes to be if there were elk living on or within five miles of their largest tract of land (**Figure 4**). Overall, more than half of respondents believed the following outcomes were positive or very positive: elk returning to their historical range (77%), people viewing elk in their community (65%), economic benefits through tourism (51%), and increased aesthetic value to the community (56%). A larger proportion of respondents believed the hunting-related outcomes to be negative, with 48% believing that people being able to hunt elk was negative and 42% believing elk bringing economic benefits via hunting was also negative. In comparing responses from those who indicated that they are hunters with non-hunters, 67% of hunters believed that people being able to hunt elk in the community was positive, compared to only 20% of non-hunters. Similarly, 60% of hunters believed the economic benefits from elk hunting were positive, compared to 20% of non-hunters.

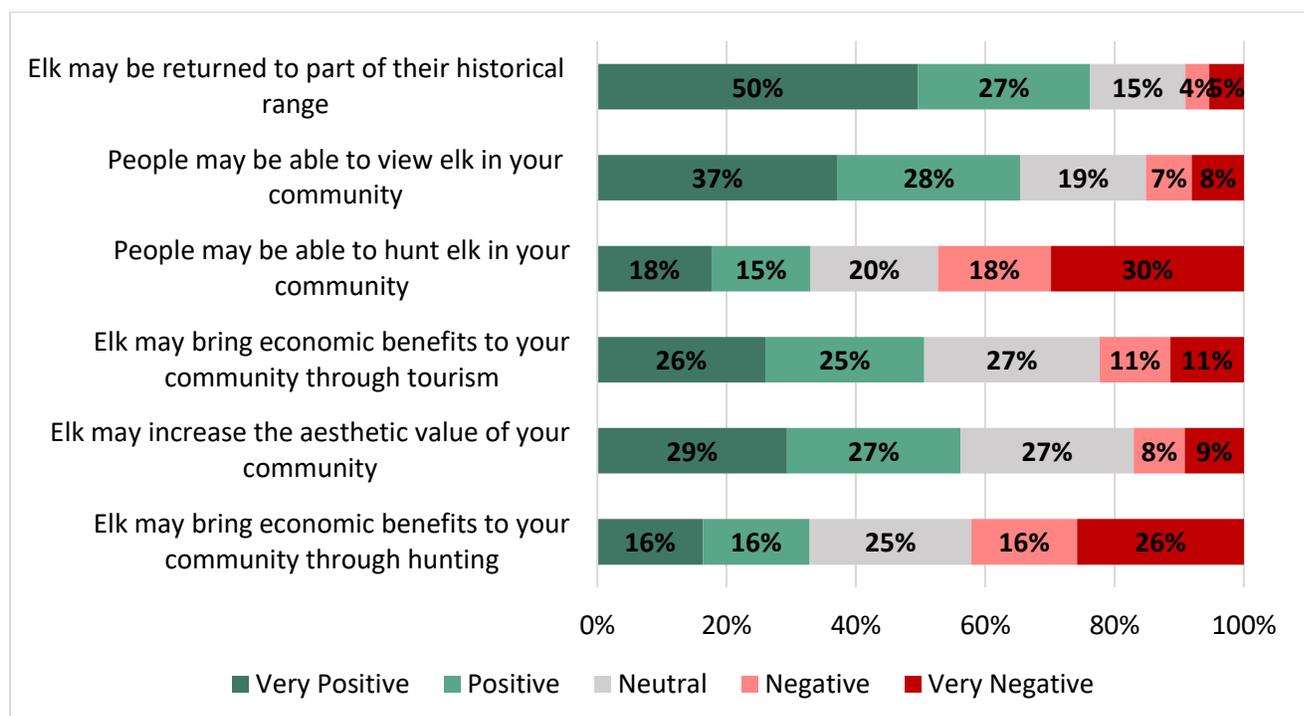


Figure 4. WNC landowner views on potential outcomes if there were elk living on or within five miles of their land (n=5,222)

WNC landowners were then asked to select their preferences for various elk population scenarios (**Table 4**). The scenarios were no elk on the landscape, elk are almost never seen, elk are sometimes seen, and elk are regularly seen. When asked which scenario they prefer, the largest percentage (53%) preferred the scenario where elk are sometimes seen. When asked which scenario would most likely cause respondents to ask/tell an authority to reduce the number of elk, 49% selected the scenario with the most elk, while 36% selected none of the above.

Table 4. WNC landowner opinions on various elk population scenarios

	Percentage	n
Situation respondents would prefer		5,209
Situation A – no elk exist	16%	
Situation B – Elk are almost never seen	27%	
Situation C – Elk are sometimes seen	53%	
Not Sure	4%	
Situation that would most likely cause respondents to desire a reduced number of elk		5,166
Situation B – Elk are almost never seen	7%	
Situation C – Elk are sometimes seen	8%	
Situation D – Elk are regularly seen	49%	
None	36%	

Management options for elk interactions & risks

WNC landowners were then asked to rate the acceptability of various management options if elk are seen, heard, or leave footprints on their property (**Figure 5**) and if elk knock down fences, disturb livestock, or eat plants on landowner property (**Figure 6**). In both situations, providing information was the most acceptable option. However, in the scenario with elk-related damage, providing information became less acceptable (85% to 69%) and the acceptability of frightening elk increased from 40% to 49% and lethal removal increased from 26% to 33%.

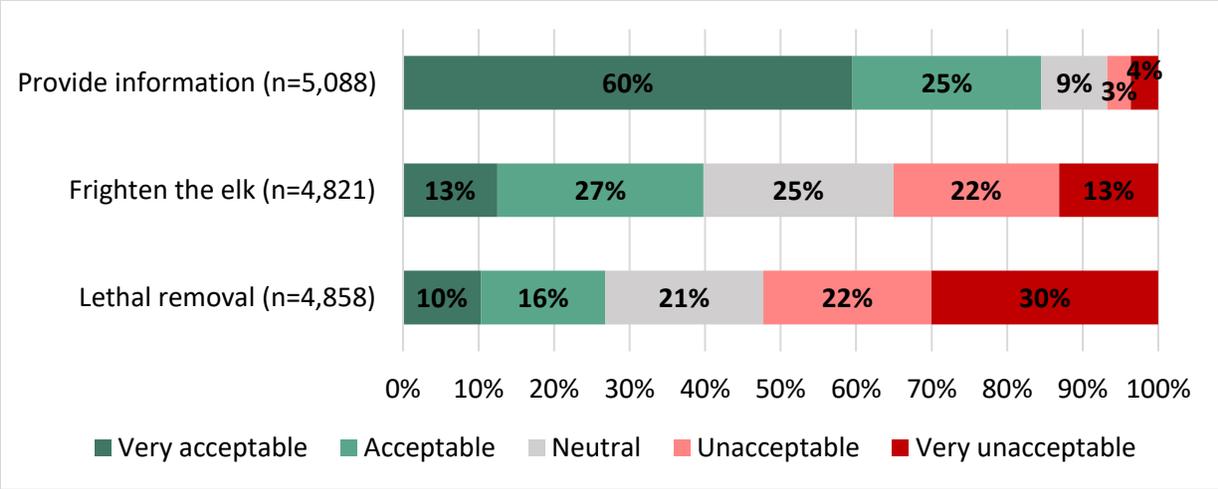


Figure 5. Acceptability of management options if elk are seen, heard, or leave footprints on property

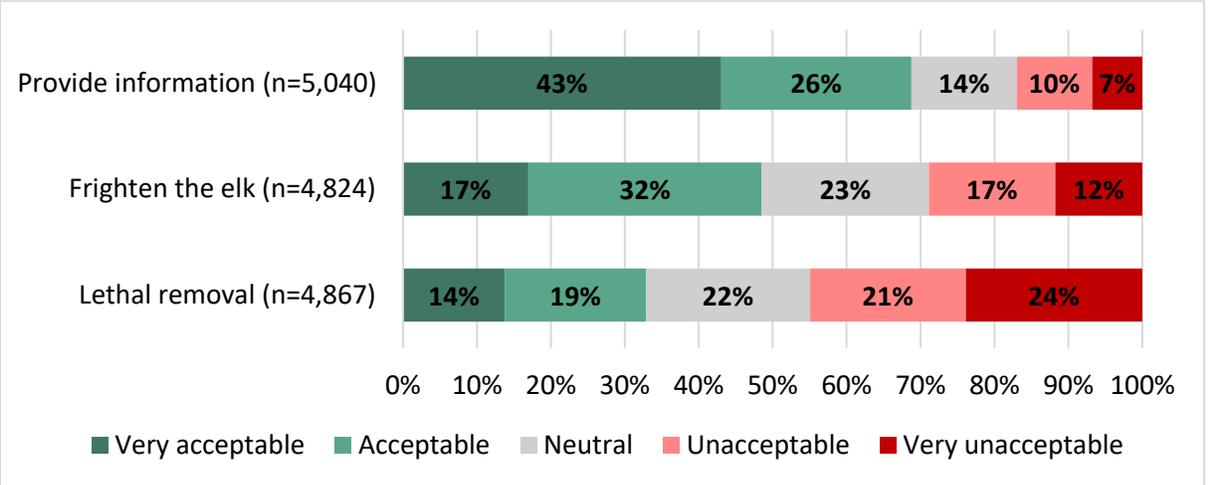


Figure 6. Acceptability for management options if elk knock down fences, disturb livestock, or eat plants on landowner property

WNC landowners were then asked to rate their level of concern with several outcomes relating to elk interactions and damage (**Figure 7**). The highest level of concern was for landowners experiencing elk related damage to crops (54% moderately or extremely concerned). In comparing groups of interest, respondents who utilized their largest tract of land for crops had a much higher proportion (70%, n=256) who were moderately or extremely concerned about elk-related damage to crops.

