

ARKANSAS

Arkansas Results of the

Wildlife Viewer Survey

Enhancing Relevancy and Engaging Support from a Broader Constituency

Report prepared by:
Christy Pototsky, Emily Sinkular, and Ashley Dayer















ARKANSAS Game and Fish Commission

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH™

WILDLIFE & SPORT FISH RESTORATION

ASSOCIATION of FISH & WILDLIFE AGENCIES

CONTRIBUTING STATE FISH AND WILDLIFE AGENCY REPRESENTATIVES

Arkansas Game and Fish Commission Representative

Kirsten Bartlow, Arkansas Game and Fish Commission

Executive Committee

Shelly Plante, Texas Parks and Wildlife Department
Anne Glick, Florida Fish and Wildlife Conservation Commission
Jerrie Lindsey, Florida Fish and Wildlife Conservation Commission
Deniz Aygen, Idaho Department of Fish and Game
Scott Anderson, North Carolina Wildlife Resources Commission
Brian Moyer, Virginia Department of Wildlife Resources

Steering Committee

Kirsten Bartlow, Arkansas Game and Fish Commission
Mary McCormac, Colorado Parks and Wildlife
Rick Lavender, Georgia Department of Natural Resources
Chris Berens, Kansas Department of Wildlife and Parks
Elizabeth Mabee, Indiana Department of Natural Resources
Cynthia Osmundson, Minnesota Department of Natural Resources
Lori Naumann, Minnesota Department of Natural Resources
Jessica Hoey, Missouri Department of Conservation
Virginia Seamster, New Mexico Department of Game and Fish
Carrie Ruhlman, North Carolina Wildlife Resources Commission
Cristina Watkins, North Carolina Wildlife Resources Commission
Kathryn Jewell, North Carolina Wildlife Resources Commission
Anna Smith, South Carolina Department of Natural Resources
Faren Wolter, formerly of South Dakota Department of Game, Fish, and Parks
Matt Bartley, Utah Division of Wildlife Resources
Kenny Johnson, Utah Division of Wildlife Resources

Acknowledgements

This state report is part of a larger project funded by the U.S. Fish and Wildlife Service's Multistate Conservation Grant Program (grant # F21AP00617-00), which is jointly managed by the Association of Fish and Wildlife Agencies and the Service's Wildlife and Sport Fish Restoration Program. This state-level survey sampling, analysis, and report was funded by the Arkansas Game and Fish Commission.

We thank the 2022 Wildlife Viewing and Nature Tourism Academy in-person and virtual attendees for their participation in the Recommendations Workshop. We thank Patricia Allen for coordination with the Association of Fish and Wildlife Agencies and the U.S. Fish and Wildlife Service. We thank Dr. Jessica Barnes, Kelsey Jennings, and Dr. Willanda Chaves for their contributions to the development of the survey and the regional report that was the foundation for this state report. We also thank Morgan Karns and Jessica Willebeek-LeMair for their assistance with tables and editing.

Note that significant portions of the regional report (Sinkular et al. 2022), in particular in the background and methods, are replicated verbatim in this report. We do so with permission from all of the regional report authors. In addition, the state reports for this project all use a similar template.

Suggested Citation

Pototsky, P.C., Sinkular, E.N., & Dayer, A.A. 2022. Arkansas Results of the Wildlife Viewer Survey: Enhancing Relevancy and Engaging Support from a Broader Constituency. Virginia Tech: Blacksburg, Virginia.

EXECUTIVE SUMMARY

Background

Wildlife viewing (closely observing, photographing, or feeding wildlife, maintaining plantings or natural areas for the benefit of wildlife, or taking trips to parks or other natural areas to feed, photograph, or observe wildlife) is one of the fastest growing wildlife-related recreation activities in the United States (U.S. Fish and Wildlife Service, 2018). As participation in wildlife viewing continues to grow, so do questions about the characteristics of wildlife viewers and their perceptions of state agencies.

Historically, state fish and wildlife agencies (hereafter, state agencies) have depended on hunters and anglers to fund the agencies' conservation efforts, through a system known as the North American Model of Conservation (Price Tack et al., 2018). In this system, state agencies rely heavily on funds derived from sales taxes on certain sporting equipment and receipts from licenses and permits purchased by hunters, anglers, and trappers to support their operations. In recent years, national surveys show a plateau or decline in participation in hunting and angling, while participation in wildlife viewing continues to rapidly grow (U.S. DOI et al., 2016). However, many viewers do not contribute directly to supporting the state agencies responsible for ensuring the sustainability of resources on which their recreational activities depend.

As the number of viewers continues to rise, it is increasingly important that state agencies understand who these wildlife viewers are and their perspectives on and expectations of state agencies and wildlife conservation. Wildlife viewers have the potential to significantly aid state agencies in achieving their conservation goals (AFWA & WMI, 2019) through financial contributions and a range of behaviors. This study of wildlife viewers in Arkansas, one of 15 states that participated in state-level surveying, represents a key step in implementing the strategies outlined in the Fish and Wildlife Relevancy Roadmap (AFWA & WMI, 2019) by providing the Arkansas Game and Fish Commission (hereafter, AGFC) with information and tools to connect with a broader constituency of wildlife viewers.

Methods

To understand wildlife viewers, our Virginia Tech research team collaborated with the Association of Fish and Wildlife Agencies' (AFWA) Wildlife Viewing and Nature Tourism Working Group (WVNTG) to conduct a multi-state survey of wildlife viewers (i.e., the Wildlife Viewer Survey) in 2021, with additional sampling at the state level in 15 states. A Steering and Executive Committee, which consisted of members of the WVNTG and other state agency representatives, worked closely with us throughout the duration of this project. We also

contracted with Qualtrics to conduct an online survey of wildlife viewers in Arkansas, which was administered from October 29-December 15, 2021. Survey respondents were compensated by Qualtrics for their participation in the study. For the 15 states with additional sampling, the survey was adapted to be most applicable to each state. All survey respondents resided in Arkansas for most of the year, were over the age of 18, and reported participating in wildlife viewing (defined as closely observing, photographing, or feeding wildlife, maintaining plantings or habitat for the benefit of wildlife, or taking trips to parks or other natural areas with the purpose of observing, feeding, or photographing wildlife) in the past five years.

The survey questionnaire was informed by the Multi-State Steering and Executive Committees, state agency representatives, and findings from a variety of surveys, including the Virginia Wildlife Recreation Study Report (Grooms et al., 2020), National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (hereafter, National Survey of Wildlife Recreation; U.S. DOI et al., 2016), and a survey conducted by the North American Waterfowl Management Plan (NAWMP) Human Dimensions Working Group (NAWMP, 2021). Respondents answered questions about their wildlife viewing behaviors, identities, preferences, and experience with their state agencies.

To ensure high-quality responses, we incorporated numerous attention check questions and minimum time limits in this survey. We set demographic quotas for survey respondents based on findings from the 2016 National Survey of Wildlife Recreation in an effort to achieve a survey sample that is representative of the wildlife viewing population across Arkansas in terms of age, education level, and gender (U.S. DOI et al., 2016). For this report, we analyzed survey responses by comparing “consumptive viewers” (those who participated in hunting and/or angling–including catch and release–in the past five years) and “nonconsumptive viewers” (those who did not participate in these other recreational activities). Categorizing respondents in this way does involve a number of assumptions; managers and researchers alike historically classified activities such as wildlife viewing as “nonconsumptive” (activities in which participants do not remove resources), and referred to hunters, anglers, and trappers as “consumptive” (activities which do remove resources; Vaske & Roemer, 2013). However, there are numerous negative impacts of nonconsumptive recreation on wildlife, including mortality, calling into question the “no impact” characteristics of wildlife viewing, while some consumptive recreationists do not remove wildlife (i.e., catch and release fishing; Tremblay, 2001). Still, we chose to compare consumptive and nonconsumptive viewers’ responses throughout the report because of the focus of this project on expanding relevancy to a broader constituency for state agencies, particularly for those wildlife viewers who are not already engaged in hunting and angling (two activities traditionally managed by state agencies).

Analysis consisted of chi-square or t-tests conducted in the Statistical Package for Social Science (SPSS).

Findings

In the following subsections, we review findings for the state of Arkansas, which consisted of a statewide descriptive analysis and a consumptive versus nonconsumptive comparative analysis based on 1,005 completed survey responses. Our survey examined demographics, behaviors, frequency, and preferences of viewing activities of wildlife viewers in Arkansas. We also examined Arkansas wildlife viewers' current relationships with and preferences for support from AGFC. Over 60% of our survey respondents were consumptive viewers and less than 40% were nonconsumptive viewers. Overall, we found that consumptive and nonconsumptive viewers are distinctive groups; consumptive and nonconsumptive viewers have different preferences, behaviors, and levels of participation in wildlife viewing. For example, we identified three demographic differences between consumptive and nonconsumptive viewers: age, education level, and residential location. Generally, we can define consumptive viewers as more active, involved, and specialized than nonconsumptive viewers; consumptive viewers participate in wildlife viewing more, spend more on wildlife viewing, and are more broadly active in wildlife viewing and outdoor recreation. We also found that consumptive viewers tended to have higher levels of experience with, familiarity with, and financial contributions (past and future) to AGFC than nonconsumptive viewers.

Wildlife viewer demographics

Around 80% of all respondents identified as solely White, and 20% identified as another race or ethnicity, or some combination. Over half of our respondents reported their total household income as $49,999 or less. Approximately 24% of wildlife viewers surveyed in Arkansas lived in a major city, 26% reported living in a small city, and the remaining 50% reported living in a rural area or small town.

Consumptive and nonconsumptive viewer comparisons

We found no differences in the demographic characteristics of consumptive and nonconsumptive viewers in terms of gender identity, ethnoracial identity, or household income; however, we did find that consumptive viewers were significantly younger than nonconsumptive viewers. In addition, we found a significant difference in the level of educational attainment of consumptive and nonconsumptive viewers, with a higher percentage of nonconsumptive viewers having attained a Bachelor's degree and a higher percentage of consumptive viewers having attained a high school diploma, equivalent, or less. Finally, we

found that there was a difference in the residential location of consumptive and nonconsumptive wildlife viewers, with a higher percentage of nonconsumptive viewers reporting that they reside in an urban area and a higher percentage of consumptive viewers living in rural areas or small towns.

Wildlife viewing behaviors

Viewing interests and activities

Wildlife viewers most commonly participated in wildlife viewing by visiting parks and natural areas with the purpose of observing, feeding, or photographing wildlife. Over three-quarters of wildlife viewers were interested in viewing land mammals and birds. In addition to visiting parks, other locally-managed areas (such as city or county parks, trails, or open spaces), and state-managed areas (such as state parks, forests, boat landings, fishing areas, conservation areas, or Wildlife Management Areas) to view wildlife, most wildlife viewers participated in viewing at their own home. In a typical year, over 60% of the survey respondents reported viewing for 30 days or more per year around their homes.

Impacts of the COVID-19 pandemic on wildlife viewing

Compared to a typical year, participation in wildlife viewing (i.e., the number of days spent viewing) declined during the first year of the COVID-19 pandemic (March 2020-February 2021) for both around-the-home viewing (defined as within one mile of their home) and away-from-home viewing (both within Arkansas and outside of Arkansas). For the "upcoming year" (defined as fall 2021-fall 2022), wildlife viewers anticipated spending an amount of time viewing wildlife that was comparable to a typical year unaffected by the COVID-19 pandemic. We also asked wildlife viewers how the COVID-19 pandemic impacted their overall participation in wildlife viewing and interpreted these findings using "R3" terminology (recruitment, retention, and reactivation) from the Outdoor Recreation Adoption Model. Nearly two-thirds of wildlife viewers were classified as "retained" meaning the pandemic had no impact on their overall participation in wildlife viewing—they were wildlife viewing prior to the COVID-19 pandemic, and continued wildlife viewing during the pandemic. Next, just under one-fifth of wildlife viewers had participated in wildlife viewing prior to the COVID-19 pandemic, but stopped during the pandemic. Over 10% of wildlife viewers were classified as "reactivated," meaning that they had participated in wildlife viewing in the past, were not actively participating when the pandemic began, but resumed participation during or after March 2020. Finally, only

around 5% of wildlife viewers were classified as “recruited”, meaning that they participated in viewing for the first time during the pandemic.

Skill level and support

In terms of expertise as a wildlife viewer, the vast majority of survey respondents self-identified as beginner, novice, or intermediate level viewers rather than advanced or expert. Just over 40% reported having participated in wildlife viewing for roughly more than 20% of their lives. Around 60% of wildlife viewers own (or have rented or borrowed) specialized equipment for viewing in recent years. Family and friends were the strongest type of social support that influenced viewer participation.

Consumptive and nonconsumptive viewer comparisons

Overall, we found that the wildlife viewing behaviors of consumptive and nonconsumptive viewers tended to be different. In comparison to nonconsumptive viewers, more consumptive viewers participated in all forms of wildlife viewing except for feeding wild birds, for which there was no difference in participation. More consumptive viewers were interested in viewing land mammals, reptiles, fish, insects, and amphibians in comparison with nonconsumptive viewers. Nonconsumptive viewers were more likely to report fewer days spent viewing away from home and out of state in a typical year, COVID-19 year, and the upcoming year. There was no difference between consumptive and nonconsumptive viewers for the number of days spent viewing around the home in a typical year, COVID-19 year, or the upcoming year. More consumptive viewers reported viewing on the property of a friend or family member, other privately-owned areas, locally-managed lands, state-managed lands, federally-managed lands, and tribal lands. COVID-19 had no significantly different impact on R3 phases of wildlife viewers between consumptive and nonconsumptive viewers.

In terms of wildlife viewing expertise, we found that more nonconsumptive viewers classified themselves as beginner or novice and more consumptive viewers classified themselves as intermediate or advanced. There was no significant difference in percent of life spent viewing between consumptive and nonconsumptive viewers. Around two-thirds of consumptive viewers have owned, borrowed, or rented specialized equipment for wildlife viewing, whereas only half of nonconsumptive viewers have done so. Finally, we found that nonconsumptive viewers were more likely to report that they felt no social support at all from family, friends, peers, and mentors.

Conservation behaviors

We investigated the likelihood of wildlife viewers in Arkansas participating in a number of conservation-related activities, either generally or with or in support of AGFC. Overall, wildlife viewers most often reported being likely to clean up trash or litter or participate in civic engagement (such as voting or advocating) related to wildlife conservation. They least often reported being likely to collect data on wildlife or habitat to contribute to science or management or to inform or teach others about wildlife conservation. When comparing wildlife viewers' likelihood to engage in conservation behaviors generally or with/in support of the state agency, wildlife viewers expressed similar likelihood of engaging in conservation behaviors in collaboration with the AGFC in comparison to on their own.

Consumptive and nonconsumptive viewer comparisons

When comparing consumptive and nonconsumptive viewers, we found that more consumptive wildlife viewers reported higher levels of likelihood to participate in all conservation behaviors investigated in this report, both generally and in collaboration with AGFC.

Wildlife viewing barriers

We surveyed wildlife viewers in Arkansas about a variety of topics that limited their participation in wildlife viewing. Our results indicate that lack of free time and distance to wildlife viewing locations are the strongest barriers, with more than half of wildlife viewers reporting *somewhat, quite a bit*, or *a great deal* of limitation to their participation. Financial costs and having few people to participate in wildlife viewing with were also common barriers.

We specifically investigated the degree to which wildlife viewers experience accessibility challenges, which were defined as "[t]he difficulties someone experiences interacting with the physical or social environment when engaging in a meaningful activity such as birding. These may be the result of mobility challenges, blindness or low vision, intellectual or developmental disabilities (including Autism), mental illness, being Deaf or Hard of Hearing or other health concerns" (Birdability, 2021). We found that just over one-third of wildlife viewers in Arkansas experienced *somewhat* to *a great deal of* accessibility challenges when participating in wildlife viewing.

Consumptive and nonconsumptive viewer comparisons

There were only three out of 14 barriers with significant differences between consumptive and nonconsumptive viewers. Generally, consumptive viewers were limited to a greater extent than nonconsumptive viewers by lack of free time, lack of organized opportunities for wildlife viewing, and accessibility challenges for themselves or the people they go wildlife viewing with.

Relationships with AGFC

Finally, we explored Arkansan wildlife viewers' familiarity and experiences with, perceptions and trust of, and financial contributions to AGFC.

Familiarity with AGFC

Around two-thirds of wildlife viewers were *moderately*, *very*, or *extremely familiar* with AGFC as a whole and over 90% of survey respondents had seen the AGFC logo before. However, over 60% of wildlife viewers were *not at all familiar* or *slightly familiar* with AGFC staff. Nearly three-quarters of survey respondents in Arkansas reported that they felt the state agency's level of prioritization of programs and services for wildlife viewing was *about right*; just over one-fifth of respondents felt it was *too low* or *far too low*. Survey respondents generally indicated moderate levels of trust in AGFC as an agency and in AGFC staff. Wildlife viewers also scored AGFC moderately, on average, on various facets of trust (capability, benevolence, and integrity).

Experience with AGFC programs and services

Fewer than 40% of survey respondents had not used or engaged in any AGFC programs and services in the last five years. Of the respondents who had utilized at least one program or service from AGFC in the past five years, they most commonly reported utilizing information (about wildlife and wildlife viewing opportunities in the state), nature/education/visitor centers, and lands provided by AGFC. The least used AGFC programs were conservation law enforcement and volunteer opportunities, not related to research or data collection.

Financial contributions to AGFC

Nearly three-quarters of wildlife viewers in Arkansas had made at least one form of a purchase or contribution to AGFC in the past five years. We divided these purchases and contributions into nonvoluntary mechanisms (e.g., fees, licenses, and required habitat or conservation

stamps) and voluntary mechanisms (e.g., donations and voluntarily purchased habitat or conservation stamps). Overall, AGFC fishing licenses were the most commonly purchased item of both nonvoluntary and voluntary purchases or contributions. Tangible products (such as books, maps, and other merchandise) from AGFC were the most commonly purchased voluntary item. We also examined the likelihood of wildlife viewers to contribute via voluntary and nonvoluntary funding mechanisms in the future. Over half to over two-thirds of survey respondents in Arkansas indicated that they were *moderately, very, or extremely likely* to purchase a fishing license or a AGFC lands access pass, permit, or entrance fee in the next five years. Over half of wildlife viewers indicated that they were *moderately*, *very*, or *extremely likely* to purchase tangible products from AGFC in the next five years. This list included items that are currently not available from AGFC. For example, over half of wildlife viewers also indicated that they were *moderately*, *very*, or *extremely likely* to purchase a lottery ticket for which the proceeds go to habitat conservation in the next five years, if they had the opportunity to do so. Additionally, we found that over 60% of wildlife viewers were *moderately*, *very*, or *extremely likely* to increase their contributions to AGFC if they knew their funds would be used to support conservation of the types of wildlife they like to view or conservation of rare and vulnerable species.

Viewing support preferences

To better support wildlife viewers' participation, the most respondents reported that AGFC can provide viewers with more information about wildlife in Arkansas, more information about where to go to see wildlife, and access to more places to view wildlife. Finally, we found that the most preferred channels of state agency communication for wildlife viewers in Arkansas were the AGFC website, printed materials (such as brochures and maps), email updates or e-newsletters.

Consumptive and nonconsumptive viewer comparisons

Broadly, we found that consumptive and nonconsumptive viewers have very different perceptions of and experiences with AGFC. Overall, consumptive viewers were considerably more familiar with and had stronger relationships with AGFC in terms of: utilization of AGFC programs, past and future contributions to AGFC, and interest in receiving wildlife viewing support from AGFC.

In contrast, nonconsumptive viewers were far less familiar with all aspects of AGFC. For example, nonconsumptive viewers were more likely to be *not at all familiar* with state agency

lands, programs, staff, and mission than consumptive viewers. Indeed, nearly half of nonconsumptive viewers were *not at all familiar* with AGFC staff.

In addition, 95% of consumptive viewers had seen the AGFC logo before, in comparison to 89% of nonconsumptive viewers. Although we did find statistically significant differences in most of our measures of trust in AGFC between consumptive and nonconsumptive viewers, these differences are not necessarily practically significant for management (as both groups still fell near the same level on the scales). Importantly, both consumptive and nonconsumptive viewers have similar, moderate levels of trust in the state agency.

The most sweeping differences between consumptive and nonconsumptive viewers were in their experiences with AGFC programs and financial contributions to AGFC. While half of nonconsumptive viewers had not participated in or used any AGFC programs and services in the last five years, only less than one-third of consumptive viewers indicated they had not taken part in or used the programs or services. More consumptive viewers had participated in more of the listed programs and services in comparison to nonconsumptive viewers, with the exception of volunteer opportunities, not related to research or data collection. Consumptive viewers most commonly contributed via the purchase of a fishing license, whereas nonconsumptive viewers most commonly had not contributed via any funding mechanism in the past five years. In addition, for past purchases and contributions, more consumptive viewers had contributed via all nonvoluntary and voluntary funding mechanisms. Furthermore, for all nonvoluntary and voluntary funding mechanisms, over half of nonconsumptive viewers reported being *not at all likely* or only *slightly likely* to make any purchases or contributions in the next five years.

We also found that, in general, more consumptive viewers were interested in receiving further support from AGFC for their wildlife viewing activities. Both consumptive and nonconsumptive viewers were interested in more information about wildlife in Arkansas, information about where to go to see wildlife, and access to more places to go wildlife viewing.

Conclusions

The Arkansas results of the Wildlife Viewer Survey provide a profile of wildlife viewers that can be utilized by AGFC to overcome barriers to broader relevance, public engagement, and support as called for in the Roadmap to Relevancy (AFWA & WMI, 2019). Our profile includes what viewers like to participate in, how they view and trust state agencies, what services and programs they want agencies to provide, how they most like to support conservation through action or funding, and more.

As AGFC aims to better engage wildlife viewers in Arkansas, we recommend three general needs to establish a lasting and equitable relationship: 1) provide more wildlife viewing information and access, 2) promote around-the-home viewing opportunities, and 3) develop social support networks for wildlife viewers. If interested in achieving broader relevancy, we recommend that AGFC focus their engagement efforts on wildlife viewers who do not hunt or fish. Support for this currently underserved group might include resources for birding, around-the-home viewing, and information on wildlife viewing tailored for beginners. This strategy will additionally serve the established constituency of hunters and anglers that also view wildlife. Finally, we recommend the development of wildlife viewer-specific AGFC contribution mechanisms, with an emphasis on appealing to wildlife viewers who do not hunt or fish. An initial strategy is developing a wildlife viewing membership or other program that uses gathered funds for species conservation or further wildlife viewing opportunities.

The following report details the methodology, findings, and conclusions from analyses of Arkansas data from the Wildlife Viewer Survey. Accompanying Appendices contain the survey instrument and supplemental results tables.

TABLE OF CONTENTS

CONTRIBUTING STATE FISH AND WILDLIFE AGENCY REPRESENTATIVES 2
Arkansas Game and Fish Commission Representative 2
Executive Committee 2
Steering Committee 2
Acknowledgements 3
Suggested Citation 3
EXECUTIVE SUMMARY 4
Background 4
Methods 4
Findings 6
Wildlife viewer demographics 6
Consumptive and nonconsumptive viewer comparisons 6
Wildlife viewing behaviors 7
Viewing interests and activities 7
Impacts of the COVID-19 pandemic on wildlife viewing 7
Skill level and support 8
Consumptive and nonconsumptive viewer comparisons 8
Conservation behaviors 9
Consumptive and nonconsumptive viewer comparisons 9
Wildlife viewing barriers 9
Consumptive and nonconsumptive viewer comparisons 10
Relationships with AGFC 10
Familiarity with AGFC 10
Experience with AGFC programs and services 10
Financial contributions to AGFC 10
Viewing support preferences 11
Consumptive and nonconsumptive viewer comparisons 11

Conclusions 12
TABLE OF CONTENTS 14
BACKGROUND 22
Introduction 22
Wildlife Viewers 22
Project Background 24
About this Report 25
METHODS 26
Survey Instrument 26
Survey Sampling and Administration 27
Figure 1: Map of state-level sampling 27
Eligibility 28
Data Quality 29
Data Analysis 29
RESULTS 31
Survey response 31
Survey Quota: Age 31
Figure 2: Respondent age 32
Survey Quota: Gender 32
Figure 3: Respondent gender identity 33
Survey Quota: Education 33
Figure 4: Respondent educational attainment 34
Demographics 34
Race and ethnicity 34
Figure 5: Respondent ethnoracial identity 36
Household income 37
Figure 6: Respondent household income 38
Residential location 38
Figure 7: Respondent self-reported size of residential area 39

Wildlife viewing behaviors 39
Forms of wildlife viewing 39
Figure 8: Forms of wildlife viewing 41
Types of wildlife 41
Figure 9: Interest in types of wildlife for wildlife viewing 43
Recreational specialization of wildlife viewers 43
Affective specialization: Centrality 44
Figure 10: Centrality of wildlife viewing 45
Behavioral specialization: Equipment and years spent viewing 45
Figure 11: Owning, renting, or borrowing specialized equipment for wildlife viewing 46
Figure 12: Estimated percentage of life spent viewing 47
Cognitive specialization: Skill level 47
Figure 13: Respondents' self-rate wildlife viewing skill level 48
COVID-19 impacts on wildlife viewing participation and the R3 Framework 48
Figure 14: COVID-19 impact on wildlife viewing as R3 50
Time spent wildlife viewing 50
Figure 15: Days spent viewing around the home in a typical year 52
Figure 16: Days spent viewing away from home in a typical year 53
Figure 17: Days spent viewing out of state or U.S. in a typical year 54
Figure 18: Days spent viewing around the home in first year of COVID-19 pandemic 56
Figure 19: Days spent viewing away from home in first year of COVID-19 pandemic 57
Figure 20: Days spent viewing out of state or U.S. in first year of COVID-19 pandemic 58
Figure 21: Days anticipated spent viewing around the home in the upcoming year 60
Figure 22: Days anticipated spent viewing away from home in the upcoming year 61
Figure 23: Days anticipated spent viewing out of state or U.S. in the upcoming year 62
Wildlife viewing location 63
Figure 24: Wildlife viewing locations 64
Wildlife viewing-related expenditures 64
Figure 25: Trip-related wildlife viewing expenditures 66

Figure 26: Other wildlife viewing-related expenditures 68
Other outdoor recreation 69
Figure 27: Other outdoor recreation activities 70
Conservation behaviors 71
Figure 28: Likelihood of participating in conservation behaviors, statewide sample 72
Figure 29: Likelihood of participating in conservation behaviors, consumptive respondents 73
Figure 30: Likelihood of participating in conservation behaviors, nonconsumptive respondents 74
Figure 31: Likelihood of participating in conservation behaviors with or in support of state agency, statewide sample 75
Figure 32: Likelihood of participating in conservation behaviors with or in support of state agency, consumptive respondents 76
Figure 33: Likelihood of participating in conservation behaviors with or in support of state agency, nonconsumptive respondents 77
Barriers to wildlife viewing 77
Figure 34: Barriers to wildlife viewing, statewide sample 79
Figure 35: Barriers to wildlife viewing, consumptive respondents 80
Figure 36: Barriers to wildlife viewing, nonconsumptive respondents 81
Groups that encourage participation in wildlife viewing 81
Figure 37: Groups that encourage viewing, statewide sample 82
Figure 38: Groups that encourage viewing, consumptive respondents 83
Figure 39: Groups that encourage viewing, nonconsumptive respondents 84
Accessibility and wildlife viewing 84
Figure 40: Accessibility challenges and wildlife viewing, all respondents 85
Familiarity 85
Figure 41: Familiarity with AGFC, all respondents 86
Figure 42: Familiarity with different aspects of AGFC, statewide sample 87
Figure 43: Familiarity with different aspects of AGFC, consumptive respondents 88
Figure 44: Familiarity with different aspects of AGFC, nonconsumptive respondents 89
Figure 45: AGFC Logo recognition, all respondents 90

Perception of state agency prioritization of programs and services for wildlife viewing 90
Figure 46: Perception of AGFC prioritization of programs and services for wildlife viewing, all respondents 92
Experiences with state agency programs and services 92
Figure 47: Experience with AGFC programs and services, all respondents 93
Programs and services for children and youth 94
Figure 48: Experience with programs and services for youth, all respondents 95
Trust 95
Figure 49: Mean trust in AGFC, all respondents 97
Figure 50: Mean trust in AGFC staff, all respondents 98
Figure 51: Gefen capability score, all respondents 100
Figure 52: Gefen benevolence score, all respondents 101
Figure 53: Gefen integrity score, all respondents 102
Past purchases and contributions 102
Figure 54: Past nonvoluntary financial contributions to AGFC, all respondents 104
Figure 55: Past voluntary contributions to AGFC, all respondents 105
Lifetime hunting and fishing licenses 105
Figure 56: Lifetime hunting and fishing license, all respondents 106
Future purchases and contributions 106
Figure 57: Likelihood of future nonvoluntary contributions, statewide sample 108
Figure 58: Likelihood of future nonvoluntary contributions, consumptive respondents 109
Figure 59: Likelihood of future nonvoluntary contributions, nonconsumptive respondents 110
Figure 60: Likelihood of future voluntary contributions, statewide sample 111
Figure 61: Likelihood of future voluntary contributions, consumptive respondents 112
Figure 62: Likelihood of future voluntary contributions, nonconsumptive respondents 113
Encouraging additional financial support 113
Figure 63: Encouraging additional support, statewide sample 114

Figure 64: Encouraging additional support, consumptive respondents 115
Figure 65: Encouraging additional support, nonconsumptive respondents 116
State agency support for wildlife viewing 116
Figure 66: AGFC support for wildlife viewing, all respondents 118
Preferred communication 119
Figure 67: Preferred communication from AGFC, all respondents 120
DISCUSSION AND CONCLUSION 121
Supporting wildlife viewers in Arkansas 121
Provide wildlife viewing information and access 121
Promote around-the-home viewing opportunities 122
Develop social support networks for wildlife viewers 122
Broadening relevance to wildlife viewers who do not hunt or fish 123
Benefits to current constituents who also view wildlife 123
Developing financial contribution opportunities for wildlife viewers 124
Engaging wildlife viewers who do not hunt or fish in funding conservation 124
Conclusion 125
REFERENCES 126
APPENDIX A. Survey Instrument 132
APPENDIX B. Reverse coded items and attention checks 170
APPENDIX C. Tables Appendix 173
Table 1. Age (survey quota) 173
Table 2. Gender (survey quota) 174
Table 3. Education (survey quota) 175
Table 4. Race and ethnicity (for descriptive analysis) 176
Table 5. Race and ethnicity (for statistical analysis) 177
Table 6. Household income 178
Table 7. Residential location 179
Table 8. Forms of wildlife viewing 180
Table 9. Types of wildlife 181

Table 10. Affective specialization: Centrality scale 182
Table 11. Behavioral specialization: specialized equipment 183
Table 12. Behavioral specialization: years viewing 184
Table 13. Behavioral specialization: experience as percentage of life spent viewing 185
Table 14. Cognitive specialization: self-rated level of expertise 186
Table 15. COVID-19 impacts on wildlife viewing participation and the R3 Framework 187
Table 16. Time spent wildlife viewing (Statewide) 188
Table 17. Time spent wildlife viewing: Consumptive and nonconsumptive 189
Table 18. Wildlife viewing location 190
Table 19. Wildlife viewing trip-related expenditures 191
Table 20. Other wildlife viewing-related expenditures 192
Table 21. Other outdoor recreation 193
Table 22. Conservation behaviors (general; statewide) 195
Table 23. Conservation behaviors (General; consumptive-nonconsumptive) 196
Table 24. Conservation behaviors (With agency support; statewide) 197
Table 25. Conservation behaviors (With agency support; consumptive-nonconsumptive) 198
Table 26. Barriers to wildlife viewing (Statewide) 199
Table 27. Barriers to wildlife viewing (Consumptive-nonconsumptive) 200
Table 28. Groups that encourage participation in wildlife viewing (Family) 202
Table 29. Groups that encourage participation in wildlife viewing (Friends) 203
Table 30. Groups that encourage participation in wildlife viewing (Mentors) 204
Table 31. Groups that encourage participation in wildlife viewing (Peers) 205
Table 32. Accessibility and wildlife viewing 206
Table 33. Basic agency familiarity 207
Table 34. Familiarity with specific state agency characteristics (AGFC staff) 208
Table 35. Familiarity with specific state agency characteristics (AGFC programs) 209
Table 36. Familiarity with specific state agency characteristics (AGFC lands) 210
Table 37. Familiarity with specific state agency characteristics (AGFC mission) 211
Table 38. Logo familiarity 212

Table 39. Perception of state agency prioritization of programs and services for wildlife viewing 213
Table 40. Experiences with state agency programs 214
Table 41. Programs and services for children and youth 215
Table 42. Measures of trust in AGFC 216
Table 43. Past purchases and contributions (nonvoluntary and voluntary) 217
Table 44. Lifetime fishing or hunting license purchases 219
Table 45. Future purchases and contributions (Statewide) 220
Table 46. Future purchases and contributions (Consumptive-nonconsumptive) 221
Table 47. Encouraging additional financial support (Statewide) 223
Table 48. Encouraging additional financial support (Consumptive-nonconsumptive) 224
Table 49. State agency support for wildlife viewing 225
Table 50. Preferred AGFC communication methods 227

BACKGROUND

Introduction

Across the United States, state fish and wildlife agencies (hereafter, state agencies) are key players in the conservation of wildlife and their habitats (AFWA, 2017). State agencies have legal authority and responsibility to steward wildlife resources as a public trust, in the interest of all current and future members of the public (Organ et al., 2012). To that end, the 50 state agencies manage public lands and waterways, provide technical support for conservation on private lands, conduct wildlife research and monitoring, and govern wildlife harvests and wildlife-associated recreation, among other activities (Organ et al., 2012; AFWA, 2017). Since their inception, the work of many state agencies has been largely funded through the sale of hunting and fishing licenses, boating and shooting permits, and taxes on recreation equipment under a user-pay user-benefit model (Organ et al., 2012). However, a shifting user-base and cultural conditions call for re-examining and possibly revising this model. In particular, declines or stagnation in hunting and angling among an increasingly urbanized population have made it clear that the sustainability of state agencies and their contributions to wildlife conservation is contingent on expanding and diversifying the financial and political support provided by the public (U.S. DOI et al., 2016; AFWA & WMI, 2019). Specifically, agencies face the challenge of maintaining their current supporters while increasing their relevance to and engagement with new and broader constituencies (AFWA & WMI, 2019). These broader constituencies include people in diverse demographic, social, and geographic groups. In addition, this includes recreationists who are invested in wildlife and the outdoors, but may have values, interests, and behaviors that differ from those of the hunting and angling communities that have traditionally been the target audience for agencies (AFWA & WMI, 2019). Central among these nontraditional recreation groups are people who participate in wildlife viewing, one of the fastest growing outdoor recreation activities in the United States (U.S. DOI et al., 2016).

Wildlife Viewers

Wildlife viewing is a broad category of wildlife-associated recreation that includes intentionally observing, photographing, or feeding wildlife, improving or maintaining wildlife habitats, and visiting parks and natural areas for the primary purpose of wildlife viewing (U.S. DOI et al., 2016). As of 2016, over a third of U.S. adults participate in various forms of wildlife viewing, including 14.3 million additional wildlife viewers reported since 2011 (U.S. DOI et al., 2016). From 2011 to 2016, the number of U.S. adults participating in wildlife viewing increased by 14.3 million, or an increase in participation to over one-third of the adult population. Viewers spend nearly $76 billion on their viewing activities annually, including $170 million in access fees for public lands (U.S. DOI et al., 2016). Specifically, in Arkansas, the 2011 National Survey of

Hunting, Fishing, and Wildlife-Associated Recreation (hereafter, National Survey of Wildlife Recreation) estimated 852,000 adult wildlife-watching participants in Arkansas. In 2011, wildlife viewers spent $216 million on wildlife-watching activities in Arkansas (U.S. DOI et al., 2011).

Birdwatchers and other viewers also directly contribute funds to wildlife and habitat conservation (Fulton et al., 2017). A study in New York State found that people who bird (including those who both hunt and bird) are more likely than non-recreationists and hunters to donate to conservation (Cooper et al., 2015). They are also more likely to participate in pro-environmental behaviors such as conducting habitat enhancement, joining environmental groups, and supporting conservation policy (Cooper et al., 2015). Similar patterns have been seen in Virginia, where recreationists who identify as birders or other viewers (alone or in addition to identifying as hunters and anglers) engage in a range of conservation activities more often than those who only hunt or fish (Grooms et al., 2020). Additionally, wildlife viewing is a means of connecting people to nature and garnering general support for wildlife conservation (Kellert et al., 2017). Wildlife viewers are thus a critical constituency for state fish and wildlife agencies, especially given stable or declining rates of participation in hunting and angling over the past decade (U.S. DOI et al., 2016) and the ongoing need to generate broader support for agency efforts. However, viewers' direct support of wildlife agencies is currently limited. In part, this limited support is due to a lack of dedicated funding streams for wildlife viewers that would parallel the licenses, permits, and excise taxes that connect hunters and anglers to state agencies (Organ et al., 2012). Limited financial support from viewers may also be due to their perceptions that agencies serve them less than hunters and anglers (Grooms et al., 2019). Additionally, birders and other viewers tend to have lower levels of trust in state and federal agencies, relative to other entities (Fulton et al., 2017) and in comparison with hunters and anglers (Grooms et al., 2020).

While wildlife viewers undoubtedly benefit from the work of state agencies through activities such as habitat management and research, as well as established wildlife viewing programs that serve viewers directly, agency relationships with this emerging constituency are still relatively new in some states. The Fish and Wildlife Relevancy Roadmap (hereafter, Relevancy Roadmap) developed by the Association of Fish and Wildlife Agencies (AFWA) and Wildlife Management Institute (WMI) in 2019 identified limited capacity to understand and plan for engagement with new groups as key barriers in the ability of agencies to broaden their public support and serve diverse constituencies (AFWA & WMI 2019). The Relevancy Roadmap articulates a need for "increase[d] acquisition and application of social science information" to address these barriers with "science that is as robust and comprehensive as the ecological information relied upon in the past" (AFWA & WMI, 2019, p. 11). Indeed, important insights about wildlife viewer behaviors and their relationships with agencies have emerged from social science surveys at

both state (e.g., Cooper et al., 2015; Grooms et al., 2020) and national levels (e.g., U.S. DOI et al., 2016; Fulton et al., 2017; NAWMP, 2021). (For a review of the current literature on wildlife viewing, see Sinkular et al., 2021) Nonetheless, key knowledge gaps remain about the activities, experiences, perceptions, needs, and preferences of wildlife viewers across the country–critical information for agencies to become more inclusive of and relevant to wildlife viewers, fulfill their missions and public trust directives, and sustainably advance fish and wildlife conservation for generations to come.

Project Background

A 2021 Multistate Conservation Grant Program (MSCGP) grant was awarded to the Association of Fish and Wildlife Agencies' (AFWA) Education, Outreach & Diversity (EOD) Committee - Wildlife Viewing and Nature Tourism (WVNT) Working Group and Virginia Tech to address barriers to the relevancy and inclusivity of state agencies for wildlife viewers. The project included a synthesis of current literature on the behaviors, interests, experiences, and preferences of wildlife viewers (Sinkular et al., 2021); a national-scale web-based survey (*n* = 4,030) that built upon previous research to deepen understanding of wildlife viewers across all four AFWA regions (West, Midwest, Northeast, and Southeast); and recommendations for improved engagement between state agencies and wildlife viewers, co-produced by the research team and staff from state agencies across the country. State agencies were offered the opportunity to opt in to additional survey data collection and analysis within their state in addition to the regional-level survey data and analysis. State-level sampling provided states with the unique opportunity to have results specific to the wildlife viewing constituencies in their state.

A six-member Executive Committee and a 16-member Steering Committee were established to guide implementation of the project by the Virginia Tech team. The Executive Committee, which included the Chair of the WVNT Working Group and other MSCGP proposal co-authors from five state agencies, provided big-picture, strategic guidance for the project and was also responsible for final decisions on a number of fine-scale details in survey design and administration. The Steering Committee, which included human dimensions, wildlife viewing, and nongame wildlife staff from 11 additional state agencies, participated in routine project meetings, liaised with others in their agencies related to the project, and provided feedback to ensure that the survey would be relevant to wildlife viewers and produce data that meet the needs of state agencies. Each of the states that participated in the state-level surveys participated in the Steering Committee. In doing so, they provided feedback on the design of the survey instrument and the state sampling approach.

About this Report

This report presents analysis of data from the Wildlife Viewer Survey (hereafter, Survey) for the state of Arkansas and concludes with evidence-based communications and engagement strategies that the Arkansas Game and Fish Commission (hereafter, AGFC) can implement to increase their relevance to wildlife viewers and the participation of wildlife viewers in activities that support agencies' conservation goals. The results and conclusions contained in this report contribute to the implementation of multiple strategies of the Relevancy Roadmap by identifying opportunities to enhance the relevancy of state fish and wildlife agencies to wildlife viewers, particularly those who are not already engaged in hunting and angling, avenues for building partnerships with viewers to support implementation of state conservation plans, and potential strategies for engaging viewers in conservation funding mechanisms (AFWA & WMI, 2019).

METHODS

Survey Instrument

Building upon other national and state-specific survey efforts of wildlife recreationists and based on input from the Steering Committee and state agency representatives, we first developed the regional survey instrument, which consisted of 117 closed-ended questions about wildlife viewers' recreation and conservation behaviors and relationships with their state wildlife agencies. Initially, the state survey was administered to 125 respondents in the state.

After completing the regional survey, we adapted it for the state of Arkansas through the addition of survey items about familiarity with AGFC, as well as the removal of survey options which were not applicable to the state for survey items about past behavior (see Appendix A for full survey instrument). For all questions which directly relate to the role of the state wildlife agency, AGFC was directly named.

Survey questions covered wildlife viewers':

- Duration, location, and frequency of participation in wildlife viewing
- Participation in other forms of outdoor recreation
- Level of specialization as a wildlife viewer
- Travel- and equipment-related expenditures for wildlife viewing
- Barriers to and social support for participating in wildlife viewing
- Likelihood of participating in conservation behaviors
- Pattern of participation in wildlife viewing during the COVID-19 pandemic
- Familiarity with, perceptions of, and trust in the state agency
- Experience with agency programs and services
- Past financial contributions to state wildlife agencies
- Likelihood to support agencies financially and through conservation behaviors in the future
- Preferred forms of viewing support and communications from the state agency
- Demographic characteristics

To aid in respondent recall, survey questions about behaviors are usually asked with reference to a distinct period of time (e.g., the past year) (Vaske, 2019, Chapter 4). Due to the impact of the COVID-19 pandemic during the survey administration period and the desire to provide state agencies with information from a less unusual time, we instead asked respondents to reflect on "a typical year," which we defined in the survey instrument as "a recent year (within the last ~5 years) that was not impacted by unusual circumstances like the COVID-19 pandemic."