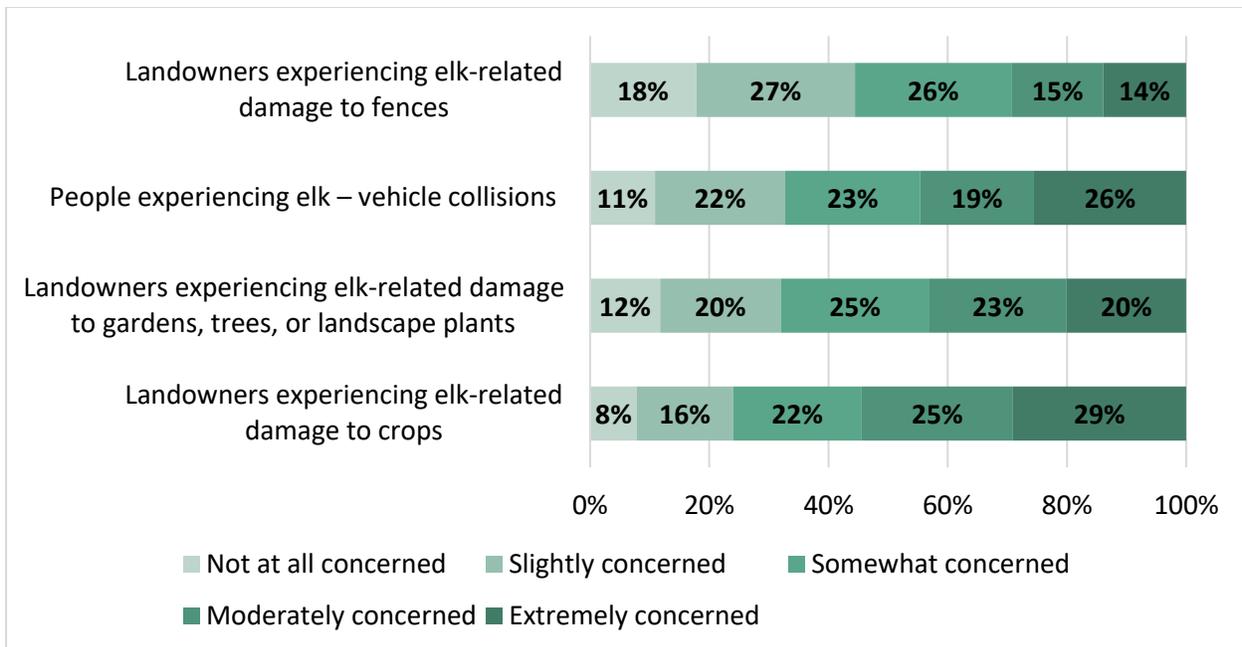


Figure 7. WNC landowners' level of concern with various outcomes if elk were living on or within five miles of their property (n=5,094)

Elk viewing & Hunting

WNC landowners were asked whether they had made a special trip to view elk. Of the 5,282 that responded to this question, 62 (1%) selected that they had not made a special trip because they had elk on their property. Otherwise, about half (54%) of respondents had made a special trip to view elk. When asked about allowing people other than members of their household or family to view elk on their land, 43% indicated they would be likely or very likely to do so (n=3,763), while only 4% indicated they would be likely or very likely to charge people to view elk on their land (n=3,215, **Figure 8**).

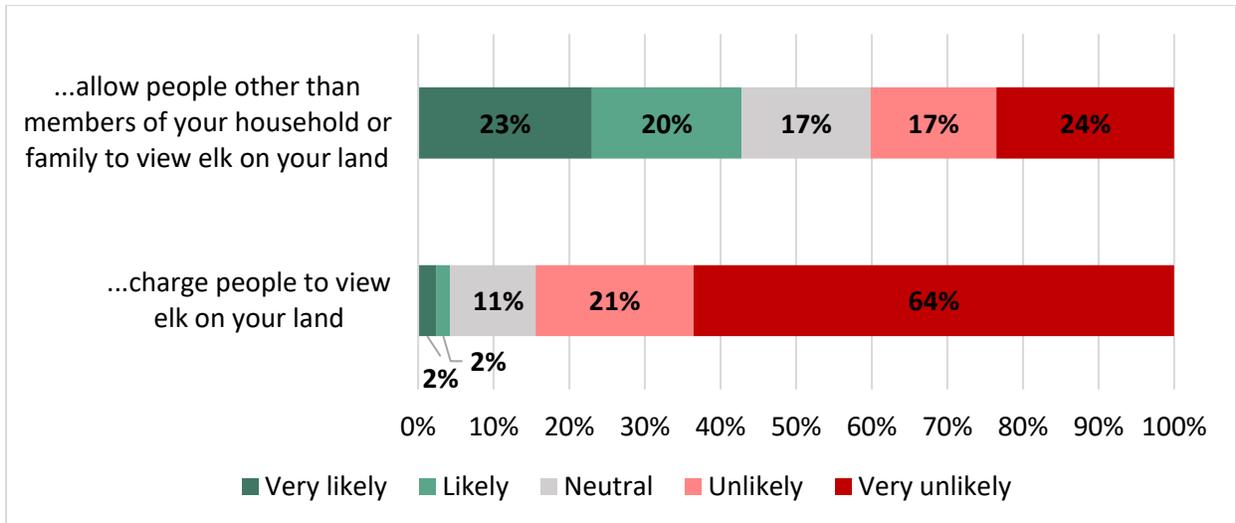


Figure 8. Likelihood of WNC landowners to charge people and allow people other than members of their household or family to view elk on their land

When asked about hunting, WNC landowners generally approved of regulated hunting and regulated elk hunting (**Figure 9**). However, the proportion of respondents indicating approval went down considerable when asked whether they approve of elk hunting on or within 5 miles of their largest tract of land (47%) and allowing non-North Carolina residents hunt elk (19%).

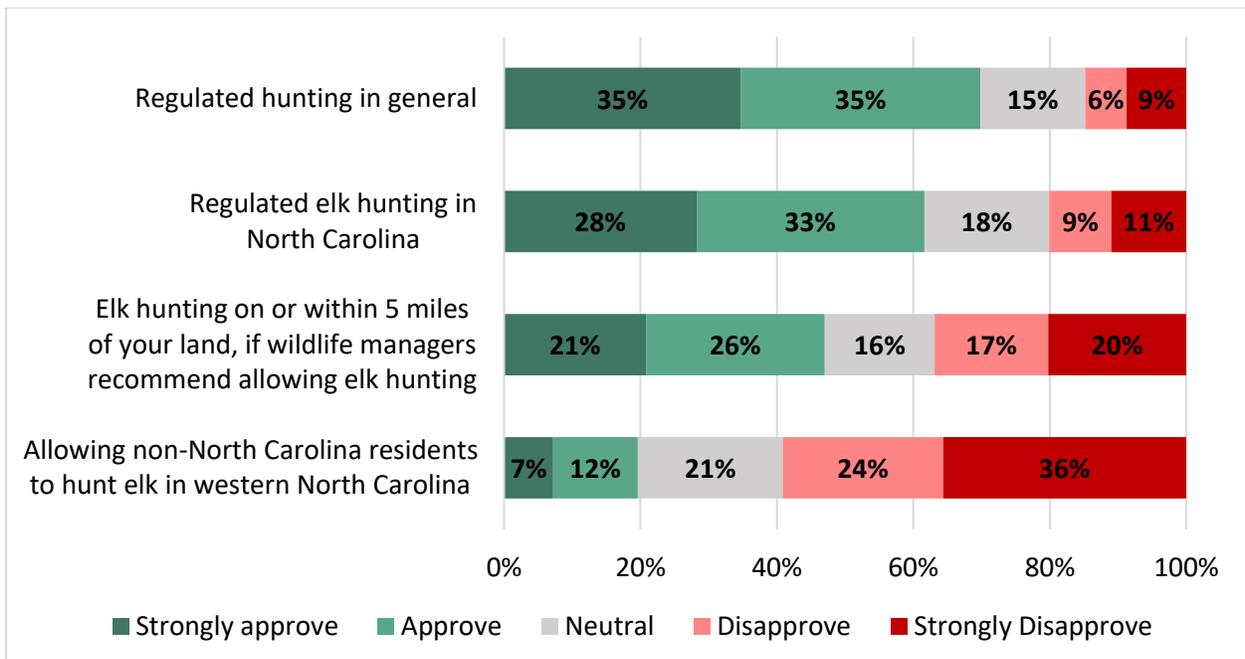


Figure 9. WNC landowner approval for various hunting scenarios (n=5,106)

When asked whether they themselves would participate in elk hunting, 25% of WNC landowners indicated they would be likely to do so, while 67% indicated they would be unlikely to hunt elk (**Figure 10**). Eighty-seven WNC landowners said they were unsure. In comparing respondents who indicated that they hunt with non-hunters, 76% of hunters indicated that they would be likely to participate in elk hunting (n=1,202), compared to only 9% of non-hunters (n=2,095).