Survey Sampling and Administration

State-level surveys were administered entirely online from October 29-December 15, 2021. All potential survey respondents were identified and recruited through a survey panel administered by Qualtrics, and participants completed the online survey through the Qualtrics platform. When conducted with appropriate methodological decisions, panel surveys have shown to be a valuable tool for conducting online social science research (Wardropper et al., 2021). Panel surveys are a form of internet surveys that consist of sampling respondents from an online group, or panel, and usually provide a small compensation. Attention checks, or quality assurance items (Czeisler et al., 2020), and time limits based on a fraction of the median completion time from pilot samples (Miller et al., 2020), are two tools utilized to increase the quality of response gathered in panel research.

The survey was administered to separate samples in 15 states, with a goal of 1,000 respondents from each state, although Qualtrics provided lower estimates of respondents for several states, the lowest of which being Idaho, with a goal of only 500 respondents (Figure 1).

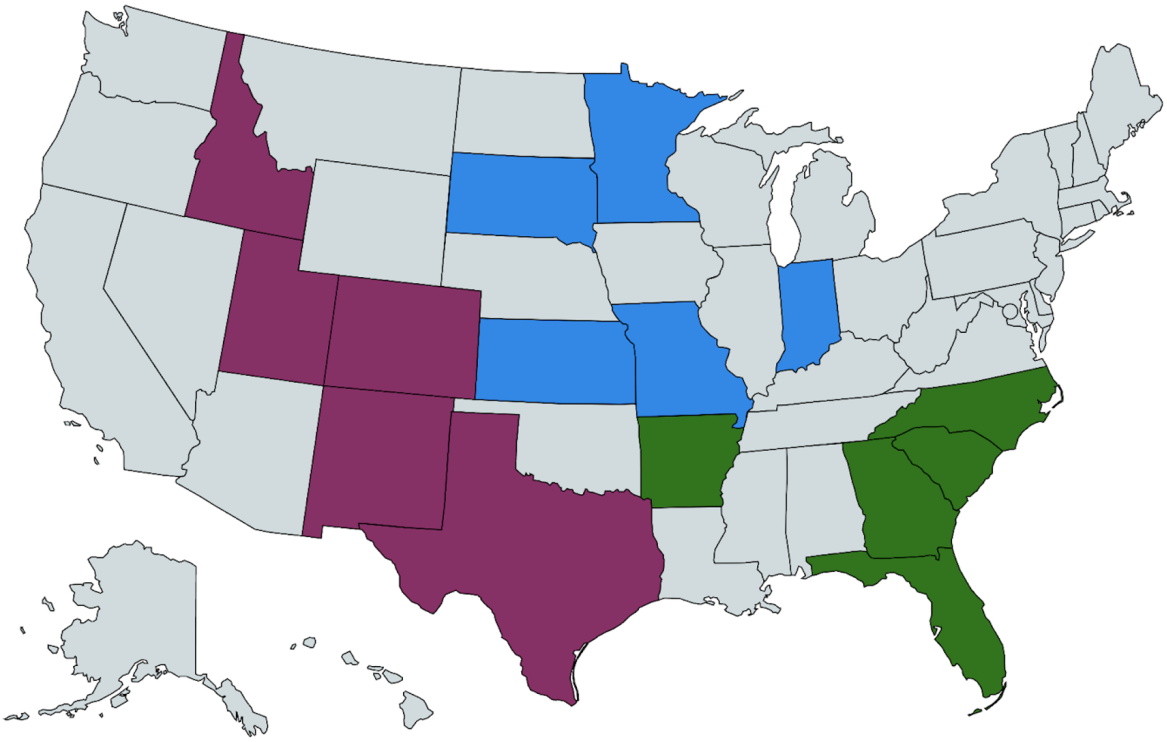


Figure 1: Map of state-level sampling

Map of the United States showing the 15 states that participated in state-level sampling for the Wildlife Viewer Survey. Participating states are colored according to their AFWA region assigned in the regional Wildlife Viewer Survey report (Sinkular et al., 2022).

Eligibility

Respondents were asked to indicate consent to participate in the study at the very beginning of the online survey instrument. Initial survey questions then screened for participant eligibility to participate in the study based on their 1) involvement in wildlife viewing; 2) state of residence; and 3) demographic characteristics such as age, gender, and education level.

Only individuals who had participated in some form of wildlife viewing in the past five years were able to complete the survey. This study did not examine traits of non-wildlife viewers. The survey provided a definition of both "wildlife" and "wildlife viewing" to ensure the inclusion of a broad range of people who participate in various forms of wildlife viewing and the exclusion of those who only observe wildlife incidentally during other outdoor activities. The following definitions were adapted from the 2016 National Survey of Wildlife Recreation (U.S. DOI et al., 2016):

> For this survey, wildlife refers to all animals, such as birds, fish, insects, mammals, amphibians, and reptiles, that are living in natural environments, including in urban and semi-urban places. Wildlife does not include animals living in artificial or captive environments, such as aquariums, zoos, or museums, or domestic animals such as farm animals or pets.
>
> Wildlife viewing refers to intentionally observing, photographing, or feeding wildlife; improving or maintaining wildlife habitat; or visiting parks and natural areas for the primary purpose of wildlife viewing. Wildlife viewing does not include simply noticing wildlife while doing something else, such as gardening, exercising, hunting, or fishing, or intentionally scouting for game.

Participant eligibility was also determined by three broad demographic quotas set to ensure a representative sample of wildlife viewers, while also ensuring we would be able to meet targets for the number of respondents. In our state-level surveys, we set quotas for respondent gender, age, and education based on national-level results of the National Survey of Wildlife Recreation, with some changes to accommodate for lower sample sizes (U.S. DOI et al., 2016). First, we required that each state sample consist of no more than 74% male or 51% female. For the age quota, we defined three broad categories by combining the smaller categories used in the National Survey of Wildlife Recreation (U.S. DOI et al., 2016). We required that no more than 28% and no less than 17% of respondents be between 18 and 34 years old, no more than 41% be between 35 and 54 years old, and no more than 56% be 55 years old or older. Unlike the National Survey of Wildlife Recreation, we did not survey individuals under 18 years of age. Finally, while the National Survey of Wildlife Recreation classified respondent educational

attainment in terms of the number of years of education (e.g., "11 years or less", "12 years", and "1 to 3 years of college"), we set quotas based on degree attainment, consistent with Qualtrics' standard survey methodology for panels, as well as other surveys of wildlife viewers (NAWMP, 2021). For state reports, we required that no more than 48% of respondents have completed a bachelor's or graduate degree.

Data Quality

We implemented a number of measures to maximize the quality of the data generated through the Qualtrics panel, including attention checks and a minimum completion time (following best practices for using survey panels, as described in Wardropper et al., 2021). The survey instrument contained two different kinds of attention checks. First, there were five sets of statements in the survey that were worded as opposites of each other (e.g., "Wildlife viewing has a central role in my life" and "Wildlife viewing is not an important part of my life"). Inconsistent responses to these statements indicated that a respondent may be taking the survey without being thoughtful. For the second kind of attention check, we identified combinations of responses that suggested the respondent was providing bad data (e.g., if a respondent indicated that they participate in "photographing or taking pictures of wildlife" in one question and in a later question responded that they are "not interested in observing, photographing, or feeding wildlife"). Respondents who failed any two attention checks in the survey were eliminated from the final sample (see Appendix B for a full list of attention checks). Finally, we also established a minimum survey completion time in order to remove respondents from the sample that completed the survey so quickly that their responses were unlikely to have been genuine. The minimum completion time was set at 6.35 minutes (or 381 seconds), which was the longest survey duration for the fastest quintile of the 101 respondents in the Qualtrics pilot test of the regional survey.

Data Analysis

In this report, we generally present response frequencies for each survey question from wildlife viewers across the entire state, referred to throughout the report as the "statewide sample", as well as separate response frequencies for "consumptive" and "nonconsumptive" wildlife viewers. Theoretical and applied frameworks both characterize wildlife recreation activities and recreationists by so-called "consumptive" and "nonconsumptive" definitions, based on their use of and impact on wildlife (Tremblay, 2001; Vaske & Roemer, 2013). Within this definition, consumptive activities, such as hunting, fishing, and trapping, generally result in the harvest or catching of species from their habitat, while nonconsumptive activities, such as hiking, birdwatching, and other forms of wildlife viewing, do not (Duffus & Deardon, 1990). We recognize the assignment of recreational activities into these categories is not clear-cut, as

activities traditionally deemed nonconsumptive can also result in substantial negative impacts on wildlife, including mortality (Green & Higginbottom, 2000). In addition, activities traditionally deemed as consumptive do not always necessarily result in the removal of wildlife (i.e., catch-and-release fishing). Still, we compare consumptive and nonconsumptive viewers' responses throughout the report because of the focus of this project on expanding relevancy to a broader constituency for state agencies. Consumptive wildlife viewers were defined as those who participated in either (or both) hunting and angling as additional forms of outdoor recreation during the past five years. Nonconsumptive wildlife viewers were those without this experience. It is important to note that, due to missing data within the question for which the consumptive and nonconsumptive wildlife viewers were defined, the sample size for the statewide (*n* = 1,005) sample and the consumptive-nonconsumptive sample are slightly different (*n* = 1,003). This difference is visually represented in most figures with hatching on the statewide sample bars or noted in figure captions. We used the Statistical Package for Social Science (SPSS) to produce descriptive statistics for survey questions and to conduct inferential statistical tests (i.e., t-test, chi-square, or ANOVA) to explore differences across consumptive and nonconsumptive wildlife viewers. We considered differences statistically significant with a *p* value of .05 or lower. Results from these tests are described in the Results section and also included in Appendix C.

RESULTS

Survey response

The Wildlife Viewer Survey for the state of Arkansas was initiated by 1,317 panel participants and completed by 1,005 wildlife viewers. A total of 312 potential participants were considered ineligible because they did not complete the survey, did not consent to participate in the study, were under 18 years of age, had not participated in any of the included forms of wildlife viewing in the past five years, failed two attention checks, or completed the survey too quickly. The three demographic quotas that were set (see Methods) were achieved.

Out of 1,005 wildlife viewers, 61% of our sample could be classified as consumptive viewers, meaning that, in addition to wildlife viewing, they reported participating in hunting or fishing in the past five years. Specifically, 31% of wildlife viewers in Arkansas also fish, 4.0% also hunt, and 26% both hunt and fish. So, 39% of our sample were classified as nonconsumptive viewers, meaning that they did not report participation in hunting or fishing in the past five years.

Survey Quota: Age

We asked respondents to indicate their birth year, with options ranging from 1920 to "After 2003" (i.e., most recent age eligible). Respondents who indicated they were born in 2003 were then asked a follow-up question, "Are you 18 years of age?", in order to account for those who had not yet turned 18 at the time of survey completion.

The reported ages of all respondents in Arkansas ranged from 18 to 93 (Mean [*M*] = 48, Standard Deviation [*SD*] = 17). Consistent with our established quota, 25% of respondents were between the ages of 18 and 34, 36% were between the ages of 35 and 54, and 39% of respondents were over the age of 55. A t-test indicated that the mean age of consumptive wildlife viewers (*M* = 45, *SD* = 16) was significantly lower (by six years) than the mean age of nonconsumptive wildlife viewers (*M* = 51, *SD* = 18; $t = 4.84$, $df = 770$, $p < .001$; Table 1; Figure 2).

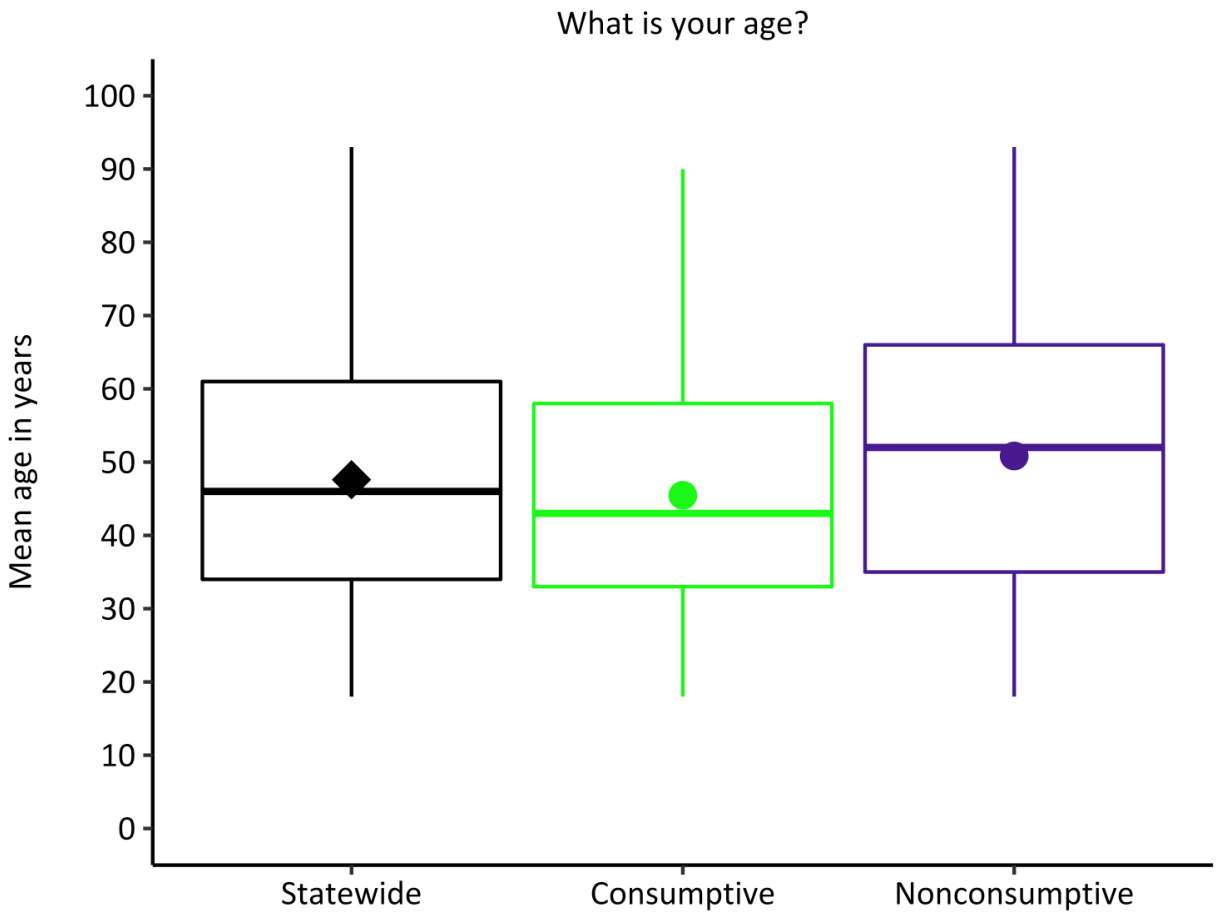


Figure 2: Respondent age

Boxplots (median and interquartile ranges within the boxes) showing the differences in the age of wildlife viewers in Arkansas across the state (statewide) and for consumptive and nonconsumptive viewers. Points represent the mean age (diamond for statewide group, circles for consumptive and nonconsumptive groups) and whiskers represent the minimum and maximum values for the dataset. A t-test indicated that the mean age of consumptive wildlife viewers was significantly lower than the mean age of nonconsumptive wildlife viewers (Table 1).

Survey Quota: Gender

We provided respondents with five gender-inclusive response options, as suggested by Speil et al. (2019). These options included “man,” “woman,” “non-binary,” “prefer to not disclose,” and “prefer to self-describe” accompanied by an open textbox. As described in the Methods, a quota was set only for two gender options (man and woman); other genders were not calculated in the gender quotas but were included in the sample of respondents.

Consistent with the quota, 48% of respondents were men and 52% of respondents were women (Figure 3). Only a very small percentage of respondents (0.4%) selected other response

options; 0.1% were non-binary and none preferred to self-describe their gender. Due to low sample sizes, non-binary and self-describing respondents, as well as any that preferred not to disclose their gender identity (0.2%), were not included in the following gender identity analysis of consumptive and nonconsumptive wildlife viewers. A chi-square test indicated no statistically significant difference in the binary gender identity of consumptive and nonconsumptive wildlife viewers (χ^2 = .118, *df* = 1, *p* = .73; Table 2; Figure 3).

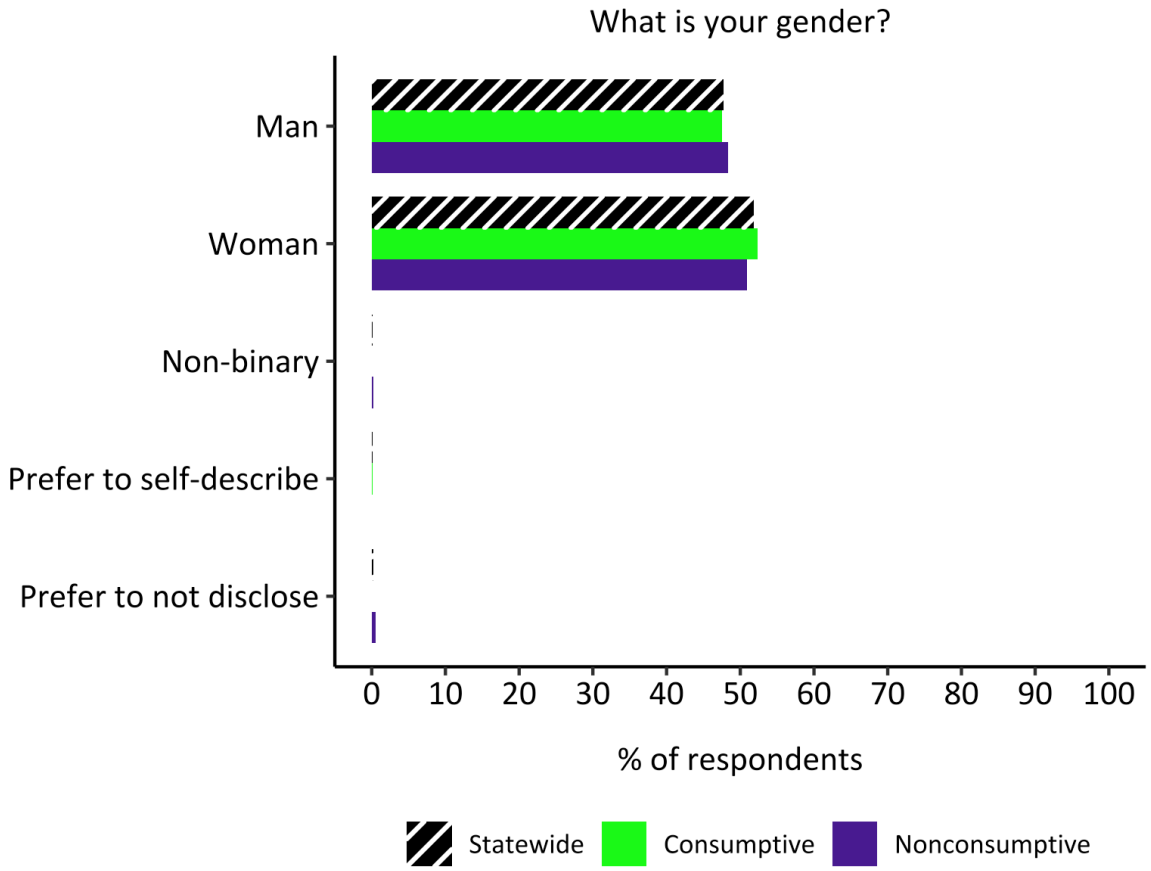


Figure 3: Respondent gender identity

Gender identity of wildlife viewers in Arkansas for statewide, consumptive, and nonconsumptive groups. A chi-square test indicated no statistically significant difference in the binary gender identity of consumptive and nonconsumptive wildlife viewers (Table 2). Note that quotas were set for this survey question.

Survey Quota: Education

Although the quota included three categories for educational attainment, we included five response options in order to gain more specific information from respondents. We then collapsed these categories for the calculation of the quota. Consistent with the quota, 31% of respondents had attained four or more years of higher education; 20% of respondents held a bachelor's degree, and 11% of respondents held advanced degrees (e.g., professional, master's,

or doctoral degrees). Results showed that 28% of respondents had received a high school diploma, equivalent, or less education. In addition, 28% of respondents had completed some college, and 14% had achieved an associate or technical degree. A chi-square test indicated a statistically significant difference in the level of educational attainment of consumptive and nonconsumptive viewers, with a higher percentage of nonconsumptive viewers having attained a Bachelor's degree and a higher percentage of consumptive viewers having attained a high school diploma, equivalent, or less ($\chi^2 = 15.83$, $df = 4$, $p = .003$; Table 3; Figure 4).

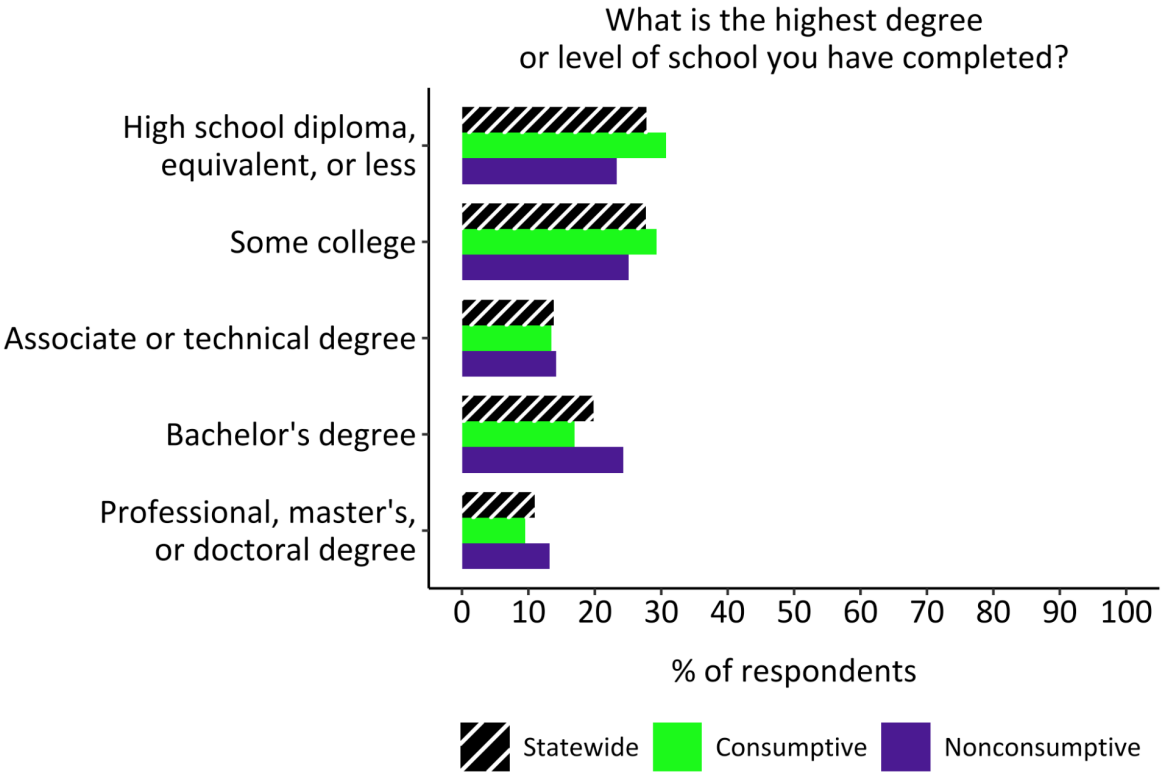


Figure 4: Respondent educational attainment

The highest level of education completed by wildlife viewers in Arkansas for statewide, consumptive, and nonconsumptive groups. A chi-square test indicated a statistically significant difference in the education level of consumptive and nonconsumptive wildlife viewers (Table 3).

Demographics

Race and ethnicity

We provided respondents with a list of eight race or ethnicity options and asked them to select all categories that applied to them. These options were consistent with recommendations from the U.S. Census Bureau, which suggests asking a single question that includes race and ethnicity, rather than a question about race and another about ethnicity, in order to ease respondent burden (Matthews et al., 2015). No quota was set for race and ethnicity, and our

findings of surveyed wildlife viewers skewing toward White were consistent with previous studies (U.S. DOI et al., 2016; Rutter et al., 2021).

While the statewide sample was primarily "White" (86%), respondents also identified as Black or African American (8.9%), Hispanic, Latino, or Spanish (4.2%), American Indian or Alaska Native (4.9%), (hereafter, "Indigenous"), and Asian (1.2%). Less than 0.5% of respondents identified as either "Middle Eastern or North African" or "Native Hawaiian or other Pacific Islander." Only 1.3% identified as "Some other race or ethnicity." In addition, 6.3% of respondents identified with more than one race or ethnicity, which we refer to as "multiracial". Due to low sample sizes for other ethnoracial identities, analysis of these identities for consumptive and nonconsumptive viewers was collapsed into two groups: White-only and Black, Indigenous, and people of color (hereafter, BIPOC). The BIPOC group includes all other ethnoracial identities, including individuals who identified as White and another race or ethnicity. A chi-square test indicated no statistically significant difference in the ethnoracial identities of consumptive and nonconsumptive viewers when comparing between White-only and BIPOC groups ($\chi^2 = 2.42$, $df = 1$, $p = .12$; Table 5; Figure 5).

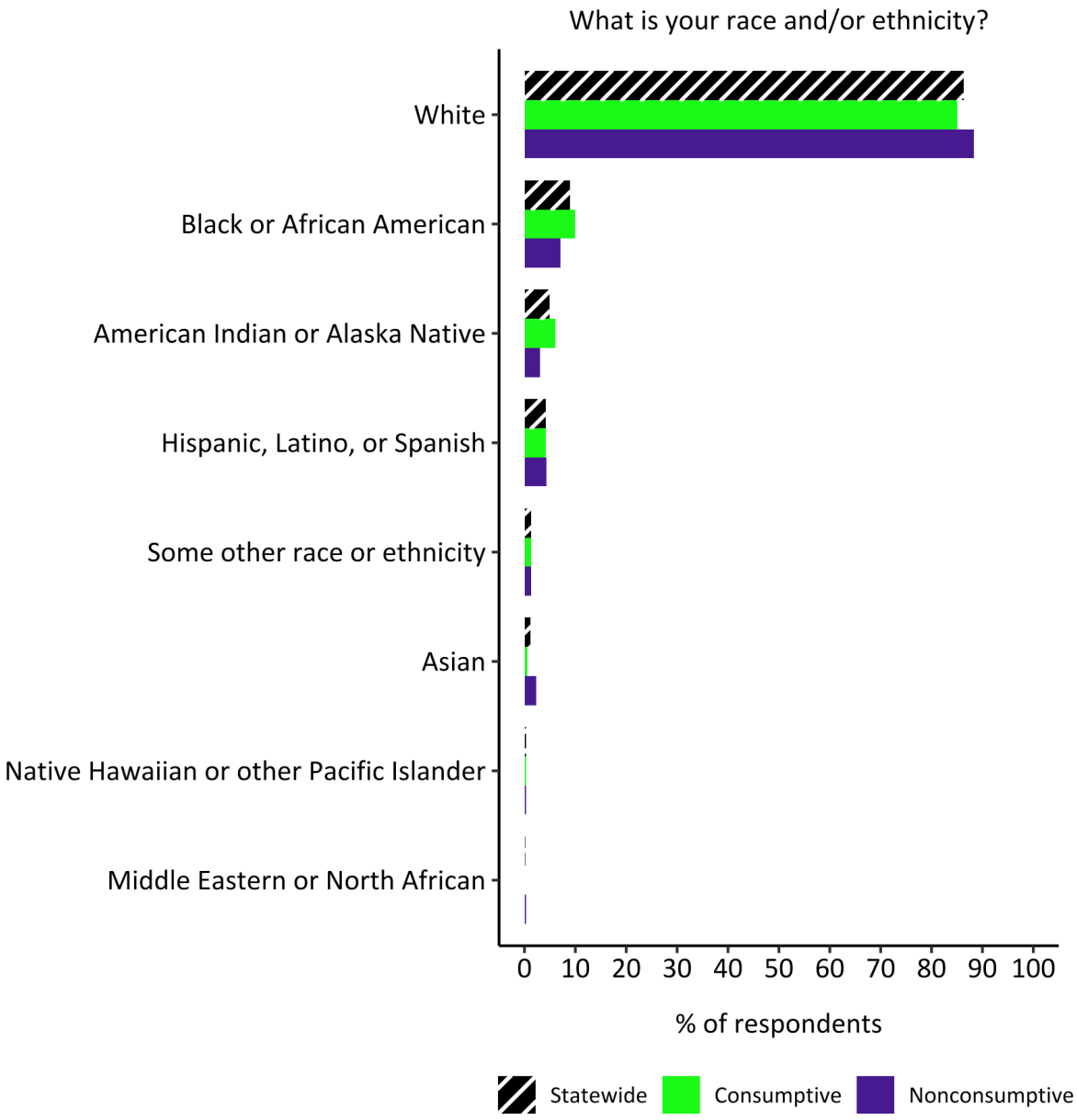


Figure 5: Respondent ethnoracial identity

Ethnoracial identity of wildlife viewers in Arkansas for statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one option to reflect their ethnoracial identity. Due to low sample sizes, analysis of ethnoracial identity for consumptive and nonconsumptive viewers was collapsed into two groups: White-only and BIPOC (Black, Indigenous, and People of Color). A chi-square test indicated no statistically significant difference in the ethnoracial identities of consumptive and nonconsumptive viewers when comparing between White-only and BIPOC groups (Table 5).

Household income

The survey asked respondents to select their total household income from six categories ranging from "Less than $24,999" to "$125,000 or more", with each category increasing by $25,000. In order to ease respondent burden, we reduced these options from the 10 categories presented in the National Survey of Wildlife Recreation, which ranged from "less than $20,000" to "$150,000 or more" (U.S. DOI et al., 2016). A seventh option, listed as "prefer not to answer," was also included and was selected by 3.9% (*n* = 39) of respondents. This group of responses was excluded from the following analysis.

Over half (54%) of our respondents reported their total household income as $49,999 or less. Less than one-third of respondents (29%) reported a total household income of $50,000-99,999 and 17% of survey respondents reported a total household income of $100,000 or more. Due to low sample size in the responses of those who participated in wildlife watching from Arkansas in the 2011 National Survey of Wildlife Recreation, we were unable to compare our results on household income (U.S. DOI et al., 2011). Arkansas-specific data from the 2016 National Survey of Wildlife Recreation was not collected. We compared the mean income level between consumptive and nonconsumptive wildlife viewers using a chi-square test and found no statistically significant difference ($\chi^2 = 7.55$, $df = 5$, $p = .18$; Table 6; Figure 6).

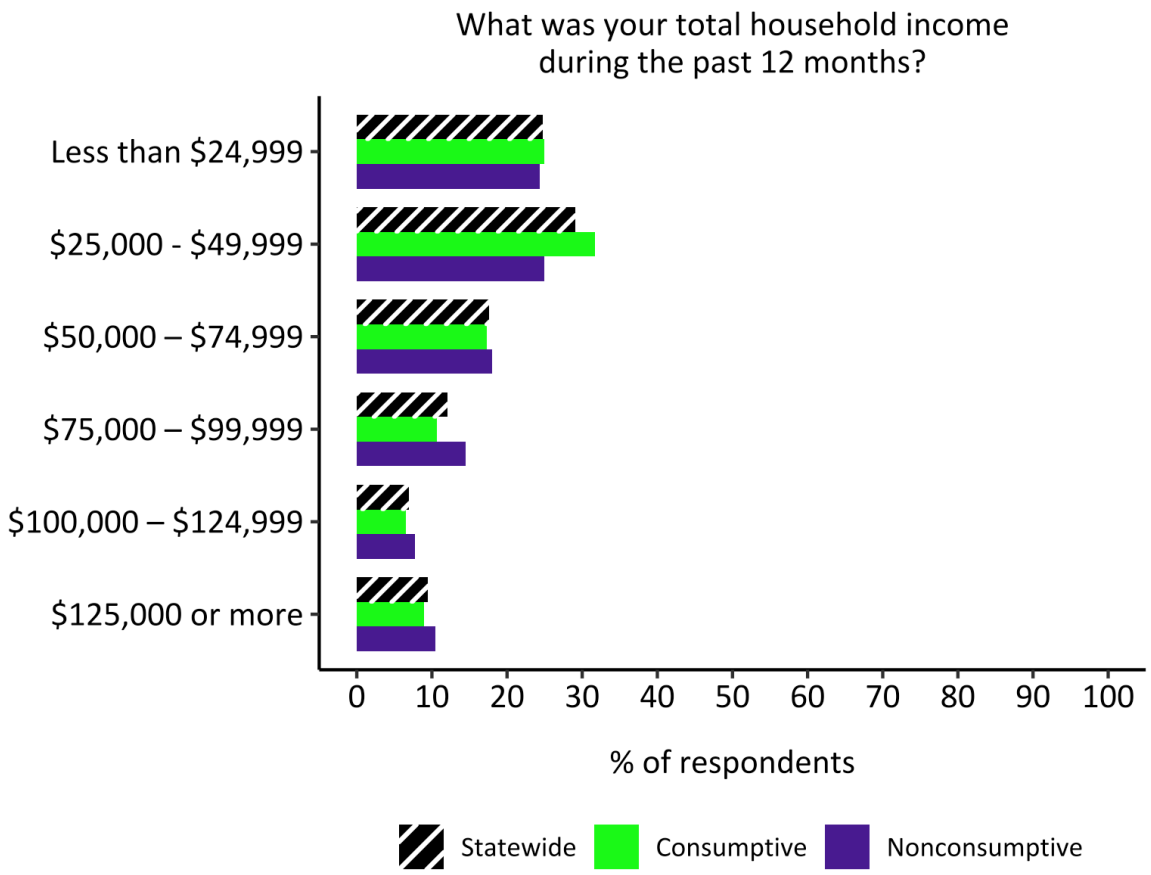


Figure 6: Respondent household income

The total household income range reported by wildlife viewers in Arkansas for statewide, consumptive, and nonconsumptive groups. A chi-square test indicated no statistically significant difference in the income level of consumptive and nonconsumptive wildlife viewers (Table 6).

Residential location

We asked respondents to indicate the size of the area in which they currently live, with the following categories: "Rural area (less than 2,500 people)," "Small town (2,500 - 9,999 people)," "Small city (10,000 - 49,999 people)," or "Urban area (50,000 or more people)." These residential classifications are consistent with the definitions used by the U.S. Census (2010).

Our sample was more rural than that of the Arkansan sample in the 2011 National Survey of Hunting, Fishing, and Wildlife-Associated Recreation (U.S. DOI et al., 2011), in which 73% of wildlife viewers lived in "Metropolitan Statistical Areas" with populations of 50,000 or more. In our survey, only 24% of Arkansas respondents self-reported living in an area with a population of 50,000 or more (Table 7; Figure 7). More respondents self-reported living in a rural area (less

than 2,500 people; 32%) or small city (10,000-49,999 people; 26%). Less than one-fifth of respondents reported living in a small town (2,500-9,999 people; 18%). A chi-square test indicated a statistically significant difference in the residential location of consumptive and nonconsumptive wildlife viewers, with a higher percentage of nonconsumptive viewers residing in urban areas and a higher percentage of consumptive viewers residing in rural areas (χ^2 = 14.18, *df* = 3, *p* = .003; Table 7; Figure 7).

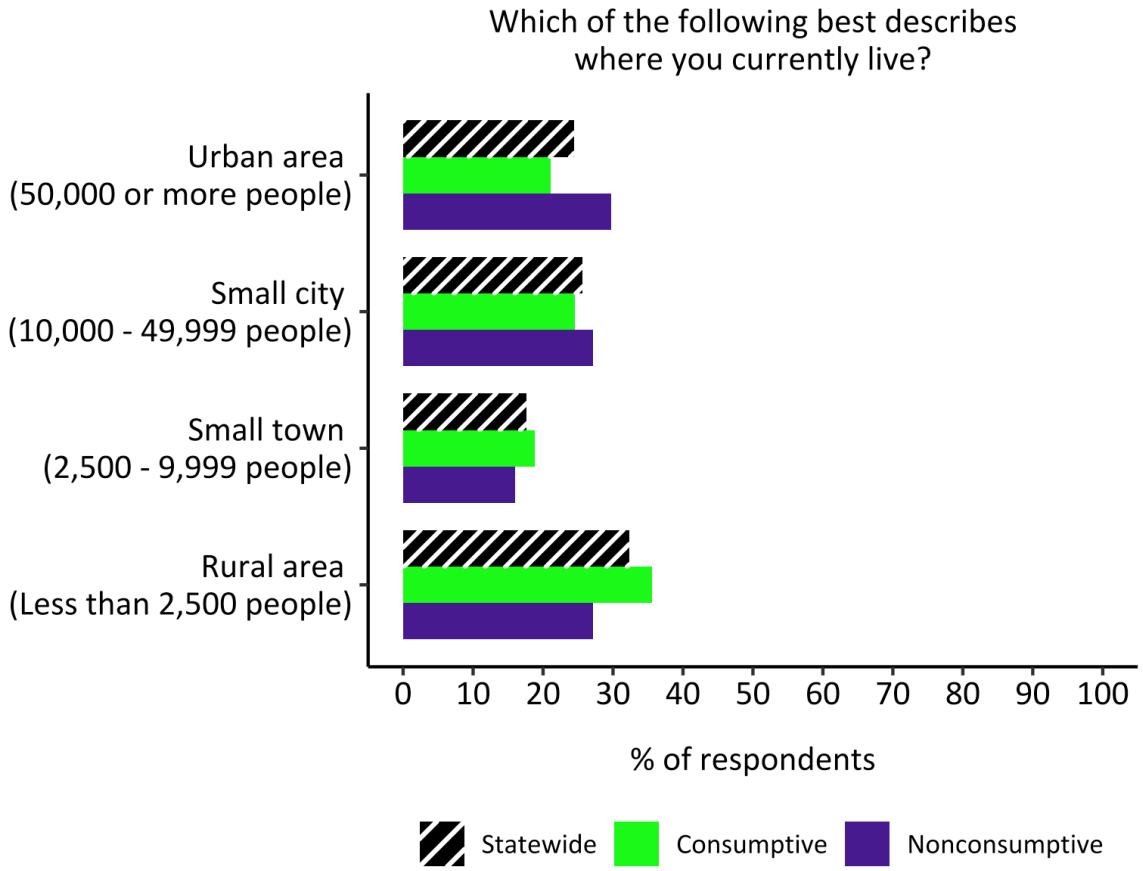


Figure 7: Respondent self-reported size of residential area

The self-reported size of the area in which wildlife viewers in Arkansas reside for statewide, consumptive, and nonconsumptive groups. A chi-square test indicated a statistically significant difference in the residential location of consumptive and nonconsumptive wildlife viewers (Table 7).

Wildlife viewing behaviors

Forms of wildlife viewing

As described in the Methods, the National Survey of Wildlife Recreation defines wildlife viewing as "closely observing, feeding, and photographing wildlife, visiting parks and natural areas around the home because of wildlife, and maintaining plantings and natural areas around the

home for the benefit of wildlife" (U.S. DOI et al., 2016). Under this definition, wildlife viewing must occur as an intentional objective of the recreational activity; it does not include incidental viewing. The survey noted: "Wildlife viewing does not include simply noticing wildlife while doing something else, such as gardening, exercising, hunting or fishing, or intentionally scouting for game." Incidental viewing, or observing wildlife while doing other recreational activities, is not considered wildlife viewing under this definition and was thus excluded from this survey effort.

We presented respondents with a list of seven wildlife viewing activities adapted from the National Survey of Wildlife Recreation and asked them to select all activities they participate in during a typical year (i.e., a recent year [within the last five years] that was not impacted by unusual circumstances like the COVID-19 pandemic). For those who started viewing wildlife during the pandemic, we asked them to answer all questions about "a typical year" for the past year. The sum of percentages exceeds 100 because 81% of respondents selected more than one behavior. The two most popular wildlife viewing behaviors amongst respondents in Arkansas were visiting parks and natural areas to observe, photograph, or feed wildlife (59%) and feeding wild birds (57%). The next most popular wildlife viewing behavior was photographing or taking pictures of wildlife (56%).

Chi-square tests indicated statistically significant differences for six of the wildlife viewing activities between consumptive and nonconsumptive wildlife viewers, with the exception of feeding wild birds. In comparison to nonconsumptive viewers, significantly more consumptive wildlife viewers participated in: 1) visiting parks and natural areas to observe, feed, or photograph wildlife, 2) photographing or taking pictures of wildlife, 3) taking trips or outings to any other location to observe, photograph, or feed wildlife, 4) feeding other wildlife, 5) closely observing wildlife/trying to identify unfamiliar types of wildlife, and 6) maintaining plantings or natural areas for the benefit of wildlife (Figure 8; Table 8).