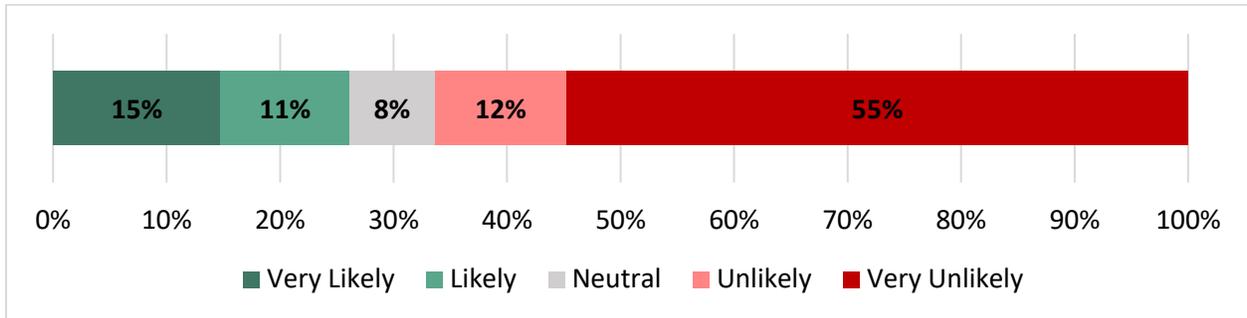


Figure 10. Likelihood of WNC landowner participation in elk hunting (n=5,051)

Respondents were further asked whether they would allow various groups of people to hunt elk on their land (**Figure 11**). Roughly a quarter of respondents to this question set stated that their land was unsuitable for any of these elk-hunting related activities (n=5,111). Of those whose land was suitable, 46% selected they would be likely or very likely to hunt or allow family members to hunt on their land. Comparatively, only 12% selected they would be likely or very likely to allow people outside their families to hunt on their land and only 5% selected that they would be likely or very likely to lease their land for elk hunting.

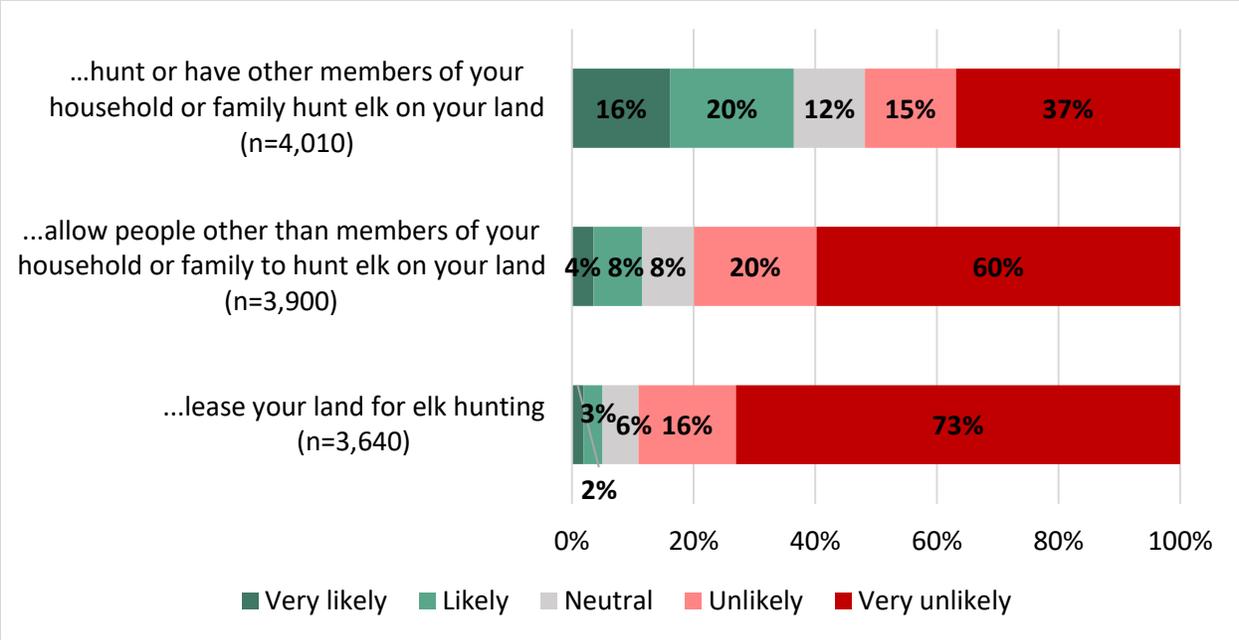


Figure 11. WNC landowner likelihood to participate in various scenarios if elk were on or within five miles of their land

When asked whether they would charge a fee if elk hunting were allowed and they would be interested in allowing people to hunt elk on their land, only 16% of WNC landowners selected that they would charge a fee (n=3,085). Of those, 381 respondents wrote in dollar values for the minimum fee a hunter would have to pay in order to access their property. However, seven people were removed from the analysis as they wrote in \$1,000,000 or more and 24 people were removed as they typed in \$0. Of the 350 remaining respondents, the minimum charge was \$25, the maximum was \$250,000, and the mean fee was \$3,289.

Appendix A: Results for Haywood County

Respondent Characteristics

A total of 1,015 respondents to the survey had their largest tract of land in Haywood County. This makes up 18% of total responses to the survey. Of those 1,015 respondents, 27% selected that their largest tract of land was 0-2 acres, 31% selected that their largest tract was between 2 and 15 acres, and 42% selected that their largest tract was over 15 acres. Roughly 30% of Haywood county landowners live within 5 miles of a national forest or game land and about 20% live within 5 miles of a national park or state forest.

The number of responses per land use type in Haywood County is shown in **Table 5**, grouped by major category. Respondents were able to select multiple land uses for their largest tract of land. Similar to the general report, the majority of respondents used their largest tract of land as a residence, with hay or pastureland, and timber production as the second and third most frequently listed use.

Table 5. Number of responses per Haywood County Land Ownership Type

Land Ownership Types	N
Recreation Tourism	61
Personal recreation	21
Vacation property/rental	23
Operating a hotel, B&B, campground	17
Commercial Agriculture	445
Hay or pastureland	237
Livestock production	116
Cropland (non- hay or pasture)	45
Vineyard/Orchard	29
Commercial horticulture	8
Christmas tree production	10
Personal Use	652
Residence for you or someone else	543
Non-commercial plants or gardens	109
Other commercial uses	215
Timber production	206
Other commercial use	9
Undeveloped	79

Elk on or within five miles of landowners' largest tracts of land

Roughly half (53%) of Haywood County residents had seen elk in Western North Carolina, while 31% had not seen elk in the area at all. Only 9% had seen elk on their property and 8% had seen elk on a neighbor's property. Only 30 Haywood County respondents indicated that elk had damaged fences, crops, gardens, trees or other property on their largest tract of land. Out of 581 Haywood County respondents who indicated that their land was suitable for elk habitat, 45% indicated that they would be interested in managing their largest tract of land for elk.

Haywood County landowner support and opposition for elk

Haywood County landowners were asked whether they supported or opposed elk living in three different areas in western North Carolina: on publicly owned lands, private lands, and on or within 5 miles of their largest tract of land (**Figure 12**). The highest level of support was for elk on publicly owned lands (87% support and strongly support), with 75% of Haywood County residents in support of elk on or within 5 miles of their largest tract of land and only 13% in opposition of elk on their land.

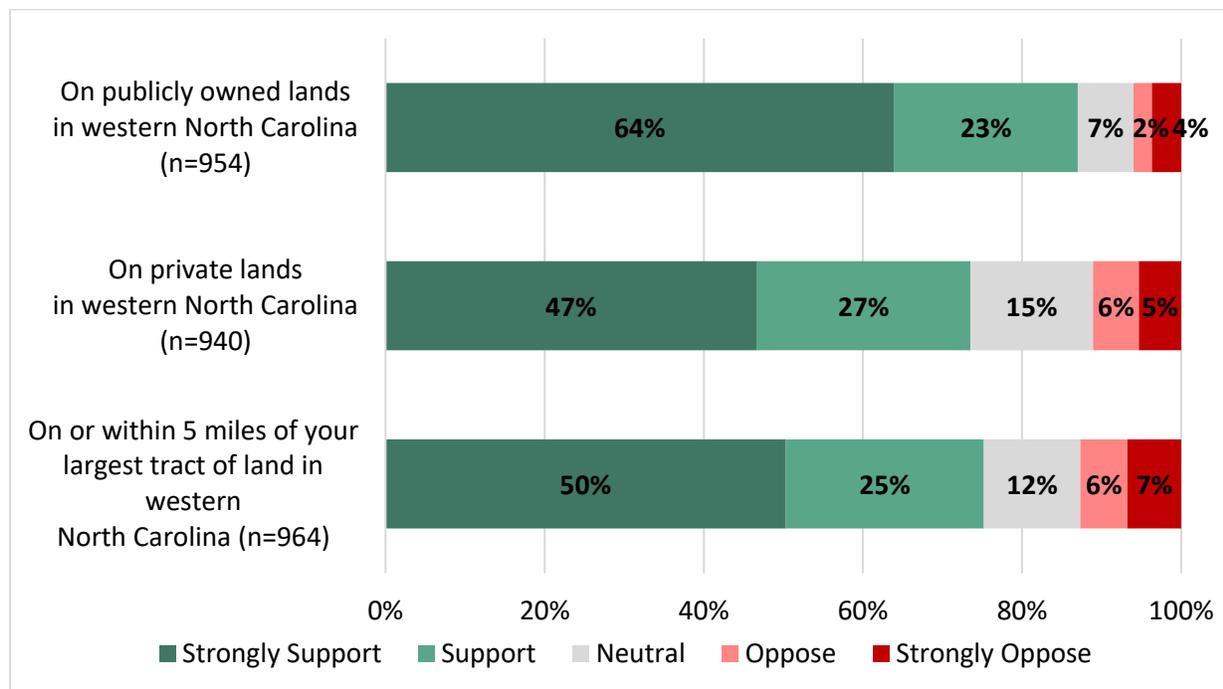


Figure 12. Haywood County residents support or opposition to elk in the area

When Haywood County residents were divided by land use types, their support for elk on or within 5 miles of their land was similar to the general population (**Figure 13**). Those who use their land for personal reasons (private home, etc.), for recreation, and as undeveloped land had the highest support for elk near their property, while those who use their land for commercial purposes, had relatively lower levels of support.

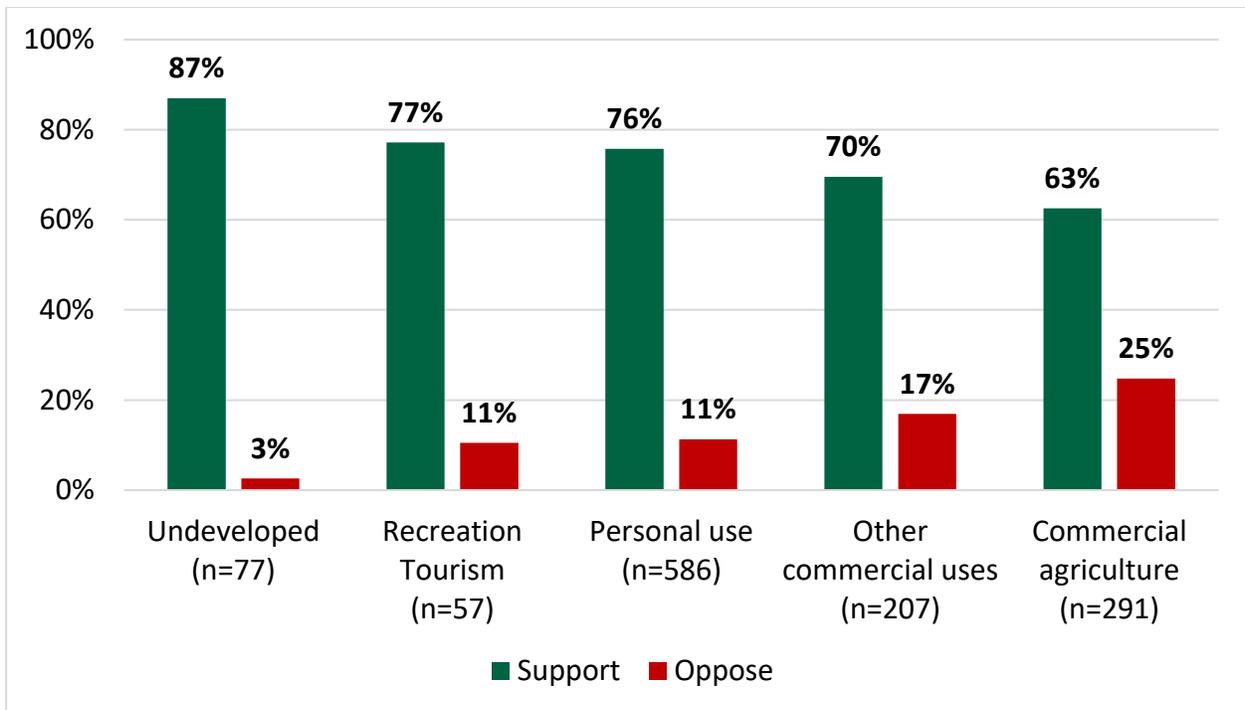


Figure 13. Haywood county resident support for elk on or near land, by land use types

WNC landowner opinions on elk outcomes and population

When asked to indicate how positive or negative they believed several outcomes to be if there were elk living on or within five miles of their largest tract of land, Haywood County residents mirrored the responses of the general public (**Figure 14**).

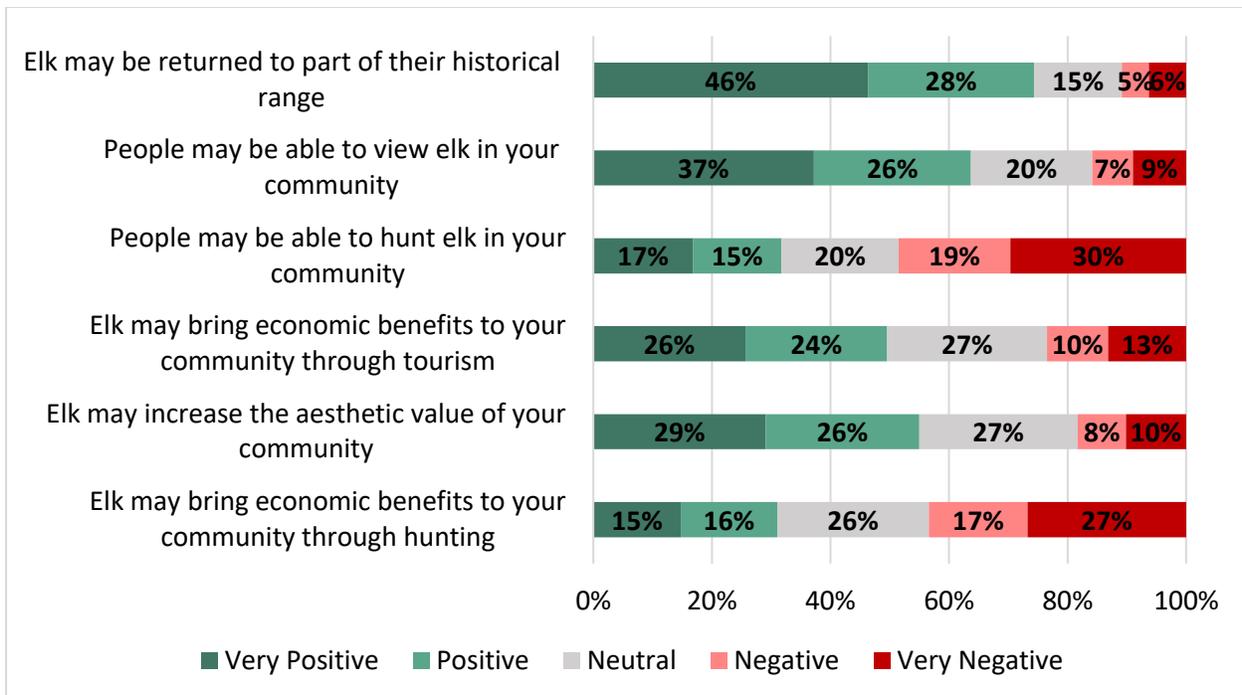


Figure 14. Haywood County landowner views on potential outcomes if there were elk living on or within five miles of their land (n=956)

Haywood county landowners were then asked to select their preferences for various elk population scenarios: no elk on the landscape, elk are almost never seen, elk are sometimes seen, and elk are regularly seen (**Table 4**). When asked which scenario they prefer, the largest percentage (51%) preferred the scenario where elk are sometimes seen. When asked which scenario would most likely cause respondents to ask/tell an authority to reduce the number of elk, 48% selected the scenario with the most elk, while 38% selected none of the above.