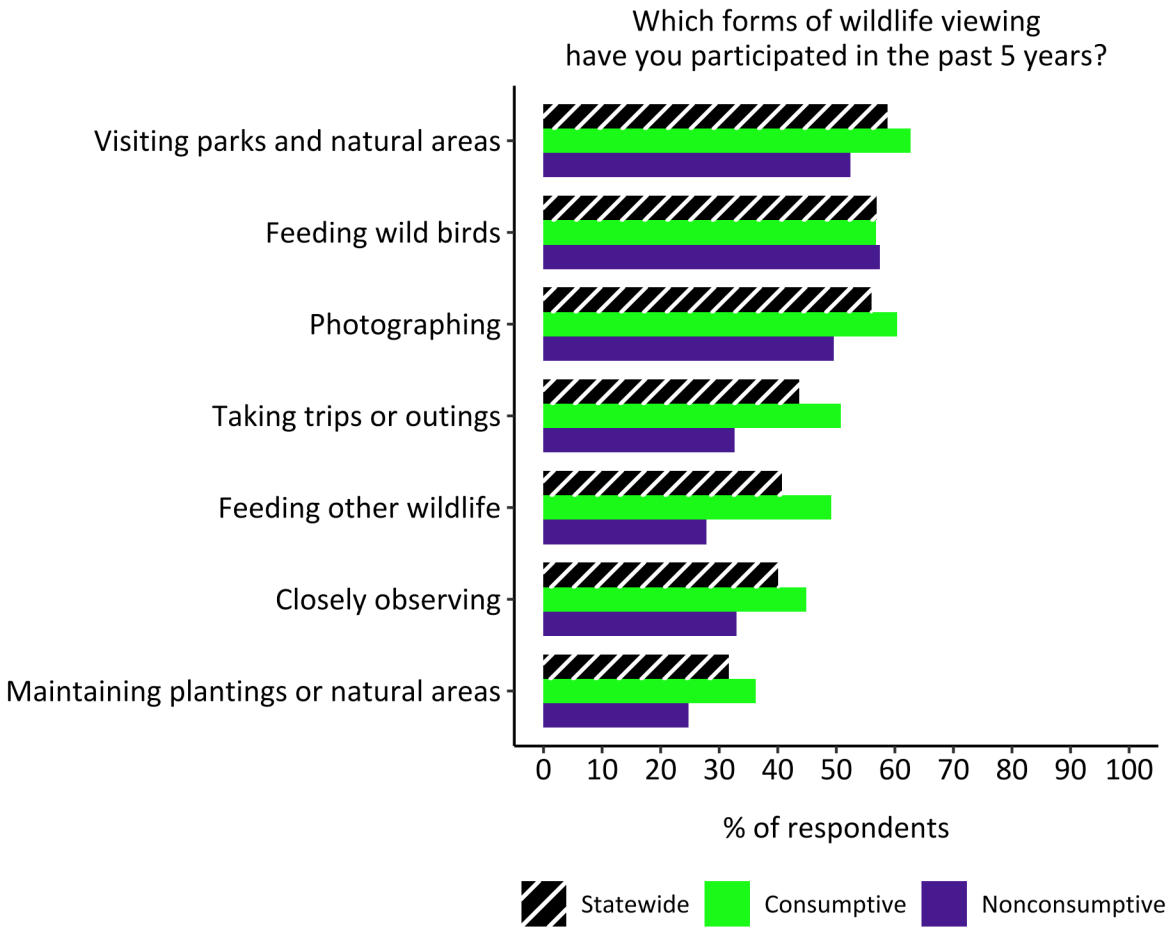


Figure 8: Forms of wildlife viewing

Forms of wildlife viewing that wildlife viewers in Arkansas reported participating in over the past five years for statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one option. Chi-square tests indicated statistically significant differences for six wildlife viewing activities between consumptive and nonconsumptive wildlife viewers (Table 8).

Types of wildlife

Birds, land mammals, and large mammals are typically the most popular types of wildlife viewed (U.S. DOI et al., 2016; Grooms et al., 2019). We asked wildlife viewers to indicate the types of wildlife they liked to view (which included observing, photographing, or feeding). The list of eight types of wildlife to view was adapted from the Virginia Wildlife Recreation Survey (Grooms et al., 2019) and the National Survey of Wildlife Recreation (U.S. DOI et al., 2016).

Land mammals were the most popular type of wildlife viewed, with 80% of respondents statewide selecting this response option (because respondents could select more than one item, the sums of all percentages per wildlife type exceed 100). In addition, 78% indicated

interest in viewing birds and 38% indicated interest in viewing reptiles. The least popular type of wildlife, besides the mutually exclusive response option “other types of wildlife” (1.4% of respondents selected this), was amphibians, still with 30% of respondents selecting this response option.

Chi-square tests indicated statistically significant differences in all wildlife type viewing preferences between consumptive and nonconsumptive wildlife viewers with the exception of both birds and marine mammals. Consumptive viewers were significantly more likely to report interest in land mammals, reptiles, fish, insects, and amphibians in comparison to nonconsumptive viewers (Table 9; Figure 9).

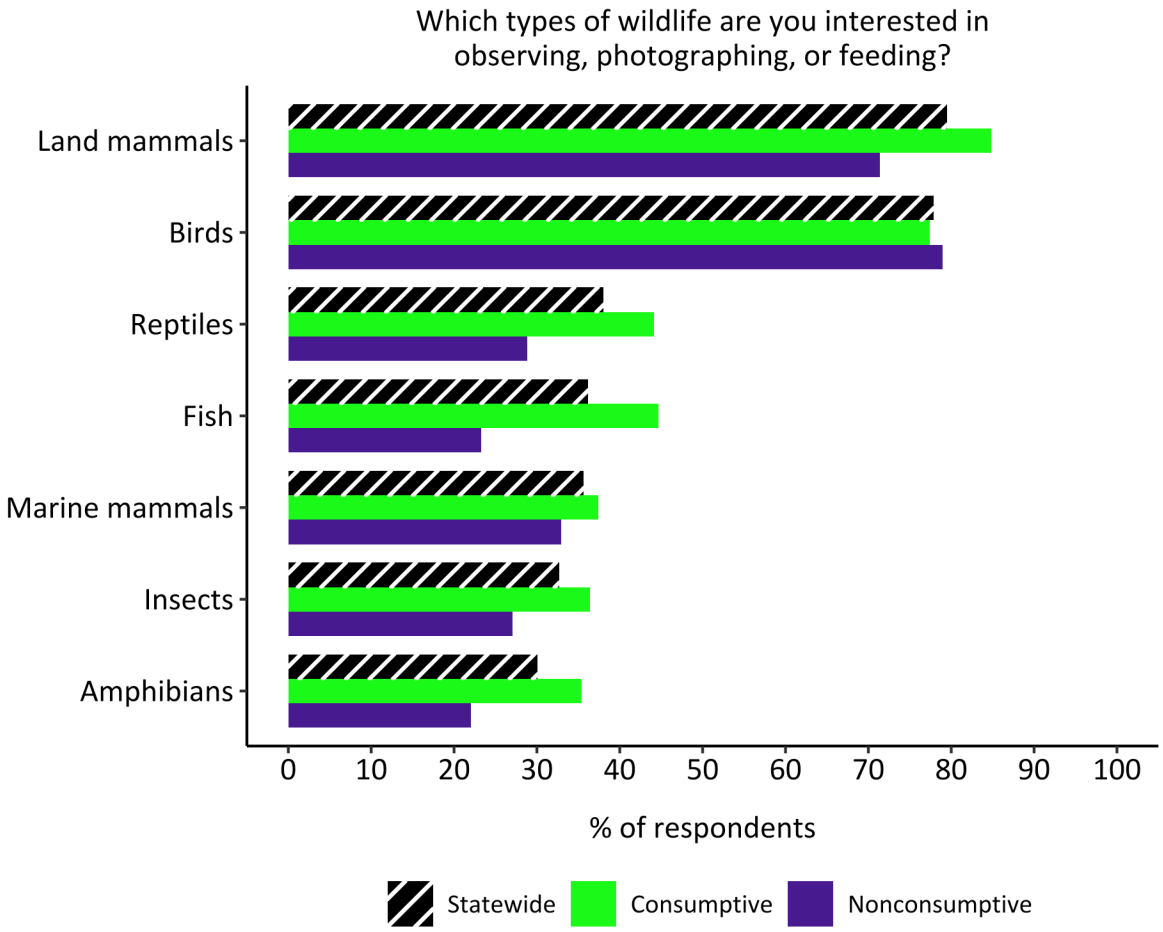


Figure 9: Interest in types of wildlife for wildlife viewing

Types of wildlife that wildlife viewers in Arkansas reported interest in observing, photographing, or feeding for statewide, consumptive, and nonconsumptive groups. Note that percentages for individual response categories sum to more than 100% because respondents were able to select more than one option. Chi-square tests indicated several statistically significant differences in wildlife type viewing preferences between consumptive and nonconsumptive wildlife viewers; consumptive viewers were significantly more likely to report interest in land mammals, reptiles, fish, insects, and amphibians in comparison to nonconsumptive viewers (Table 9).

Recreational specialization of wildlife viewers

Across diverse forms of outdoor recreation, specialization refers to a continuum of intensity in an individual's interest and involvement in a given activity (Scott & Shafer, 2001). The best approach to measuring specialization is an area of active research and debate among scholars, but there is consensus that specialization is multidimensional, and as such, it is generally measured through multiple questions in survey research, rather than a single item (Needham et al., 2009). Specialization is consistently discussed and measured through three dimensions, often referred to as affective, behavioral, and cognitive (outlined in more detail below;

Needham et al., 2009). We developed a series of survey questions to evaluate each of these dimensions of specialization, drawing on concepts and items from a previous survey of eBird participants conducted by the North American Waterfowl Management Plan (NAWMP) Human Dimensions Working Group (Harshaw et al., 2021) and a survey of anglers conducted by Needham et al. (2009). We present results for these dimensions separately below, as recommended by Lee and Scott (2004), in order to retain insights into each dimension.

Affective specialization: Centrality

Following Harshaw et al. (2021) and Needham et al. (2009), we assessed the affective dimension of viewers' specialization through the concept of centrality, which reflects how important wildlife viewing is in an individual's life. Respondents were asked to indicate their extent of agreement, on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*), with three statements: 1) "A lot of my life is organized around wildlife viewing," 2) "Wildlife viewing has a central role in my life," and 3) "Being a wildlife viewer is an important part of who I am." Responses to these three statements, which provide information regarding the centrality of wildlife viewing to an individual's life, comprised a reliable scale (Cronbach's alpha = .84), so we combined these variables by calculating the mean response to these items for an overall centrality measure (Table 10; Figure 10). The mean level of centrality was 3.10 in Arkansas, indicating that, on average, respondents selected *neither agree nor disagree*. A t-test indicated that the mean measure of centrality of wildlife viewing to an individual's life was significantly higher in consumptive viewers (M = 3.25, SD = 0.95) compared to nonconsumptive viewers (M = 2.84, SD = 0.99; t = -6.59, df = 990, p < .001; Table 10; Figure 10). However, as both mean measures for consumptive and nonconsumptive viewers were about 3, this means that both groups, on average, selected *neither agree nor disagree* for the three statements, which may have little practical relevance for management.

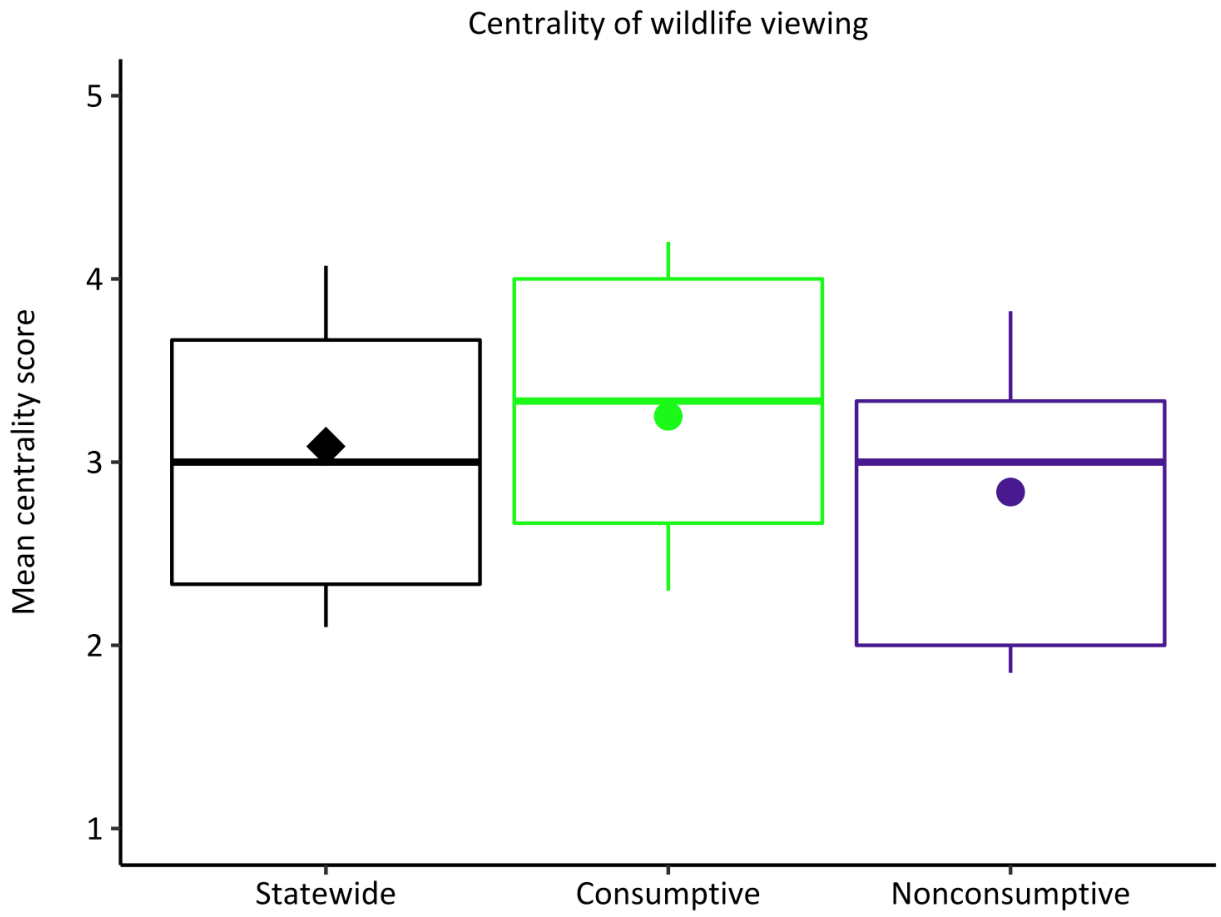


Figure 10: Centrality of wildlife viewing

Boxplots (median and interquartile ranges within the boxes) showing the differences in the measure of centrality of wildlife viewing in the lives of wildlife viewers in Arkansas for statewide, consumptive, and nonconsumptive groups. Points represent the mean centrality measure (diamond for statewide group, circles for consumptive and nonconsumptive group) calculated as the mean of respondents' extent of agreement with three statements about the importance of wildlife viewing in their lives on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). Whiskers represent the mean ± 1 standard deviation. A t-test indicated that the mean measure of centrality of wildlife viewing to an individual's life was significantly higher in consumptive viewers in comparison to nonconsumptive viewers (Table 10).

Behavioral specialization: Equipment and years spent viewing

We measured the behavioral dimension of specialization through respondents' use of specialized equipment for wildlife viewing and the duration of their experience in wildlife viewing. In Arkansas, 60% of all wildlife viewers reported owning or renting specialized equipment, such as binoculars, cameras, mobile apps, spotting scopes, field guides, or specialized clothing in the past five years (Figure 11; Table 11). A chi-square test indicated that

consumptive wildlife viewers (66%) were significantly more likely to own or rent specialized equipment for wildlife viewing than nonconsumptive wildlife viewers (51%; $\chi^2 = 22.06$, $df = 1$, $p < .001$; Table 11; Figure 11).

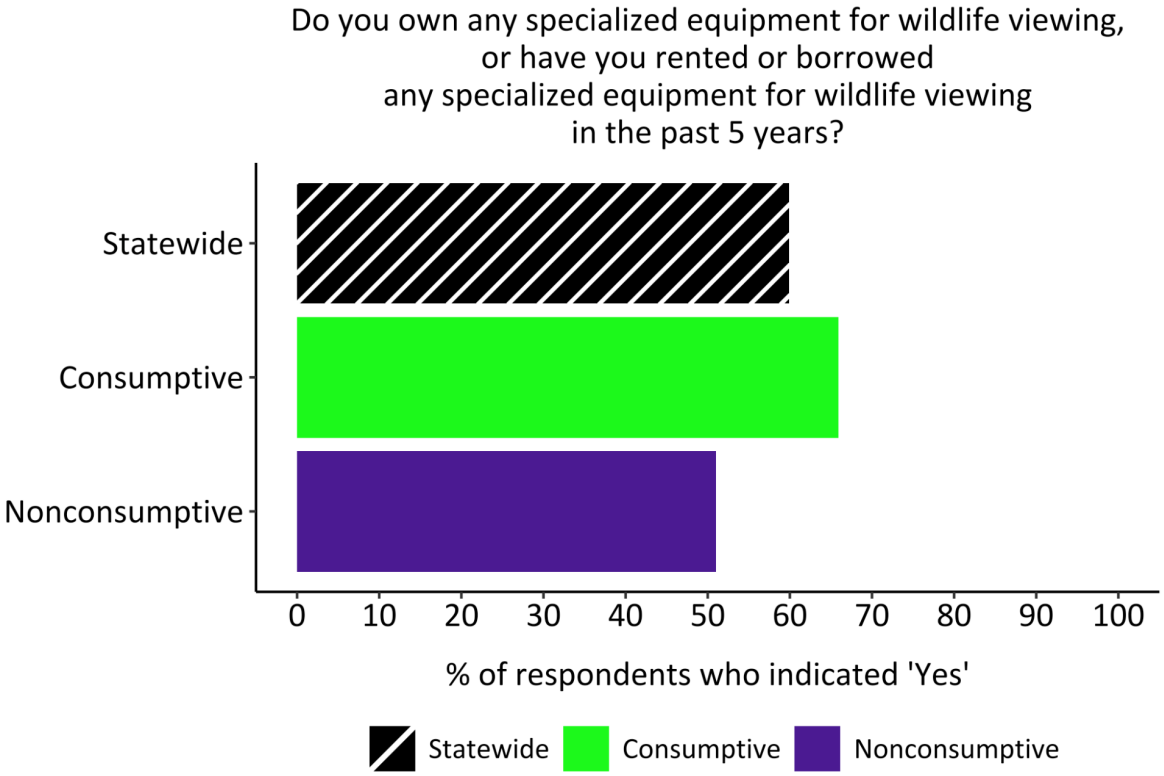


Figure 11: Owning, renting, or borrowing specialized equipment for wildlife viewing

Percent of wildlife viewers in Arkansas who reported owning, renting, or borrowing specialized equipment for wildlife viewing in the past 5 years for statewide, consumptive, and nonconsumptive groups. A chi-square test indicated that consumptive wildlife viewers were significantly more likely to own or rent specialized equipment for wildlife viewing than nonconsumptive wildlife viewers (Table 11).

As another measure of behavioral specialization, we also asked survey respondents to indicate how many years they had been participating in wildlife viewing and provided response options in five-year categories. To ease respondent burden, we did not present this question to respondents who indicated in a previous question that they had only started viewing during the COVID-19 pandemic. As the COVID-19 pandemic began about 18 months before the survey was administered, we added the 52 wildlife viewers who reported that they started viewing during the pandemic to the 1-5 years category. Around 7% of viewers in Arkansas had more than 50 years of wildlife viewing experience (Table 12).

In order to account for the effect of the age of respondents, we roughly estimated the percentage of life during which wildlife viewers had participated in wildlife viewing by creating

five-equally sized categories (1-20%, 21-40%, 41-60%, 61-80%, and 81-100% of life). The majority of wildlife viewers had participated in the activity for less than half their life: 41% reported viewing for one-fifth of their life or less, while 24% reported viewing for one to two-fifths of their life (Figure 12). Twelve percent of respondents had participated in wildlife viewing for close to their entire life (81-100%). A chi-square test indicated no statistically significant differences in this measure of experience as a percentage of life spent viewing when comparing consumptive and nonconsumptive viewers ($\chi^2 = 7.52$, $df = 4$, $p = .11$; Table 13; Figure 12).

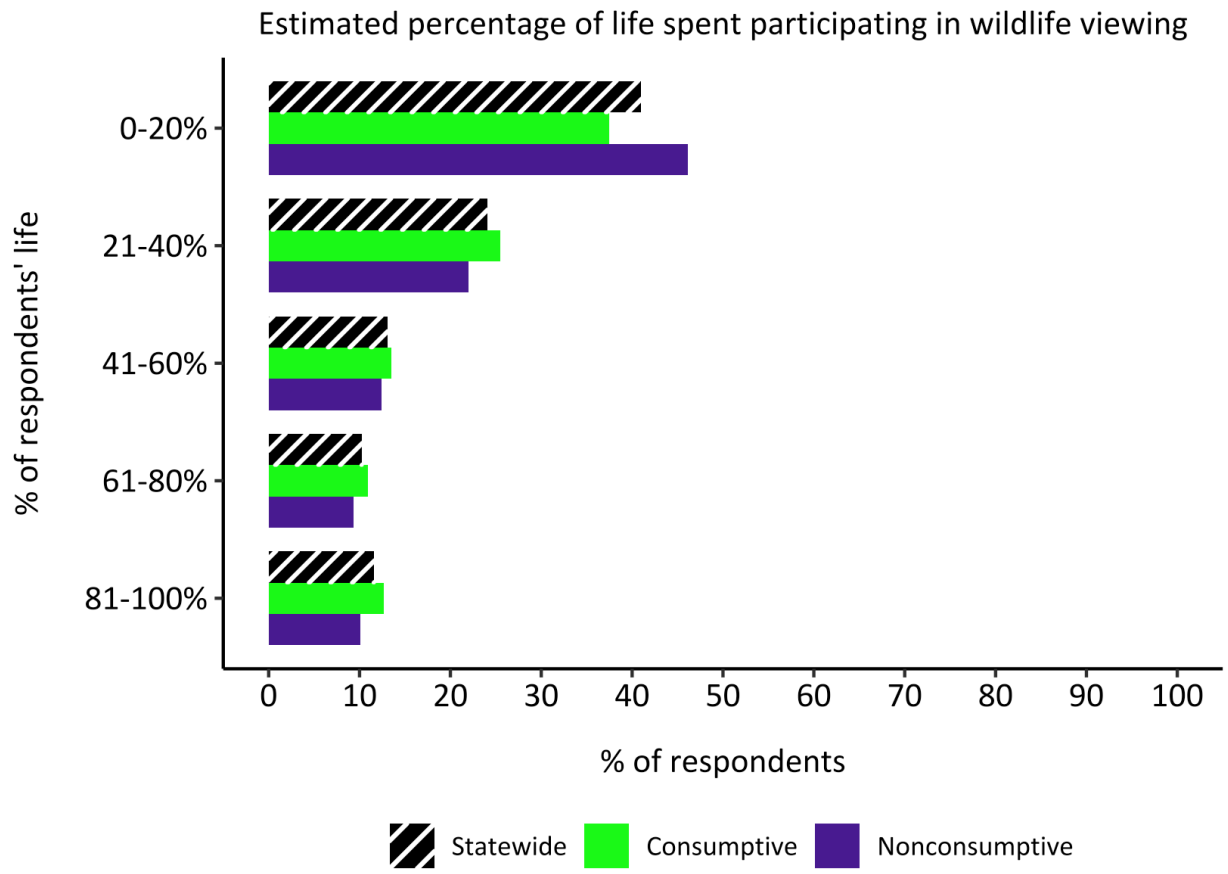


Figure 12: Estimated percentage of life spent viewing

The estimated percentage of life during which wildlife viewers had participated in wildlife viewing in five categories (1-20%, 21-40%, 41-60%, 61-80%, and 81-100% of life) for statewide, consumptive, and nonconsumptive groups. A chi-square test indicated no significant difference in this measure of experience as a percentage of life spent viewing when comparing consumptive and nonconsumptive viewers (Table 13).