Table 6. Haywood County landowner opinions on various elk population scenarios

	Percentage	n
Situation respondents would prefer		959
Situation A – no elk exist	16%	
Situation B – Elk are almost never seen	30%	
Situation C – Elk are sometimes seen	51%	
Not Sure	3%	
Situation that would most likely cause respondents to desire a reduced number of elk		948
Situation B – Elk are almost never seen	7%	
Situation C – Elk are sometimes seen	8%	
Situation D – Elk are regularly seen	48%	
None	38%	

Management options for elk interactions & risks

Haywood County landowners then rated the acceptability of various management options if elk are seen, heard, or leave footprints on their property (**Figure 15**) and if elk knock down fences, disturb livestock, or eat plants on landowner property (**Figure 16**). In both situations, providing information was the most acceptable option. However, in the scenario with elk-related damage, providing information became less acceptable (82% to 68%) and the acceptability of frightening elk increased from 40% to 49% and lethal removal increased from 39% to 45%.

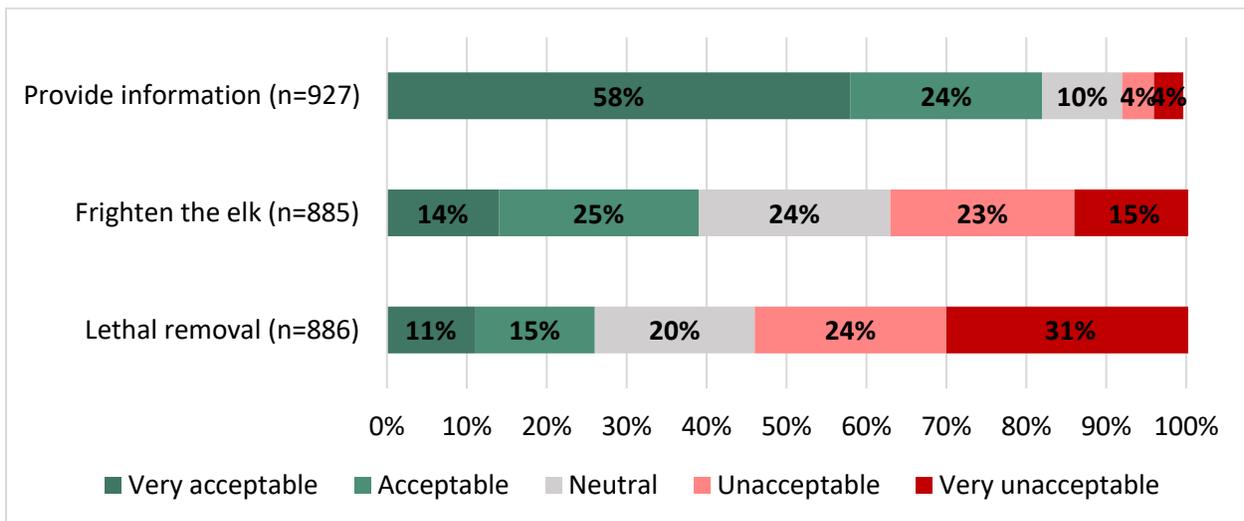


Figure 15. Acceptability of management options to Haywood County residents if elk are seen, heard, or leave footprints on property

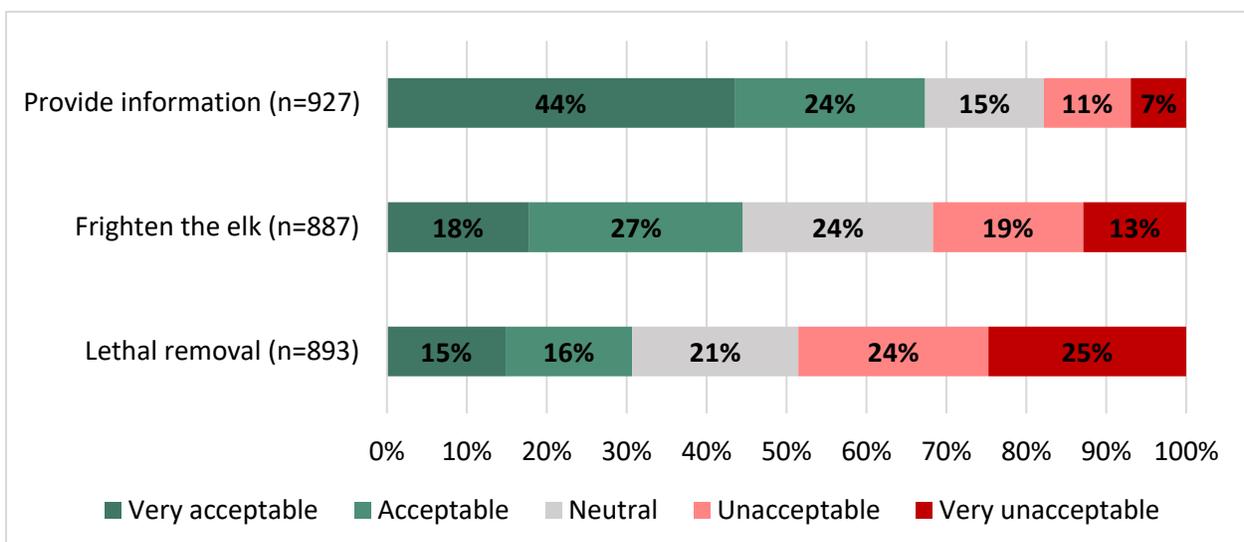


Figure 16. Acceptability for management options to Haywood County residents if elk knock down fences, disturb livestock, or eat plants on landowner property

When asked to rate their level of concern with several outcomes relating to elk interactions and damage, the highest level of concern was for landowners experiencing elk related damage to crops (55% moderately or extremely concerned) (**Figure 17**).

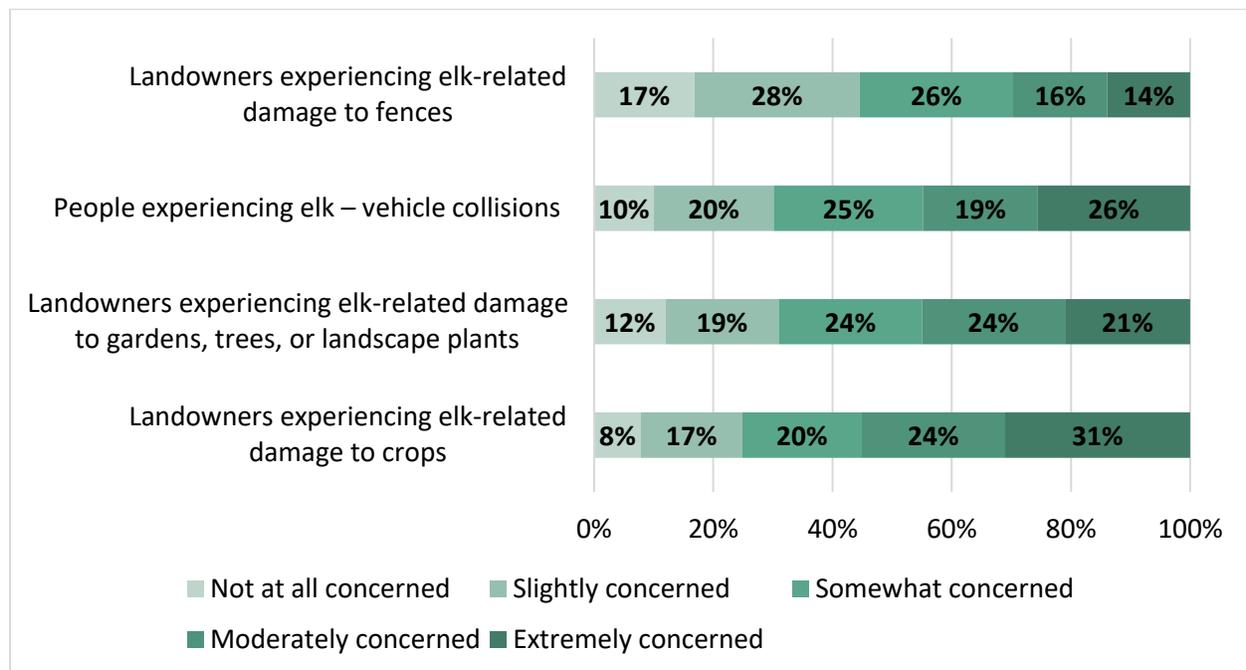


Figure 17. Haywood County landowners' level of concern with various outcomes if elk were living on or within five miles of their property (n=935)

Elk viewing and hunting

Half (50%) of the Haywood County respondents had made a special trip to view elk. When asked about allowing people other than members of their household or family to view elk on their land, 41% indicated they would be likely or very likely to do so (n=703), while only 3% indicated they would be likely or very likely to charge people to view elk on their land (n=592, **Figure 18**).

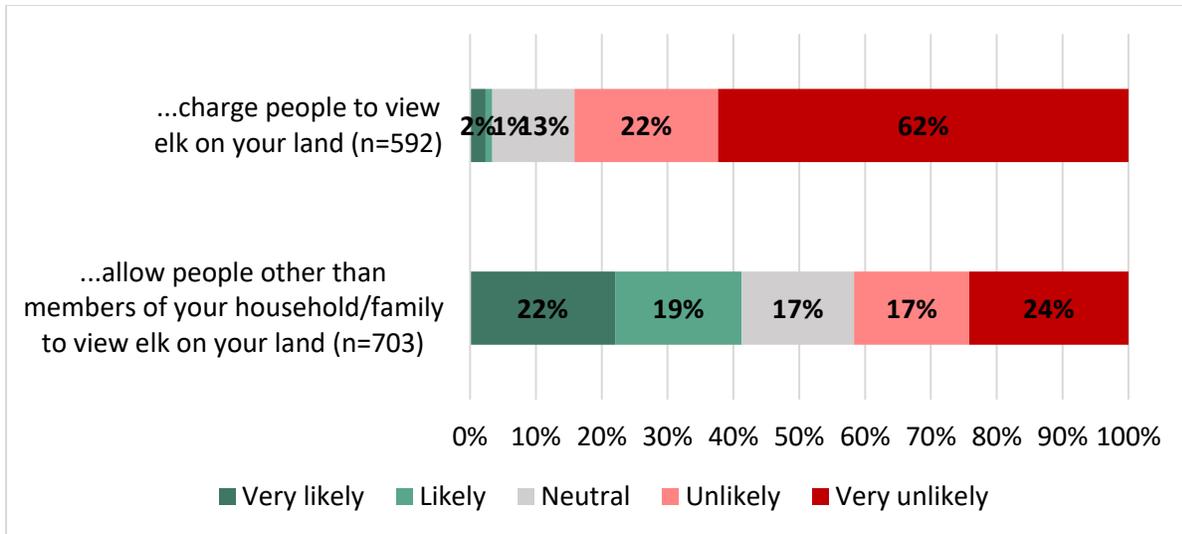


Figure 18. Likelihood of Haywood County landowners to charge people and allow people other than members of their household or family to view elk on their land

The majority (69%) of Haywood County residents approved of regulated hunting in general and regulated elk hunting (59%) (**Figure 19**). They were less supportive of elk hunting on or within 5 miles of their land and allowing non-North Carolina residents to hunt elk in WNC.

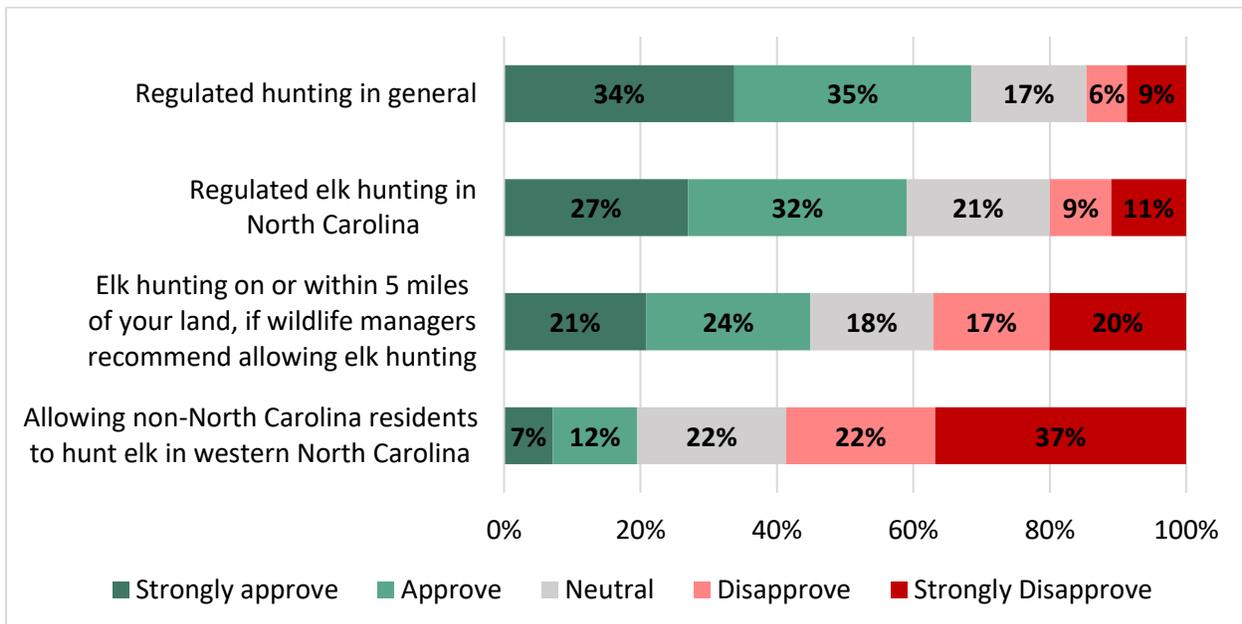


Figure 19. Haywood County landowner approval for various hunting scenarios (n=936)

When asked whether they themselves would participate in elk hunting, 25% of Haywood County landowners indicated they would be likely to do so, while 66% indicated they would be unlikely to hunt elk. Fifteen landowners said they were unsure.

Respondents were further asked whether they would allow various groups of people to hunt elk on their land (**Figure 20**). Roughly a quarter of respondents to this question set stated that their land was unsuitable for any of these elk-hunting related activities (n=1,015). Of those whose land was suitable, 36% selected they would be likely or very likely to hunt or allow family members to hunt on their land. Comparatively, only 12% selected they would be likely or very likely to allow people outside their families to hunt on their land and only 4% selected that they would be likely or very likely to lease their land for elk hunting.

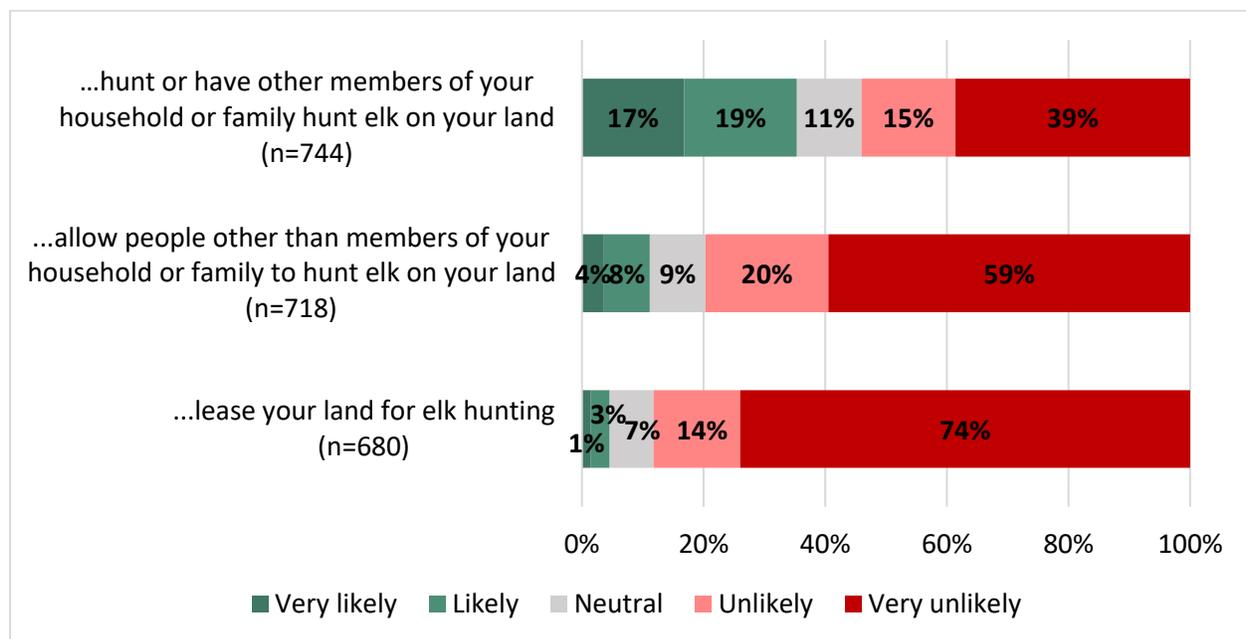


Figure 20. Haywood County landowner likelihood to participate in various scenarios if elk were on or within five miles of their land

When asked whether they would charge a fee if elk hunting were allowed and they would be interested in allowing people to hunt elk on their land, only 14% of Haywood County landowners selected that they would charge a fee (n=585). Of those, 57 respondents wrote in dollar values for the minimum fee a hunter would have to pay in order to access their property. The minimum charge was \$25, the maximum was \$100,000, and the mean fee was \$2,714.