Cognitive specialization: Skill level

Due to the number of diverse activities and types of wildlife that are included under the umbrella of wildlife viewing, we used a single, broad item to measure the cognitive dimension of specialization through viewers' self-rated level of expertise, ranging from beginner to expert.

We asked respondents "How would you rate your skill level in wildlife viewing?" and provided them with five options ranging from "beginner" to "expert." In Arkansas, 61% of respondents considered themselves beginner or novice wildlife viewers. Around 30% of viewers rated their skill level as intermediate. Only 8.5% of respondents considered themselves to be advanced, and only 1.5% considered themselves to be expert wildlife viewers (Table 14; Figure 13). A chi-square test indicated a statistically significant difference in self-rated expertise levels between consumptive and nonconsumptive wildlife viewers, with the majority of nonconsumptive wildlife viewers rating themselves as beginners (35%) or novices (32%) and fewer consumptive viewers rating themselves as beginners (27%) or novices (30%; Table 14; Figure 13).

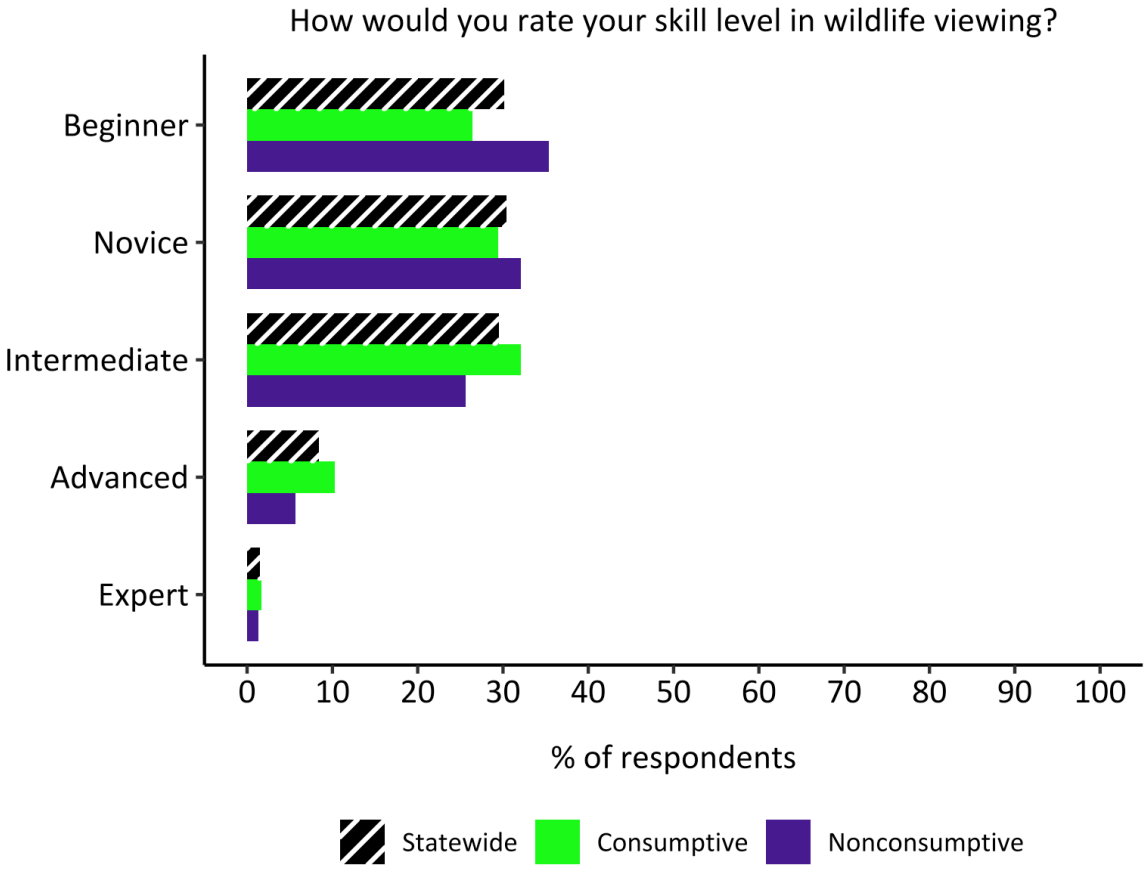


Figure 13: Respondents' self-rate wildlife viewing skill level

Respondents' self-rated level of skill in wildlife viewing for statewide, consumptive, and nonconsumptive groups. A chi-square test indicated a statistically significant difference in self-rated expertise levels between consumptive and nonconsumptive wildlife viewers (Table 14).

COVID-19 impacts on wildlife viewing participation and the R3 Framework

On March 11th, 2020, the World Health Organization declared the COVID-19 virus as a pandemic (Cucinotta & Vanelli, 2020). This pandemic dramatically altered everyday activities

worldwide as federal, state, and local governments enacted public health policies to mitigate the spread of this highly contagious virus (Cucinotta & Vanelli, 2020). For example, the COVID-19 pandemic and associated mitigations brought about unprecedented and dynamic changes in outdoor recreation behaviors throughout the country, which we are only beginning to understand. A study by Rice et al. (2020) indicated that, as limitations were instituted on travel on a wide range of scales, participation in outdoor activities declined significantly overall, with disproportionately negative effects for urban residents. However, another study showed slight increases in participation in wildlife viewing and recreation close to home (Hochachka et al., 2021).

For this survey, we examined how COVID-19 affected wildlife viewers and the nature of their participation in wildlife viewing and identified any potential valuable management implications for state fish and wildlife agencies interested in supporting wildlife viewing. We examined participation in wildlife viewing using the Outdoor Recreation Adoption Model (also referred to as the "R3 Framework'' [recruitment, retention, and reactivation]) vis a vis the first year of the pandemic (Byrne & Dunfee, 2018). By comparing the number of days spent viewing in the first year of the COVID-19 pandemic against a typical year, we categorized wildlife viewers into four groups: "churned" (i.e., stopped viewing during the pandemic), retained (i.e., maintained viewing throughout the pandemic), "recruited" (i.e., began wildlife viewing for the first time during the pandemic), and "reactivated" (i.e., had participated in wildlife viewing in the past, were not actively participating when the pandemic began, but resumed participation during or after March 2020).

The majority of respondents in Arkansas (64%) fell into the "retained" category, meaning the COVID-19 pandemic had no impact on their overall participation in wildlife viewing. The next largest group was the "churned" viewers (18%), meaning that they stopped viewing during the pandemic, followed by "reactivated" viewers (13%), meaning those who resumed participation during or after March 2020. Finally, the smallest proportion of wildlife viewers indicated they were "recruited" (5.2%) or began participating in wildlife viewing for the first time during or after March 2020. A chi-square test indicated no statistically significant differences between consumptive and nonconsumptive viewers' R3 participation categorization ($\chi^2 = 3.62$, $df = 3$, $p = .31$; Table 15; Figure 14).

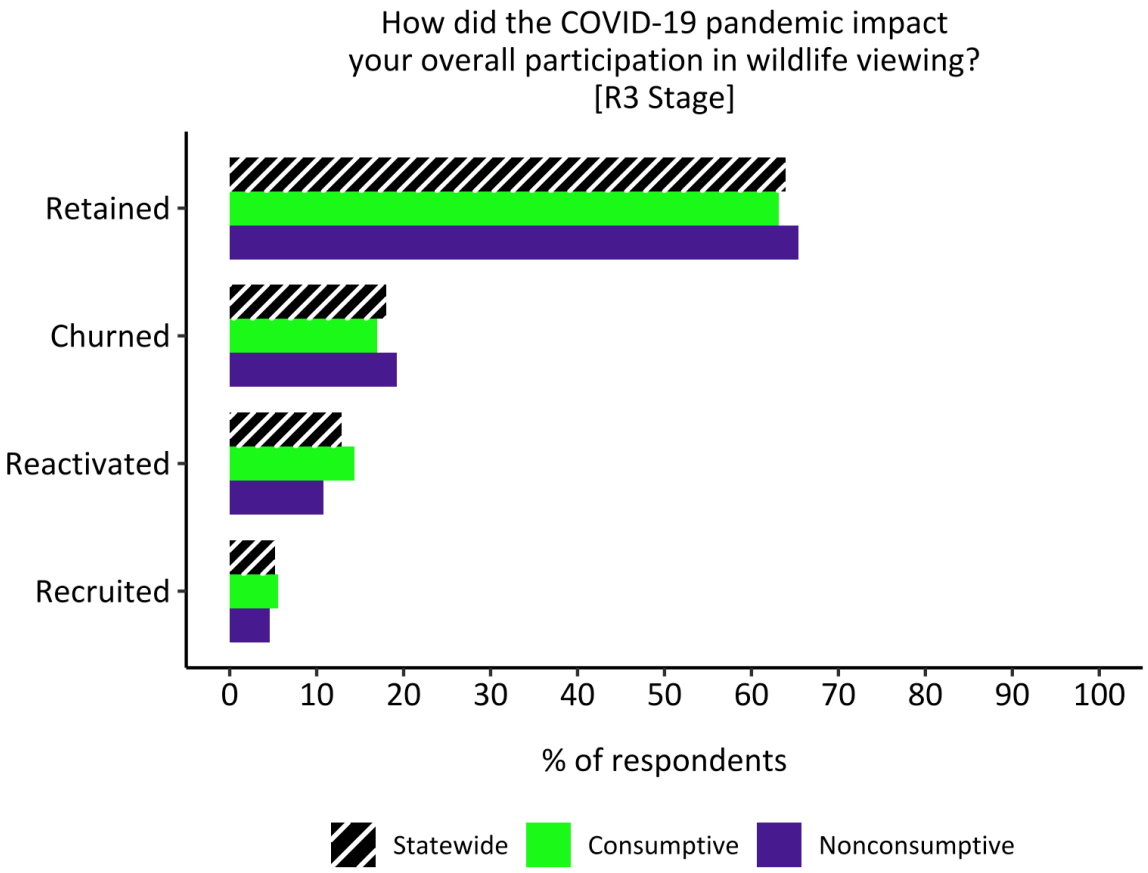


Figure 14: COVID-19 impact on wildlife viewing as R3

Impact of the COVID-19 pandemic on wildlife viewers' overall participation in wildlife viewing for statewide, consumptive, and nonconsumptive groups. Respondents were separated into four groups; retained (maintained throughout the pandemic), churned (stopped viewing during the pandemic), reactivated (had participated in wildlife viewing in the past, were not actively participating when the pandemic began, but resumed participation during or after March 2020), and recruited (began wildlife viewing for the first time during the pandemic). A chi-square test indicated no statistically significant differences between consumptive and nonconsumptive viewers.

Time spent wildlife viewing

In this section of the survey, wildlife viewers estimated the number of days they spent wildlife viewing during a typical year, the first year of the COVID-19 pandemic (March 2020 - February 2021), and the number of days that they anticipated wildlife viewing in the upcoming year (the next 12 months from the date of survey completion). Wildlife viewers who indicated they were recruited (see COVID-19 section) during the pandemic were not asked to report the number of days they spent viewing during a typical year, as the first year of the COVID-19 pandemic was assumed to be their only year participating in wildlife viewing. For each time period, we specified three locations, following the National Survey of Wildlife Recreation's (U.S. DOI et al.,

2016) definition of "around the home" ("within one mile of home") and "away from home" ("at least one mile away from home"), the latter of which we further stratified to two locations: "more than one mile away from your home, but within your state" and "outside of your state or outside of the United States." We were interested in this nuance to better understand the impact of the COVID-19 pandemic on travel that occurred for wildlife viewing (Hochachka et al., 2021). For all time periods and locations, we provided respondents with seven time intervals, each 30 days long, and a single option for "0 days" and "211 or more days."

We first reviewed days viewing during a typical year (*n* = 953 around the home, *n* = 941 away from home, and *n* = 935 outside of Arkansas or the U.S.; Table 16; Figures 15-17). Nearly all respondents (95%) reported participating in wildlife viewing around the home for 1 day or more in a typical year (Table 16; Figure 15). A substantial proportion (19%) reported wildlife viewing around the home for "211 or more days" in a typical year, which approximates to 17 days a month or more. Similar to around the home but slightly lower, 90% of wildlife viewers reported participating in wildlife viewing away from home for 1 day or more during a typical year. Only 4.0% of wildlife viewers spent 211 or more days in a typical year viewing away from home. Of all three wildlife viewing locations, wildlife viewers were less apt to participate in wildlife viewing outside of their state or country in a typical year, but still well over half of respondents (59%) participated in wildlife viewing outside their state or country for 1 day or more.

Due to low group size for each category for consumptive and nonconsumptive viewers, statistical testing was done by comparing "0 days," "1-30 days," and "> 30 days" per year. A chi-square with three categories ("0 days," "1-30 days," and "> 30 days") indicated no statistically significant difference in the amount time spent viewing around the home in a typical year between consumptive and nonconsumptive viewers (Table 17; Figure 15). The second chi-square test indicated that there was a statistically significant difference in away-from-home viewing in a typical year for consumptive and nonconsumptive viewers, with more consumptive viewers spending more than 30 days viewing away from home (Table 17; Figure 16). Finally, the third chi-square test indicated that there was a statistically significant difference in out-of-state-or-country viewing in a typical year for consumptive and nonconsumptive viewers, with more nonconsumptive viewers spending zero days viewing out of Arkansas or the U.S. (Table 17; Figure 17).

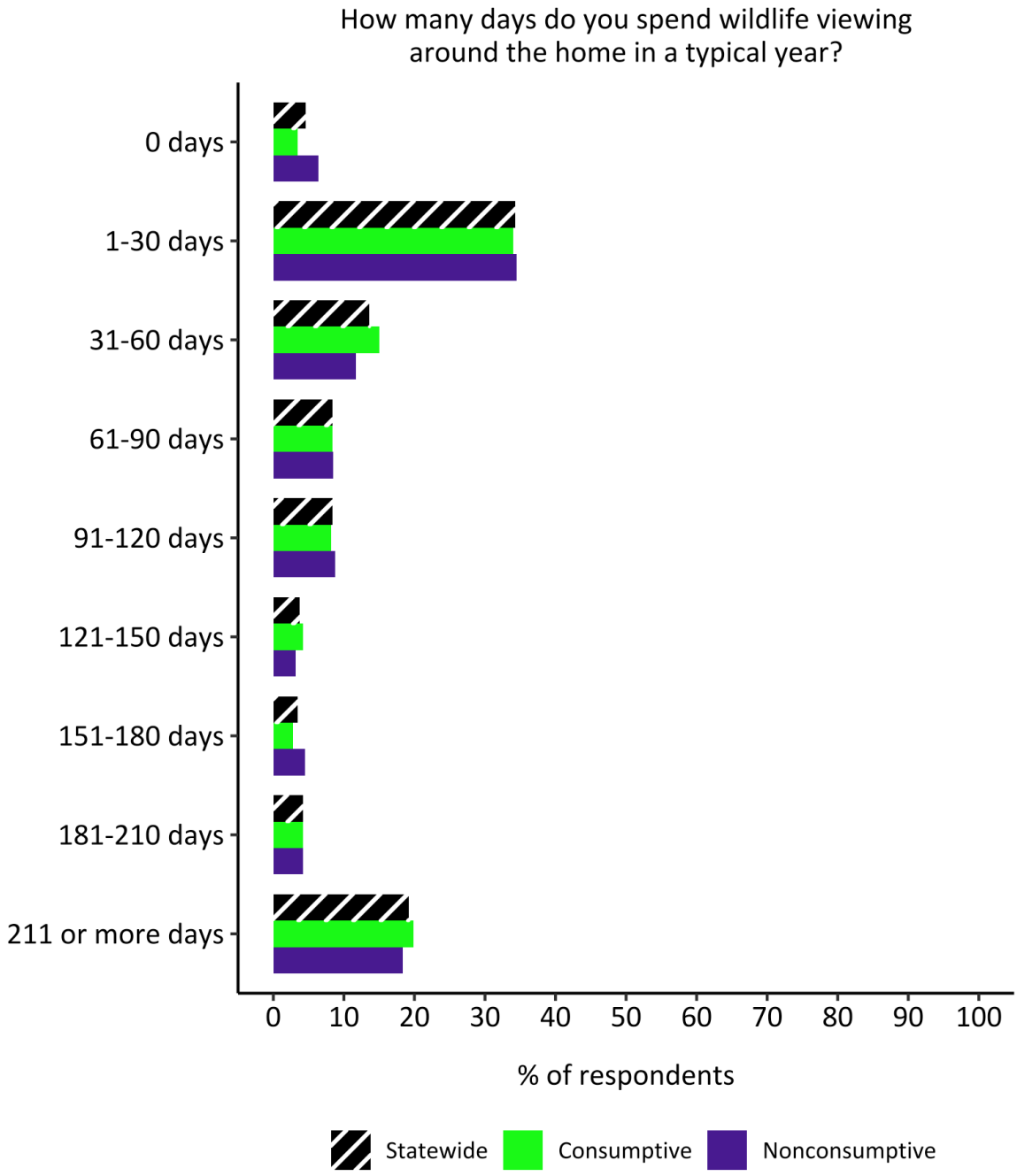


Figure 15: Days spent viewing around the home in a typical year

Days wildlife viewers in Arkansas reported spending wildlife viewing around the home during a typical year for statewide, consumptive, and nonconsumptive groups. Typical year response omits wildlife viewers who began participating in wildlife viewing during the pandemic, as they had not yet viewed wildlife in a typical year. A chi-square run with only three categories ("0 days", "1-30 days", and ">30 days"), due to low sample sizes, indicated no statistically significant differences in time spent viewing around the home in a typical year between consumptive and nonconsumptive viewers (Table 17).

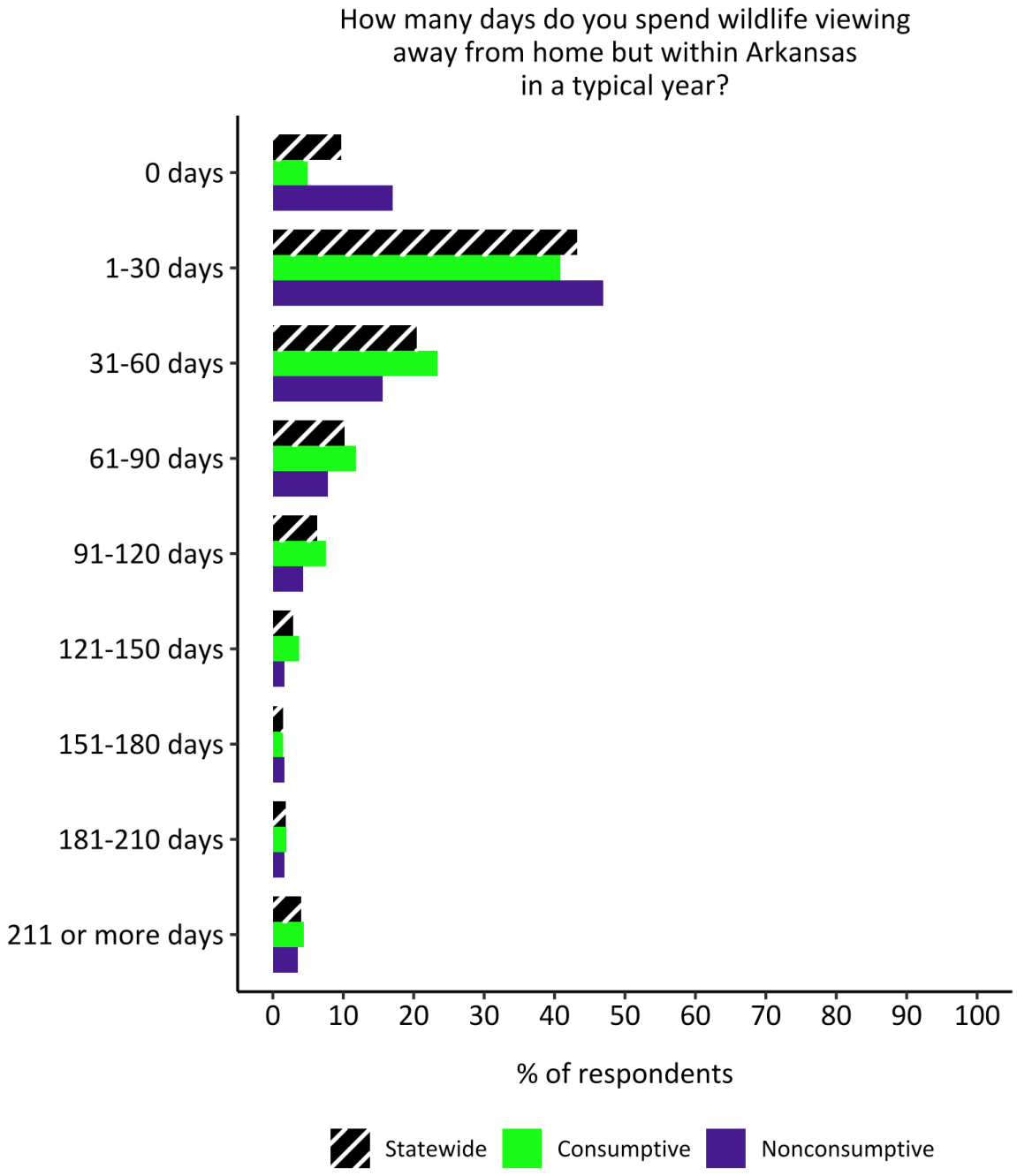


Figure 16: Days spent viewing away from home in a typical year

Days wildlife viewers in Arkansas reported spending wildlife viewing away from home, but within Arkansas, during a typical year for statewide, consumptive, and nonconsumptive groups. Typical year response omits wildlife viewers who began participating in wildlife viewing during the pandemic, as they had not yet viewed in a typical year. A chi-square test indicated that there was a statistically significant difference in away-from-home viewing in a typical year for consumptive and nonconsumptive viewers (Table 17).