Appendix B: Extra Tables and Figures

Table 1. Socio-demographics of survey respondents

Demographics	mean	%	n
Age	64.4		4,818
Gender			5,027
Male		71%	3,576
Female		27%	1,359
Prefer not to say		2%	92
Education			5,025
High School or less		16%	784
Some College or trade school		18%	910
Associate or trade school degree		13%	629
Bachelor's or four-year degree		27%	1,359
Graduate or professional degree		27%	1,343
Race/Ethnicity			4,983
White/ Caucasian		97%	4,838
American Indian or Alaska Native		2%	110
Other		1%	72
Hispanic		1%	45
Black/ African American		<1%	33
Asian		<1%	16
Native Hawaiian or Pacific Islander		<1%	4
Income			4,082
Less than \$40,000		15%	595
\$40,000 to \$59,999		14%	574
\$60,000 to \$79,999		14%	581
\$80,000 to \$99,999		12%	491
\$100,000 to \$119,999		11%	430
\$120,000 or more		35%	1,411

Table 2. Percentage of WNC landowner participation in outdoor activities

Activity	%	n
Wildlife watching	81%	4,667
Hiking	75%	4,567
Fishing	57%	3,876
Hunting	36%	3,429
Camping	47%	3,756
Boating	50%	3,762
None of the Above	11%	2,884
Other		364

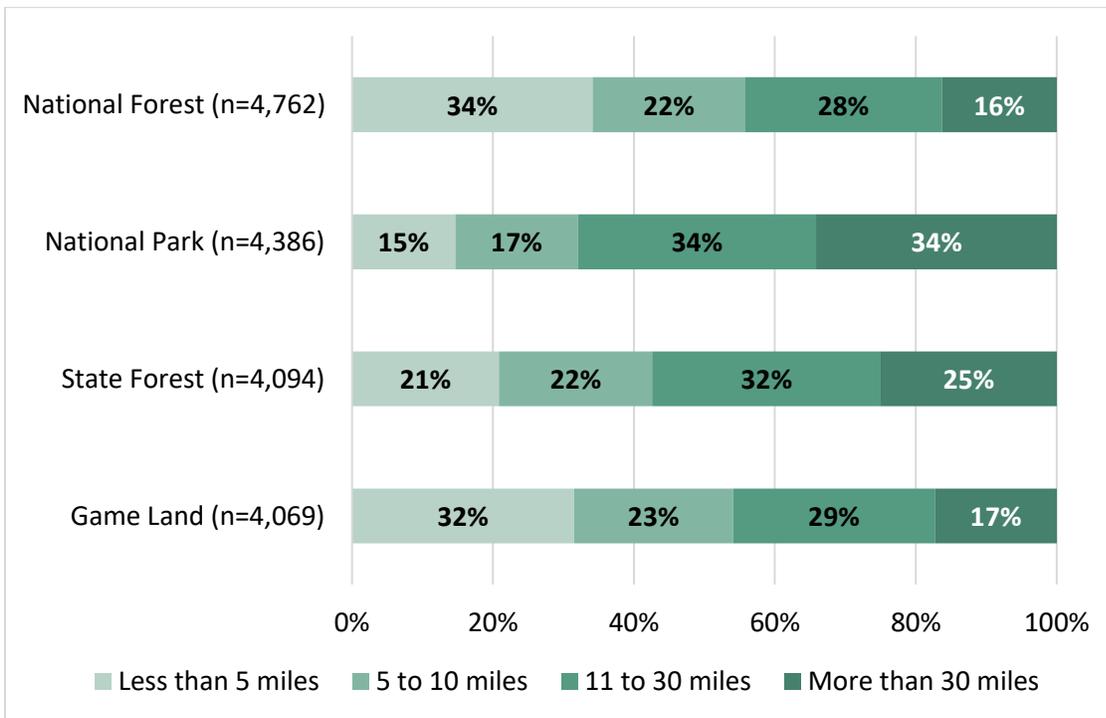


Figure 1. Average distance from WNC landowner property to public land

Appendix C: Survey Instrument



Landowner Attitudes Towards Elk in Western North Carolina



A Survey Conducted by the North Carolina Wildlife Resources Commission

Elk once lived throughout much of the United States, including western North Carolina. By 1800, elk were eliminated from North Carolina by loss of habitat and over-hunting. In 2000 and 2001, elk were reintroduced into the Great Smoky Mountains National Park (Park). Today there are about 250 elk in western North Carolina living both within the Park and on public and private lands outside of the Park.

This survey asks about your views on elk in western North Carolina. You are one of the landowners in western North Carolina randomly selected to represent your neighbors by participating in this survey. **We are interested in your responses even if you have had no experience with elk or have little knowledge about elk.**

Property Characteristics

(1) Do you own land in western North Carolina? For this survey, we define western North Carolina as the counties shaded in the map below. **(Note:** If you own land, no matter how small, in western North Carolina, please answer "Yes.")

- Yes (continue to question 2)
- No (please stop here and return the survey)

Western North Carolina Counties



(2) How many total acres do you own in western North Carolina? **(Note:** Please include your residence and any separate parcels in the total.)

(3) How many acres is the largest tract of land you own in western North Carolina? **(Note:** Please add together the acreages of individually deeded parcels that are connected.)

(4) In which county is the largest tract of land you own in western North Carolina?

(5) Do you live on the largest tract of land you own in western North Carolina?

- Yes
- No

(6) Which of the following best describes the location of your largest tract of land in western North Carolina? (**check one**)

- Rural area outside city or town limits
- Small city or town with less than 5,000 people
- Medium city with 5,000 to 19,999 people
- City or urban area with 20,000 people or more

(7) Which of the following describe your use(s) for the largest tract of land you own in western North Carolina? (**check all that apply**)

- | | |
|--|---|
| <input type="checkbox"/> A residence for you or someone else | <input type="checkbox"/> Orchards |
| <input type="checkbox"/> Growing ornamental plants or gardens for non-commercial use | <input type="checkbox"/> Commercial horticulture |
| <input type="checkbox"/> Hay or pastureland | <input type="checkbox"/> Operating a hotel, motel, or bed and breakfast |
| <input type="checkbox"/> Cropland (other than hay or pasture) | <input type="checkbox"/> Operating a commercial campground |
| <input type="checkbox"/> Livestock production | <input type="checkbox"/> Operating a golf course |
| <input type="checkbox"/> Timber production | <input type="checkbox"/> None of the above |
| <input type="checkbox"/> Christmas tree production | <input type="checkbox"/> Other (please specify): |
| <input type="checkbox"/> Vineyards | _____ |

(8) Please select the option that best describes approximately how far the largest tract of land you own is from each of the following types of public land:

	Less than 5 miles	5 to 10 miles	11 to 30 miles	More than 30 miles
National Forest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
National Park	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State Forest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Game Land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Elk in North Carolina

(9) In general, do you support or oppose wild, free-roaming elk living in the following areas?

	Strongly Support	Support	Neutral	Oppose	Strongly Oppose
On or within 5 miles of your largest tract of land in western North Carolina	<input type="checkbox"/>				
On private lands in western North Carolina	<input type="checkbox"/>				
On publicly owned lands in western North Carolina (national forests, national park, game lands, etc.)	<input type="checkbox"/>				

(10) Which of the following describes your experience with elk in western North Carolina?

- I have seen elk on my property
- I have seen elk on my neighbors' properties
- I have seen elk in western N.C. but not near my property
- I have not seen elk in western N.C

(11) Have elk ever damaged fences, crops, gardens, trees, or other property on the largest tract of land you own in western North Carolina?

- Yes
- No

(12) Even if you have never seen elk on your land, would you be interested in managing your largest tract of land in western North Carolina for elk habitat? (i.e. early successional habitat, forest management, open pasture, etc.)