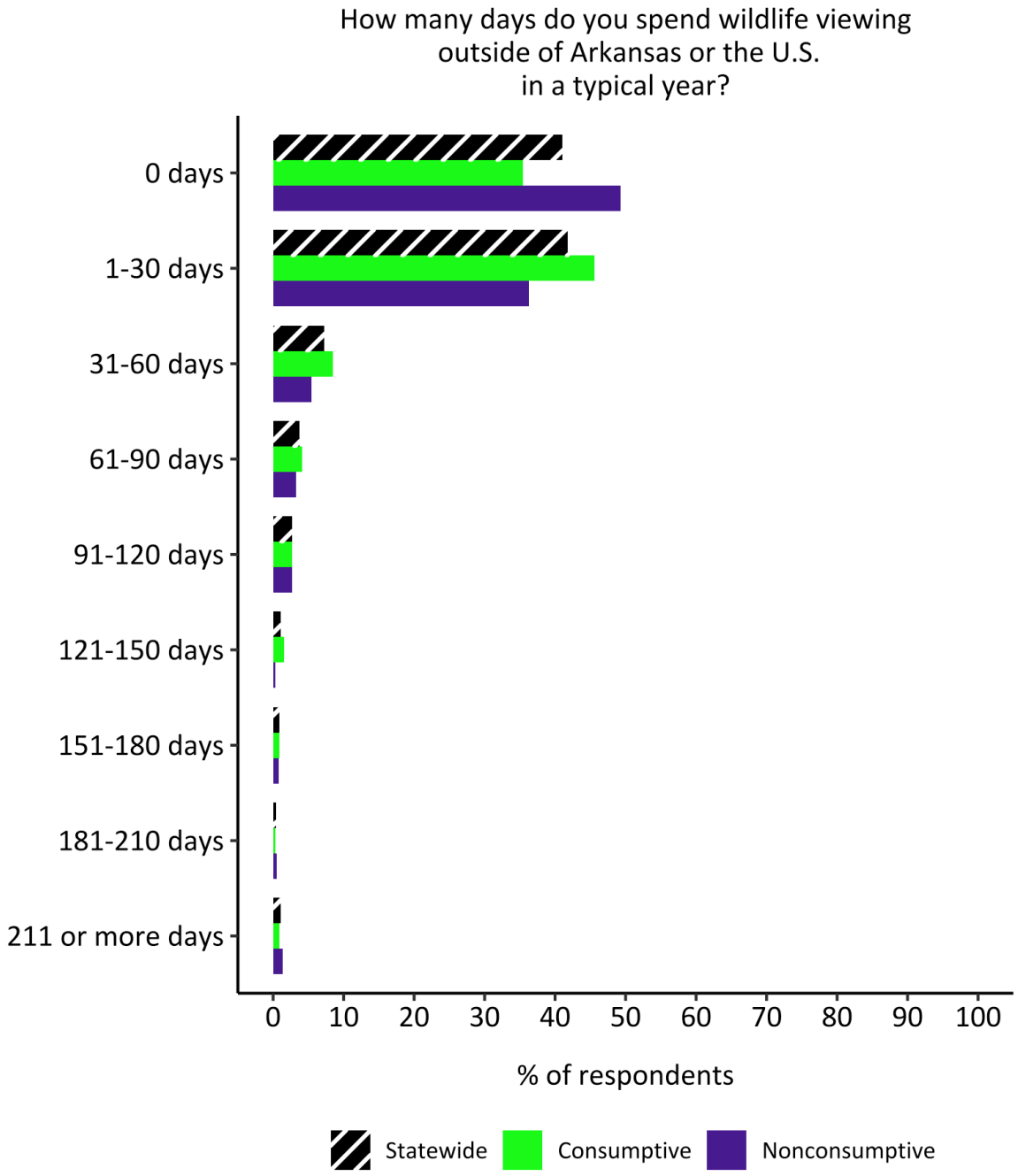


Figure 17: Days spent viewing out of state or U.S. in a typical year

Days wildlife viewers in Arkansas reported spending wildlife viewing outside of Arkansas or the U.S. during a typical year for statewide, consumptive, and nonconsumptive groups. Typical year response omits wildlife viewers who began participating in wildlife viewing during the pandemic, as they had not yet viewed wildlife in a typical year. A chi-square test indicated that there was a statistically significant difference in out-of-state-or-country viewing in a typical year for consumptive and nonconsumptive viewers (Table 17).

Next, we reviewed days spent viewing during the first year of the COVID-19 pandemic (*n* = 1,002 around the home, *n* = 986 away from home, and *n* = 981 outside state or country; Table 16; Figure 18-20). Slightly less respondents (90%) reported participating in wildlife viewing around the home for one day or more in the first year of the COVID-19 pandemic in comparison to a typical year (95%). Participation in away from home (80% of respondents participated for one day or more) viewing also decreased slightly in comparison to a typical year (90%). Only 3.2% of respondents reported participation in wildlife viewing away from home for 211 or more days during the first year of the COVID-19 pandemic. Finally, less than half of respondents (44%) reported participating in wildlife viewing out-of-state-or-country during the first year of the COVID-19 pandemic, a more considerable decrease in comparison to a typical year (59%).

The chi-square tests for the first year of the pandemic indicated the same patterns for statistical significance as a typical year. The first chi-square test indicated that there was no statistically significant difference in time spent viewing around the home in a typical year between consumptive and nonconsumptive viewers (Table 17; Figure 18). The second chi-square test indicated that there was a statistically significant difference in away-from-home viewing during the first year of the pandemic for consumptive and nonconsumptive viewers, with more consumptive viewers spending more than 30 days viewing away from home and more nonconsumptive viewers spending zero days away from home (Table 17; Figure 19). Finally, the third chi-square test indicated that there was a statistically significant difference in out-of-state-or-country viewing during the first year of the pandemic for consumptive and nonconsumptive viewers, with more nonconsumptive viewers spending zero days viewing outside of Arkansas or the U.S. (Table 17; Figure 20).

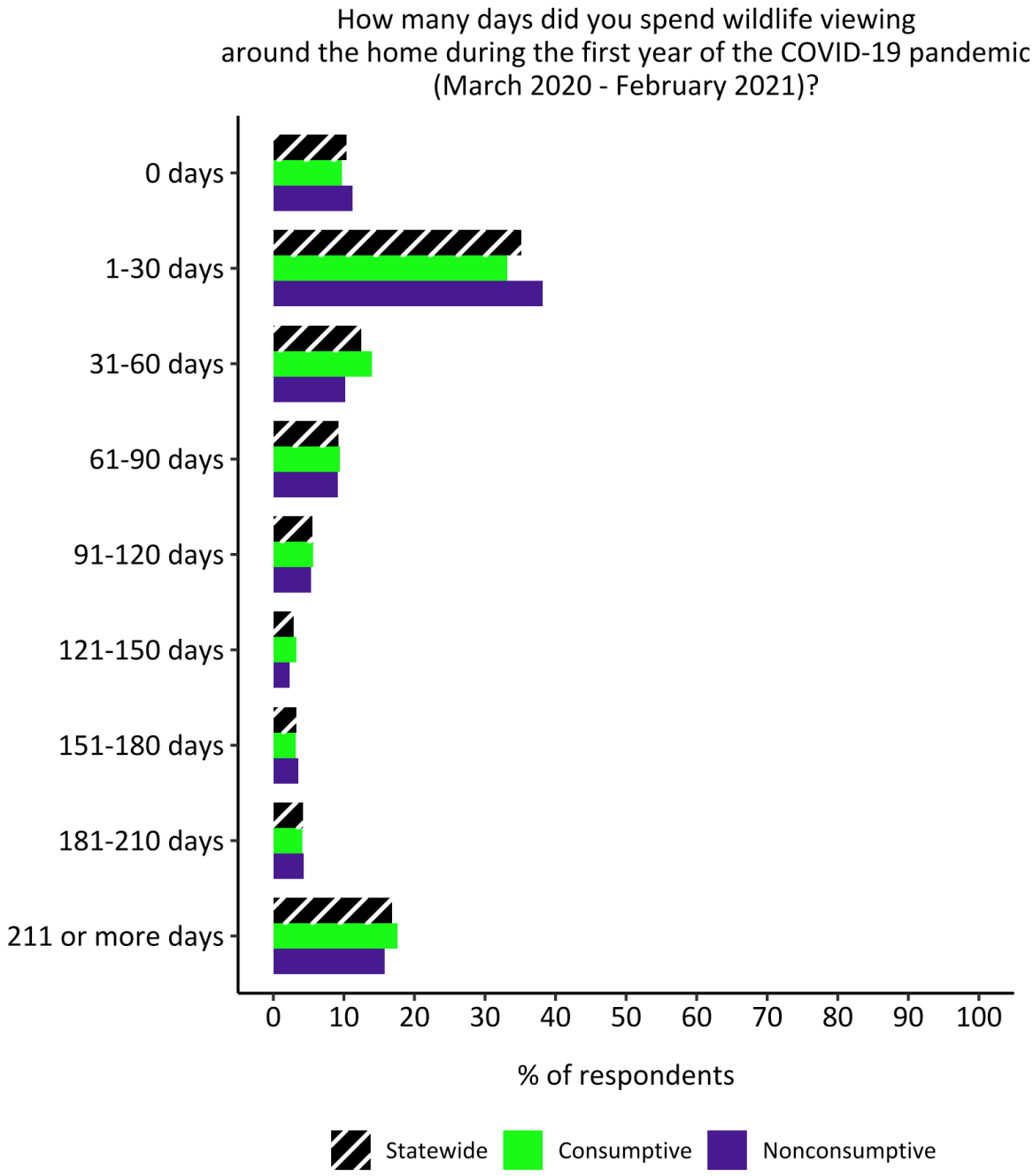


Figure 18: Days spent viewing around the home in first year of COVID-19 pandemic

Days wildlife viewers in Arkansas reported spending wildlife viewing around the home during the first year of the pandemic (March 2020-February 2021) for statewide, consumptive, and nonconsumptive groups. This includes wildlife viewers who began participating in wildlife viewing during the pandemic. A chi-square run with only three categories ("0 days," "1-30 days," and "> 30 days"), due to low sample sizes, indicated no statistically significant differences in time spent viewing around the home during the first year of the pandemic between consumptive and nonconsumptive viewers (Table 17).

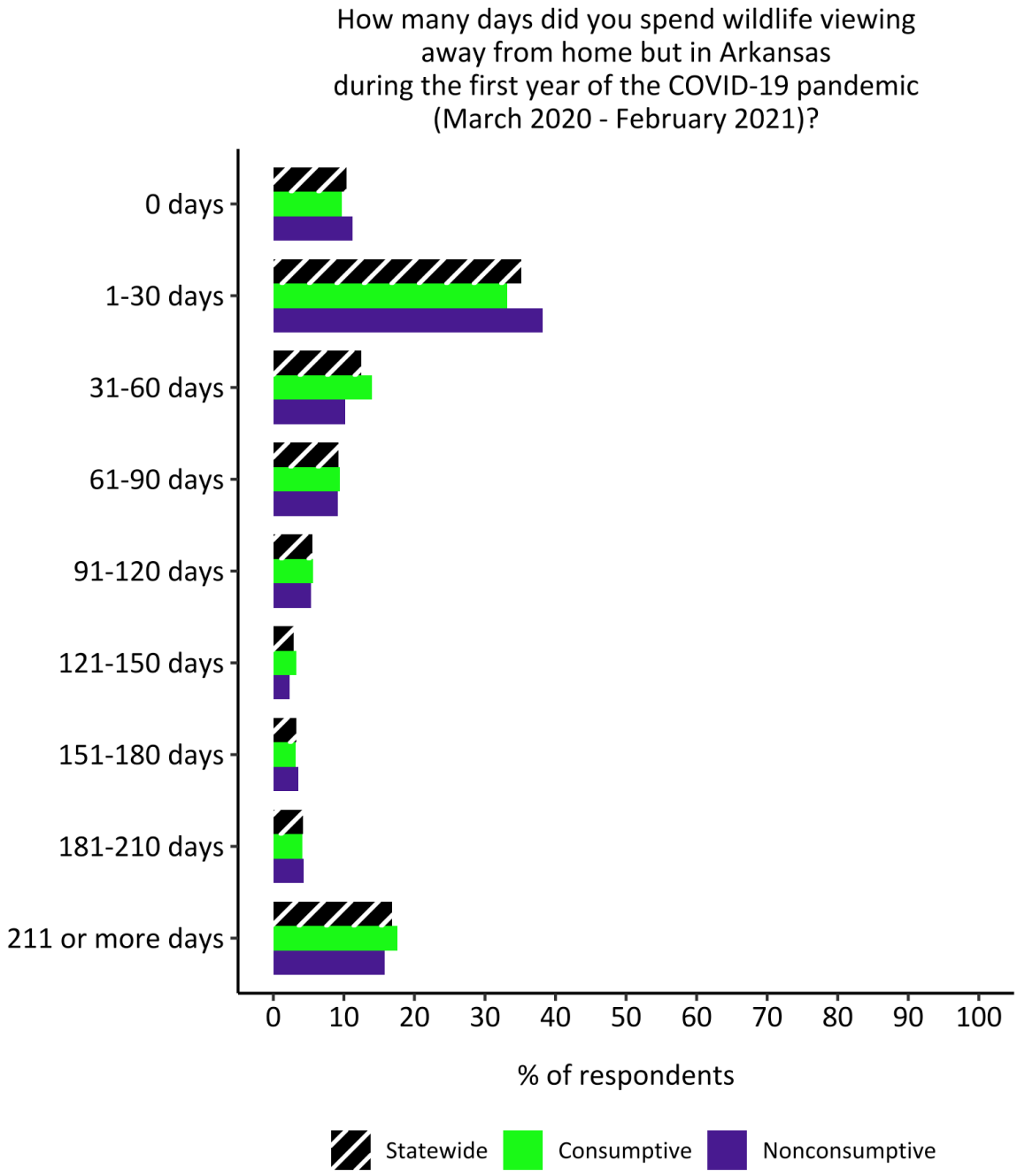


Figure 19: Days spent viewing away from home in first year of COVID-19 pandemic

Days wildlife viewers in Arkansas reported spending wildlife viewing away from home but within Arkansas during the first year of the pandemic (March 2020-February 2021) for statewide, consumptive, and nonconsumptive groups. This includes wildlife viewers who began participating in wildlife viewing during the pandemic. A chi-square run with only three categories ("0 days," "1-30 days," and "> 30 days"), due to low sample sizes, indicated that there was a statistically significant difference in away-from-home viewing during the first year of the pandemic for consumptive and nonconsumptive viewers (Table 17).

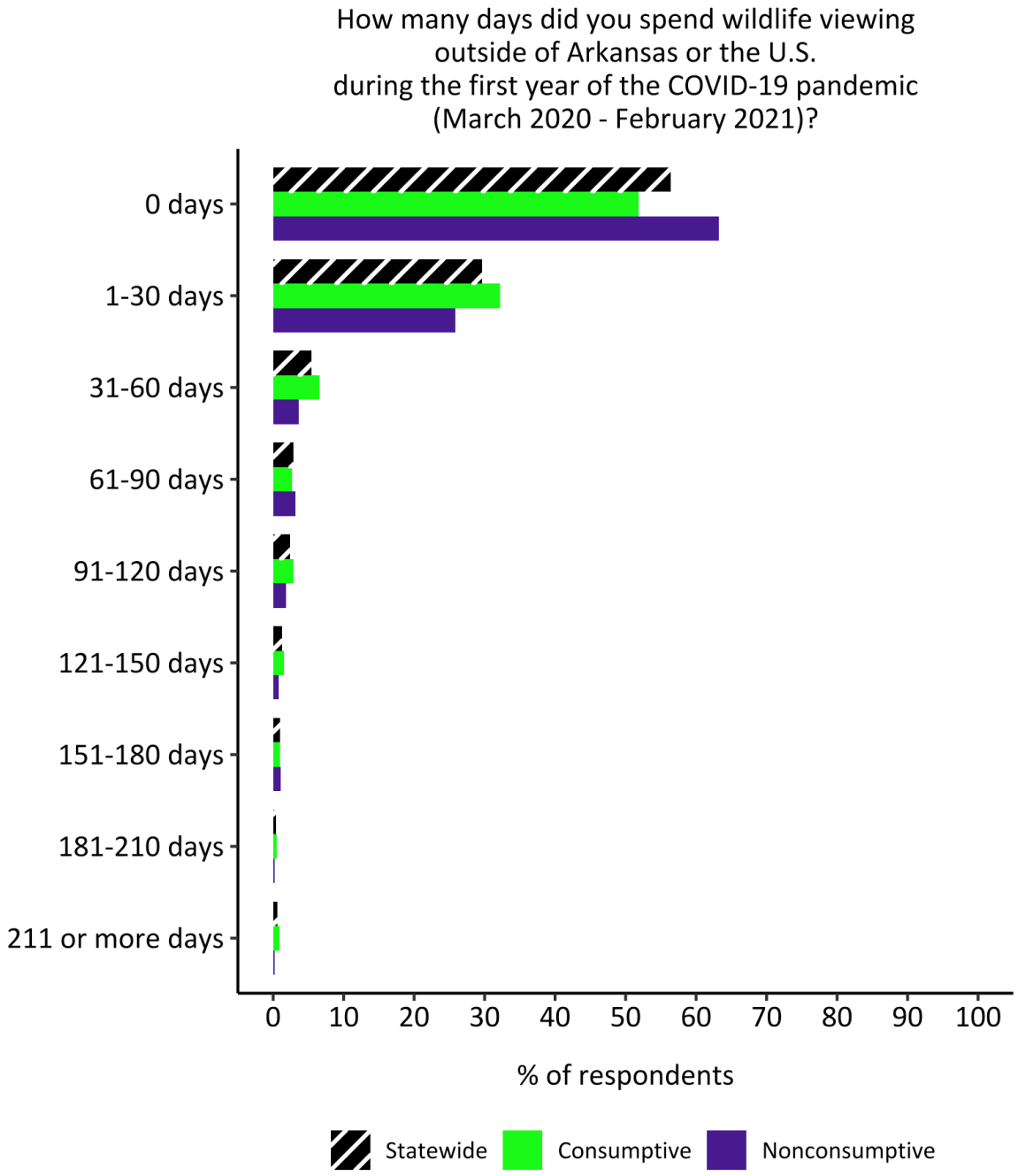


Figure 20: Days spent viewing out of state or U.S. in first year of COVID-19 pandemic

Days wildlife viewers in Arkansas reported spending wildlife viewing outside of Arkansas or the U.S. during the first year of the pandemic (March 2020-February 2021) for statewide, consumptive, and nonconsumptive groups. This includes wildlife viewers who began participating in wildlife viewing during the pandemic. A chi-square run with only three categories ("0 days," "1-30 days," and "> 30 days"), due to low sample sizes, indicated that there was a statistically significant difference in time spent out-of-state-or-country viewing the first year of the pandemic between consumptive and nonconsumptive viewers (Table 17).

Finally, we asked respondents about days they anticipate viewing in the three locations during the next year (*n* = 1,001 around the home, *n* = 992 away from home, and *n* = 981 outside state or country; Table 16; Figures 21-23). Anticipated viewing was higher in all three locations when compared to the first year of the pandemic and was much closer to values reported during a typical year. Similarly to a typical year, 94% of respondents anticipated spending one or more days viewing around the home and 89% anticipated spending one or more days viewing away from home. We also note an increase in anticipated participation outside of state or country compared to the first year of the COVID-19 pandemic, with 57% of respondents saying they anticipated spending one or more days viewing outside of their state or country.