- Yes (**continue to question 13**)
- No (**skip to question 14 on next page**)
- My land is not suitable for this (**skip to question 14 on next page**)

(13) **If you answered yes** above and would like to learn more about managing your land for elk habitat, please provide your email address or phone number below:

Email/Phone Number: _____



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(14) Have you ever made a special trip to view elk? (**check one**)

- Yes
- No
- No, because I have elk on my property

(15) If there were elk on or within five miles of your largest tract of land in western North Carolina, how likely or unlikely would you be to... (**check one for each activity**)

	Very likely	Likely	Neutral	Unlikely	Very unlikely	My land is unsuitable for this activity
...allow people other than members of your household or family to view elk on your land	<input type="checkbox"/>					
...charge people to view elk on your land	<input type="checkbox"/>					

(16) Please indicate how positive or negative you believe each of the following outcomes would be if there were elk living on or within five miles of your largest tract of land in western North Carolina. (**check one for each possible outcome**)

	Very Positive	Positive	Neutral	Negative	Very Negative
Elk may be returned to part of their historical range	<input type="checkbox"/>				
People may be able to view elk in your community	<input type="checkbox"/>				
People may be able to hunt elk in your community	<input type="checkbox"/>				
Elk may bring economic benefits to your community through tourism	<input type="checkbox"/>				
Elk may increase the aesthetic value of your community	<input type="checkbox"/>				
Elk may bring economic benefits to your community through hunting	<input type="checkbox"/>				

Dealing with Elk/Human Interactions

(17) Below are four situations that progressively indicate increasing levels of interactions between people and elk.

Situation A <ul style="list-style-type: none">• No elk exist	Situation B <ul style="list-style-type: none">• Elk are almost never seen.• Residents including you may rarely have damage to fences, crops, gardens, or trees• A low number of elk may be present for wildlife viewing or other activities
Situation C <ul style="list-style-type: none">• Elk are sometimes seen• Residents including you may have occasional damage to fences, crops, gardens, or trees• A moderate number of elk may be present for wildlife viewing or other activities	Situation D <ul style="list-style-type: none">• Elk are regularly seen• Residents including you may have regular damage to fences, gardens, crops, or trees• Many elk may be present for wildlife viewing or other activities

(A) Which situation would you **prefer** on or within five miles of your largest tract of land in western North Carolina? (**check one**)

- Situation A
- Situation B
- Situation C
- Not Sure

(B) Which situation would most likely cause you to ask/tell an authority to reduce the number of elk on or within five miles of your largest tract of land in western North Carolina? (**check one**)

- Situation B
- Situation C
- Situation D
- None of the above

(18) When people and elk live in the same area, conflicts may occur. The following are some actions that could be taken when elk enter an area where people live. Please note the considerations within each option.

	Option	Consideration
Option A	<ul style="list-style-type: none"> Provide information to landowners on preventing problems with elk 	<ul style="list-style-type: none"> People must take extra precautions to avoid problems with elk.
Option B	<ul style="list-style-type: none"> Frighten the elk using tools such as fireworks or dogs. 	<ul style="list-style-type: none"> The elk may not be frightened and may stay in the area. The elk may cause problems in other areas. Other elk may enter the area.
Option C	<ul style="list-style-type: none"> Landowners lethally remove elk causing problems. 	<ul style="list-style-type: none"> Some people may object to lethally removing elk. Other elk may enter the area.

(A) How acceptable or unacceptable are each of the following options if elk are seen, heard bugling, or leave hoof prints on a landowner's property? (check one for each option)

	Very acceptable	Acceptable	Neutral	Unacceptable	Very unacceptable
Option A	<input type="checkbox"/>				
Option B	<input type="checkbox"/>				
Option C	<input type="checkbox"/>				

(B) How acceptable or unacceptable are each of the following options if elk knock down fences, disturb livestock, or eat hay, landscape plants, and gardens on a landowner's property? (check one for each option)

	Very acceptable	Acceptable	Neutral	Unacceptable	Very unacceptable
Option A	<input type="checkbox"/>				
Option B	<input type="checkbox"/>				
Option C	<input type="checkbox"/>				

(19) Please indicate your level of concern with each of the following outcomes if there were elk living on or within five miles of your largest tract of land in western North Carolina. (**check one for each possible outcome**)

	Not at all concerned	Slightly concerned	Somewhat concerned	Moderately concerned	Extremely concerned
Landowners experiencing elk-related damage to fences	<input type="checkbox"/>				
Elk – vehicle collisions	<input type="checkbox"/>				
Landowners experiencing elk-related damage to gardens, trees, or landscape plants	<input type="checkbox"/>				
Landowners experiencing elk-related damage to crops	<input type="checkbox"/>				

Elk Hunting

(20) Please indicate how much you approve or disapprove of the following. (**check one for each item**)

	Strongly approve	Approve	Neutral	Disapprove	Strongly Disapprove
Regulated hunting in general	<input type="checkbox"/>				
Regulated elk hunting in North Carolina	<input type="checkbox"/>				
Elk hunting on or within 5 miles of your land, if wildlife managers recommend allowing elk hunting	<input type="checkbox"/>				
Allowing non-North Carolina residents to hunt elk in western North Carolina	<input type="checkbox"/>				

(21) If limited elk hunting were allowed in western North Carolina, how likely or unlikely would you be to hunt elk? (**check one**)

Very Likely	Likely	Neutral	Unlikely	Very Unlikely	Unsure
<input type="checkbox"/>					

(22) If there were elk on or within five miles of your largest tract of land in western North Carolina, how likely or unlikely would you be to... (**check one for each activity**)

	Very likely	Likely	Neutral	Unlikely	Very unlikely	My land is unsuitable for this activity
...manage your land for elk habitat (early successional habitat, forest management, open pasture)	<input type="checkbox"/>					
...hunt or have other members of your household or family hunt elk on your land	<input type="checkbox"/>					
...allow people other than members of your household or family to hunt elk on your land	<input type="checkbox"/>					
...lease your land for elk hunting	<input type="checkbox"/>					

(23) If elk hunting were allowed **and** you would be interested in allowing people to hunt elk on your land, would you charge a fee?

- Yes (**continue to question 24**)
- No (**please skip to next section**)

(24) If yes, what is the minimum fee a hunter would have to pay you to access your property during one hunting season?

\$ _____ per hunting season



Next page

Background Information

This next set of questions will help us get to know the people we have the privilege of representing. This information will only be used for internal research purposes and will not be shared with anyone. All responses are voluntary and confidential.

(25) In which of the following outdoor activities have you participated in the last 12 months?
(**check all that apply**)

- | | |
|--|---|
| <input type="checkbox"/> Wildlife watching | <input type="checkbox"/> Camping |
| <input type="checkbox"/> Hiking | <input type="checkbox"/> Boating |
| <input type="checkbox"/> Fishing | <input type="checkbox"/> None of the above |
| <input type="checkbox"/> Hunting | <input type="checkbox"/> Other, please specify: _____ |

(26) Do you live in North Carolina?

- Yes (**continue to question 27**)
- No (**please skip to question 28**)



(27) In which county in North Carolina do you live? _____

(28) What is your gender?

- Male
- Female
- Non-binary
- Prefer not to answer

(29) What is the highest level of formal education you have completed? (**check one**)

- Less than a high school graduate
- High school graduate or GED
- Some college or trade school
- Associate or trade school degree
- Bachelor's or four-year degree
- Graduate or professional degree

(30) In what year were you born? _____

(31) Choose one or more race/ethnicities with which you identify (**check all that apply**)

- Hispanic or Latino
- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or other Pacific Islander
- Other

(32) Which of the following best represents your gross household income (before taxes) last year? (**check one**)

- | | |
|---|---|
| <input type="checkbox"/> Prefer not to answer | <input type="checkbox"/> \$60,000 to \$79,999 |
| <input type="checkbox"/> Less than \$20,000 | <input type="checkbox"/> \$80,000 to \$99,999 |
| <input type="checkbox"/> \$20,000 to \$39,999 | <input type="checkbox"/> 100,000 to \$119,999 |
| <input type="checkbox"/> \$40,000 to \$59,999 | <input type="checkbox"/> \$120,000 or more |

Thank you for your participation!

If you would like to be entered into a prize drawing for completing this survey, please provide your email address below.

Email Address: _____

Please use the enclosed postage-paid envelope, or mail this survey to:

**Elk Landowner Survey
N.C. Wildlife Resources Commission
1723 Mail Service Center
Raleigh, NC 27699-1722**

If you have any other comments you would like to share with us, please use the space below.

If you would like to complete the survey over the phone, please contact:

Dr. Cristina Watkins, surveys@ncwildlife.org, 919-707-4002

This survey may also be completed online at:

www.ncwildlife.org/surveys/elk

Or by scanning the QR Code with the camera on your mobile device:



Enter the code provided below to access the survey online:

<<SurveyAccessCode>>