The chi-square tests for anticipated time spent viewing in the upcoming year indicated the same levels of statistical significance as those for a typical year. First, a chi-square with three categories ("0 days," "1-30 days," and "> 30 days") indicated no statistically significant difference in the expected time spent viewing around the home in the upcoming year between consumptive and nonconsumptive viewers (Table 17; Figure 21). The second chi-square test indicated that there was a statistically significant difference in expected away-from-home viewing in the upcoming year for consumptive and nonconsumptive viewers, with more consumptive viewers anticipating spending more than 30 days viewing away from home and more nonconsumptive viewers expecting to spend zero days viewing away from home (Table 17; Figure 22). Finally, the third chi-square test indicated that there was a statistically significant difference in out-of-state-or-country viewing in a typical year for consumptive and nonconsumptive viewers, with more nonconsumptive viewers expecting to spend zero days viewing outside of Arkansas or the U.S. (Table 17; Figure 23).

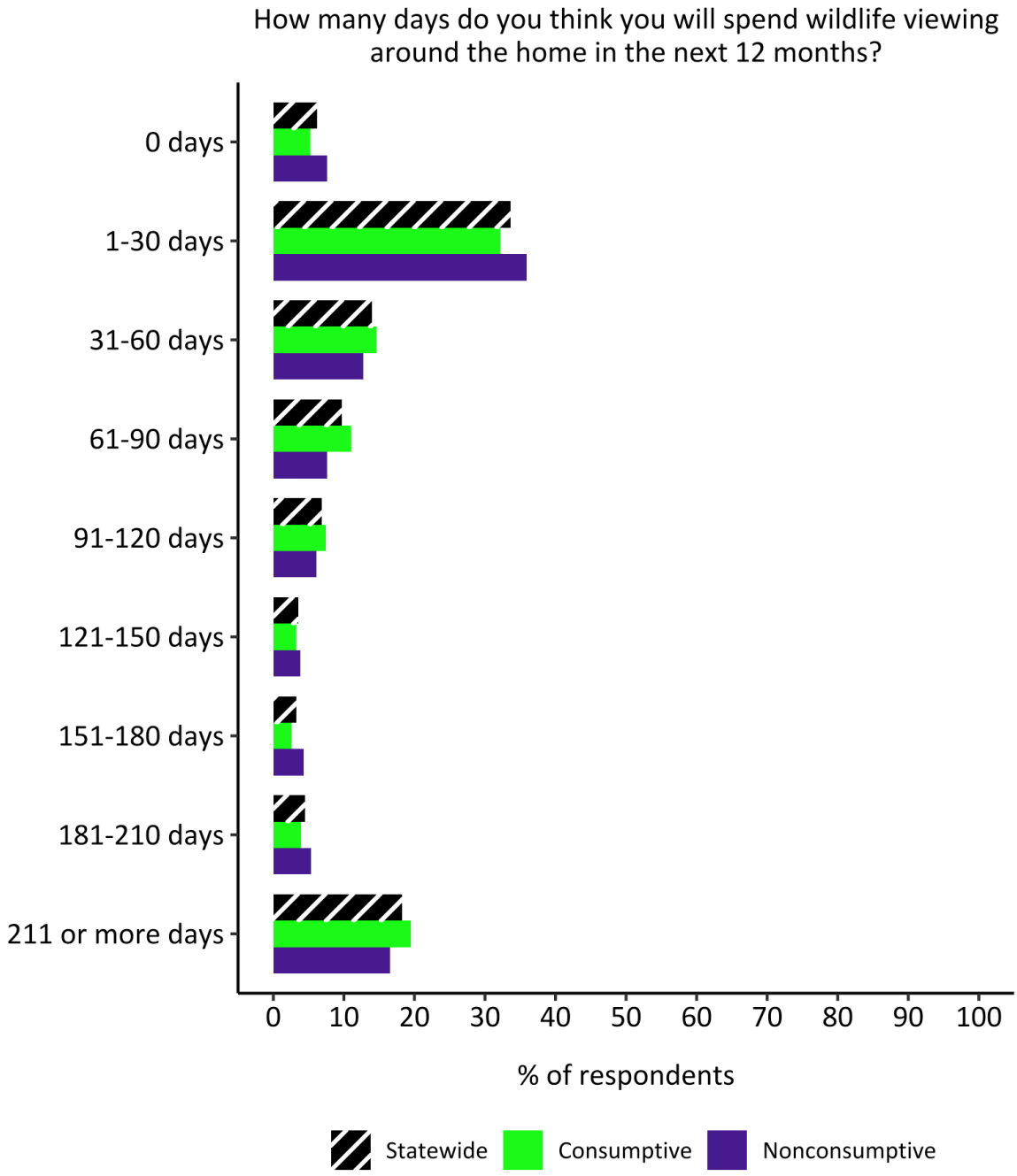


Figure 21: Days anticipated spent viewing around the home in the upcoming year

Days wildlife viewers in Arkansas anticipated spending wildlife viewing around the home in the upcoming year for statewide, consumptive, and nonconsumptive groups. This includes wildlife viewers who began participating in wildlife viewing during the pandemic. A chi-square run with three categories ("0 days," "1-30 days," and "> 30 days"), due to low sample sizes, indicated no statistically significant differences in time spent viewing around the home in the upcoming year between consumptive and nonconsumptive viewers (Table 17).

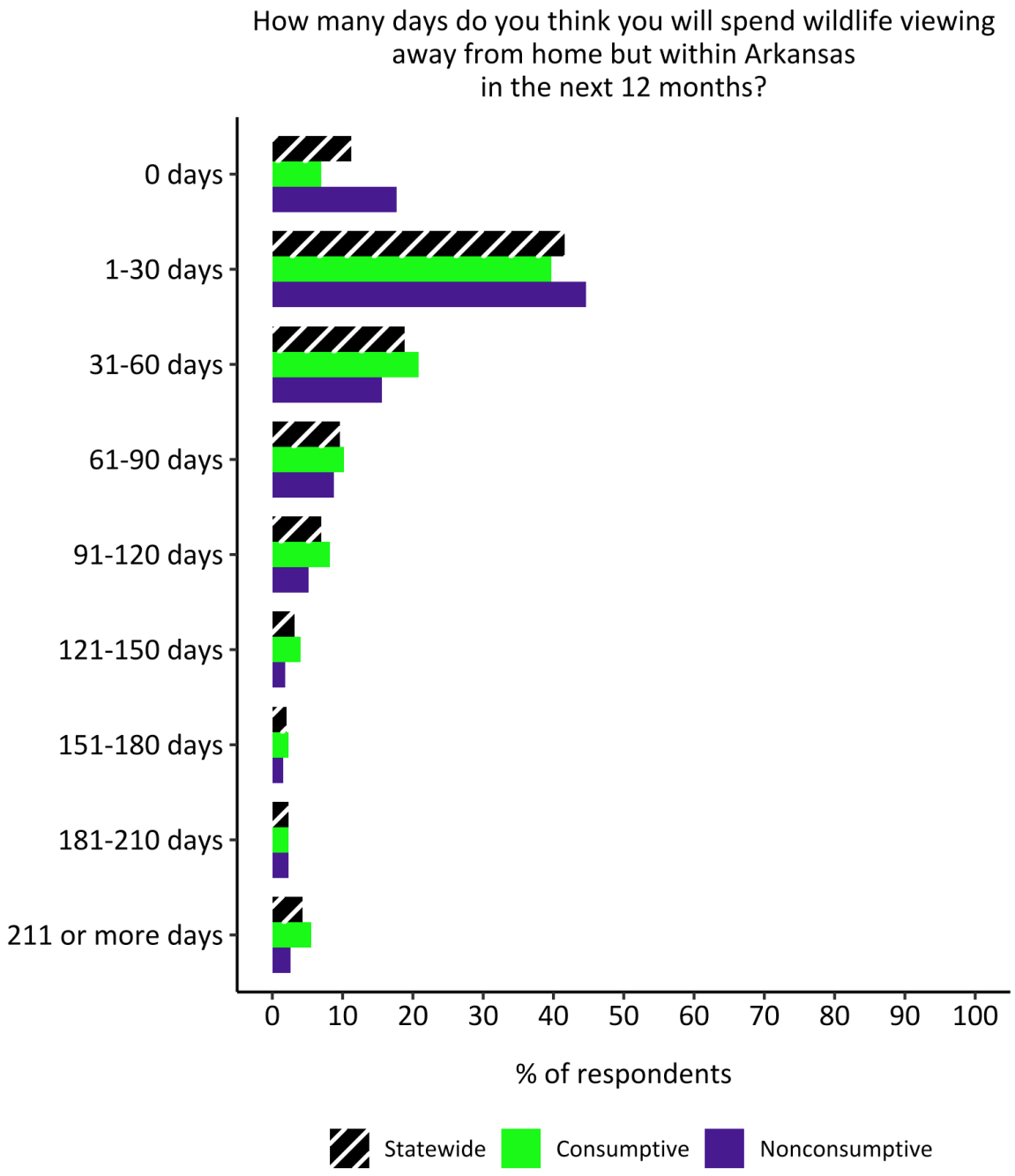


Figure 22: Days anticipated spent viewing away from home in the upcoming year

Days wildlife viewers in Arkansas anticipated spending wildlife viewing away from home but within Arkansas in the upcoming year for statewide, consumptive, and nonconsumptive groups. This includes wildlife viewers who began participating in wildlife viewing during the pandemic. A chi-square run with only three categories ("0 days," "1-30 days," and "> 30 days"), due to low sample sizes, indicated that there were statistically significant differences in away-from-home viewing in the upcoming year for consumptive and nonconsumptive viewers (Table 17).

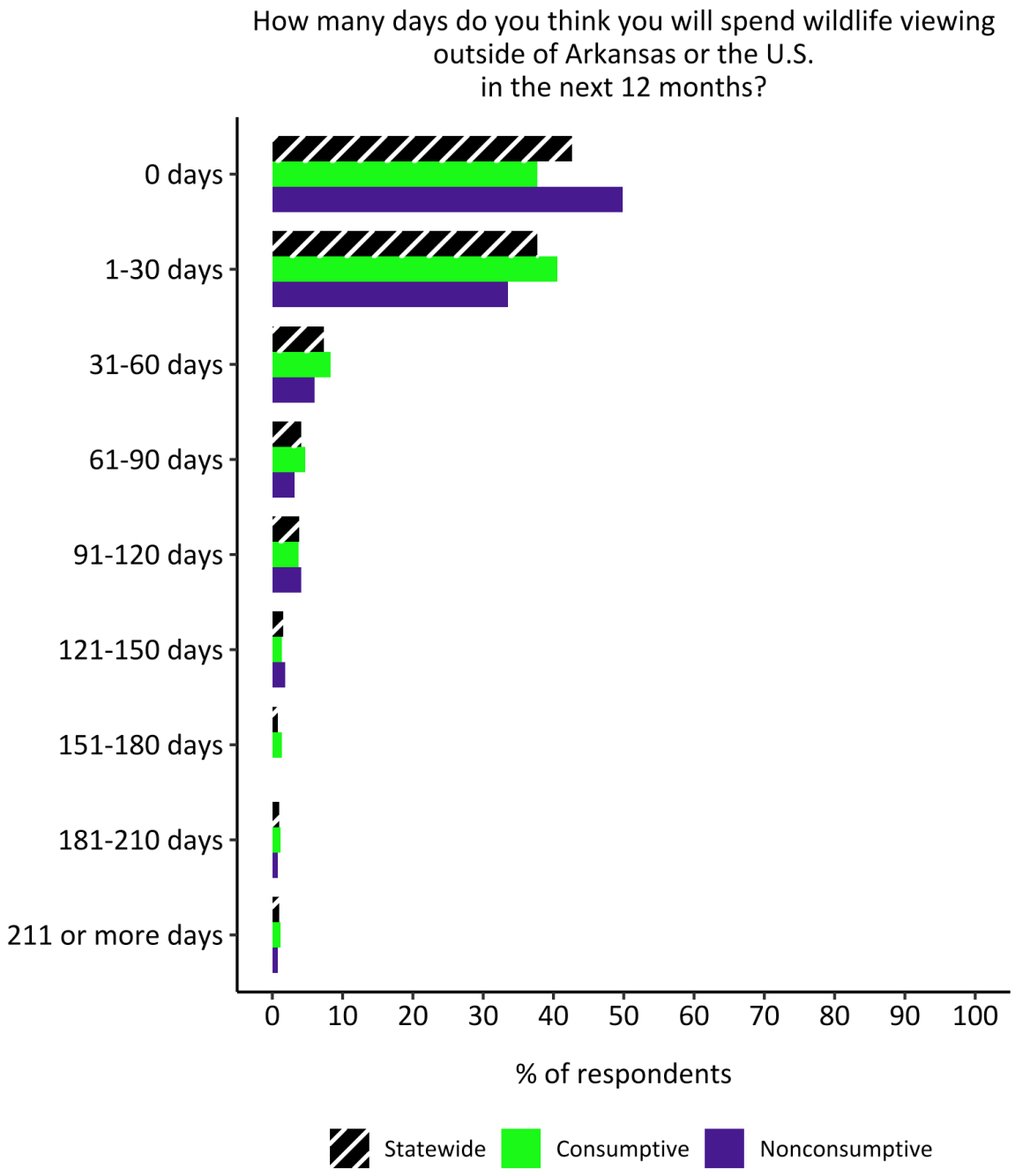


Figure 23: Days anticipated spent viewing out of state or U.S. in the upcoming year

Days wildlife viewers in Arkansas anticipated spending wildlife viewing outside of Arkansas or the U.S. in the upcoming year for statewide, consumptive, and nonconsumptive groups. This includes wildlife viewers who began participating in wildlife viewing during the pandemic. A chi-square run with only three categories ("0 days," "1-30 days," and "> 30 days"), due to low sample sizes, indicated that there was a statistically significant difference in time spent viewing around the home in the upcoming year between consumptive and nonconsumptive viewers (Table 17).

Wildlife viewing location

In addition to understanding around-the-home, away-from-home, and out-of-state viewing, we further examined the land ownership status of locations where respondents participate in wildlife viewing within Arkansas. Wildlife viewing takes place across all land ownership statuses: from state and privately-owned land (Bensen, 2001) to federally-owned land (Abrams et al., 2020), with vastly different managerial implications for each setting. We asked respondents: "In a typical year, in which locations do you participate in wildlife viewing in Arkansas?" This question was adapted from the Virginia Wildlife Recreation Survey (Grooms et al., 2019) to include options more applicable to the state setting. A list of seven locations was provided, featuring a mix of public, private, and tribal lands. In addition, an option reading: "I am unsure who owns or manages the areas where I participate in wildlife viewing" (4.3% of respondents selected this) was also provided. Finally, a mutually exclusive option reading: "I do not participate in wildlife viewing in any of the above locations" (1.2% of respondents selected this) was also provided. This mutually exclusive option was excluded from analysis.

About 84% of respondents reported viewing in more than one location (Table 18; Figure 24). Respondents most commonly reported wildlife viewing at their own home or property (81%), followed by state-managed areas (61%), such as state parks, forests, boat landings, fishing areas, conservation areas, or Wildlife Management Areas. Over half (55%) of wildlife viewers in Arkansas also utilized locally-managed areas, such as town or county parks, trails, or open spaces. The least common location for wildlife viewing was tribal lands (5.0%).

Statistical tests indicated several statistically significant differences between consumptive and nonconsumptive wildlife viewers for where they viewed wildlife. First, a t-test indicated that the mean number of wildlife viewing locations for consumptive (M = 3.47, SD = 1.59) wildlife viewers was significantly higher than nonconsumptive viewers (M = 2.77, SD = 1.37; t = -7.38, df = 912, p < .001). Second, chi-square tests indicated that significantly more consumptive viewers participated than nonconsumptive viewers in wildlife viewing on the property of a friend or family member, other privately-owned areas (such as lands owned by land trusts, non-profit organizations, private companies, or individuals), locally-managed lands, state-managed lands, federally-managed lands (such as National Parks, National Wildlife Refuges, Bureau of Land Management Land, Waterfowl Production Areas, or National Forests), and tribal lands (Table 18; Figure 24).

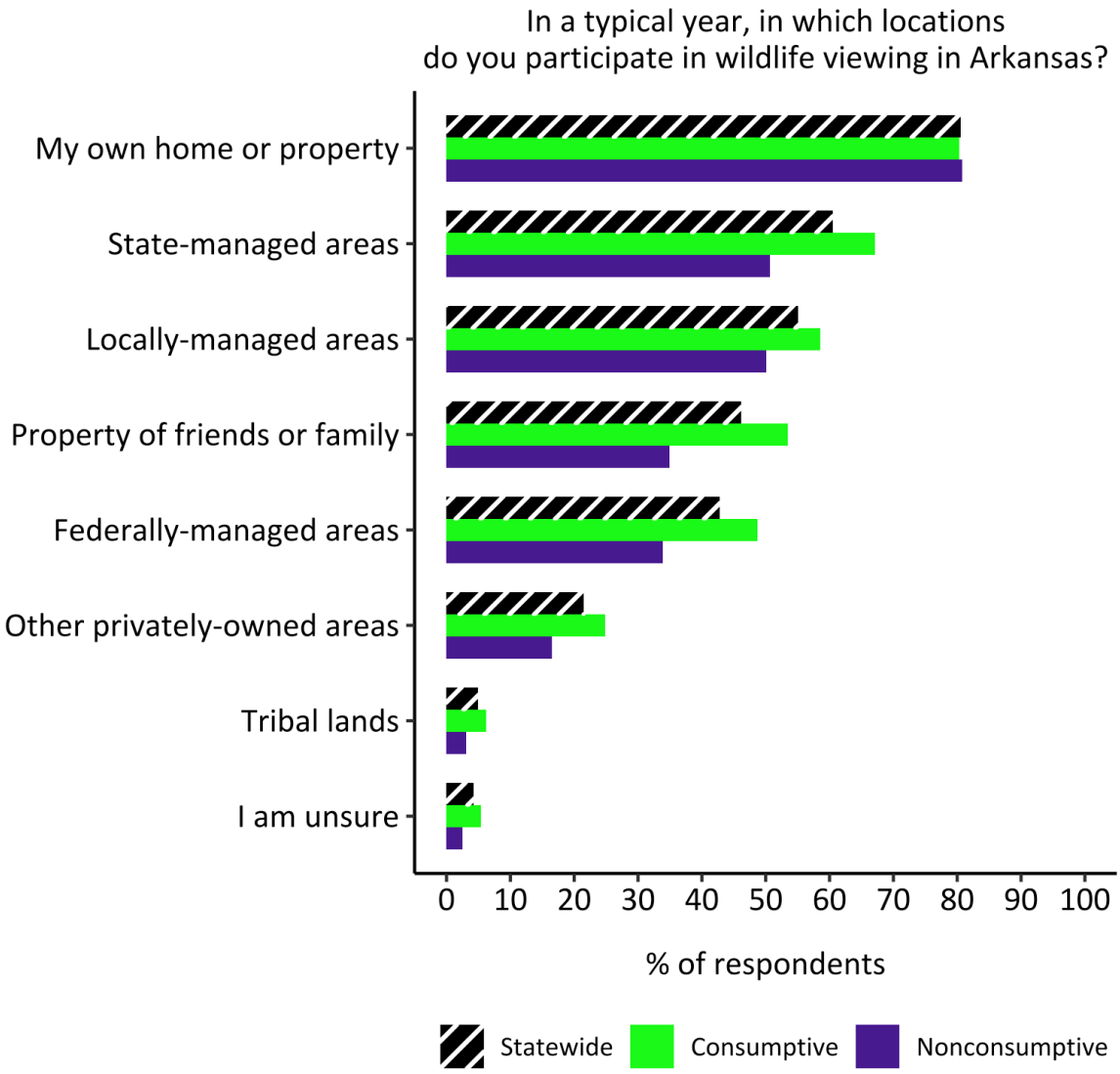


Figure 24: Wildlife viewing locations

Locations wildlife viewers in Arkansas reported participating in wildlife viewing in a typical year for statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one option. A chi-square test across regions revealed a number of statistically significant differences. Chi-square tests indicated that significantly more consumptive than nonconsumptive viewers participated in wildlife viewing on the property of a friend or family member, other privately-owned areas, locally-managed lands, state-managed lands, federally-managed lands, and tribal lands (Table 18).

Wildlife viewing-related expenditures

Wildlife viewing-related expenditures generate significant economic activity; the National Survey of Wildlife Recreation valued wildlife viewing-related expenditures at $75.9 billion in 2016. This 2016 survey also assessed wildlife viewers' trip-related expenses (food and lodging,

transportation, and other trip costs), equipment expenditures (wildlife-watching equipment, auxiliary equipment, and special equipment), and total other expenses (land leasing and owning, plantings, membership dues and contributions, magazines, books, and DVDs; U.S. DOI et al., 2016). To ease respondent burden, we collapsed the National Survey of Wildlife Recreation categories into two: trip-related costs and all other wildlife viewing expenses and equipment. We provided respondents with a drop-down box consisting of 12 equal-sized ($50 increments) options informed by the range of responses in the National Survey of Wildlife Recreation.

Over half (56%) of survey respondents reported spending $100 or less on wildlife viewing trip-related costs annually. About 19% of respondents reported spending no money on trip-related costs annually, and only 7.2% of respondents reported spending $501 or more on trip-related costs annually.

A chi-square test indicated that wildlife viewing-related expenditures varied significantly when comparing consumptive and nonconsumptive wildlife viewers ($\chi^2 = 62.05$, $df = 11$, $p < .001$; Table 19; Figure 25). Nearly one-third (29%) of nonconsumptive viewers reported spending $0 annually on trip-related expenses, over twice as many in comparison to consumptive viewers (12%; Table 19; Figure 25).

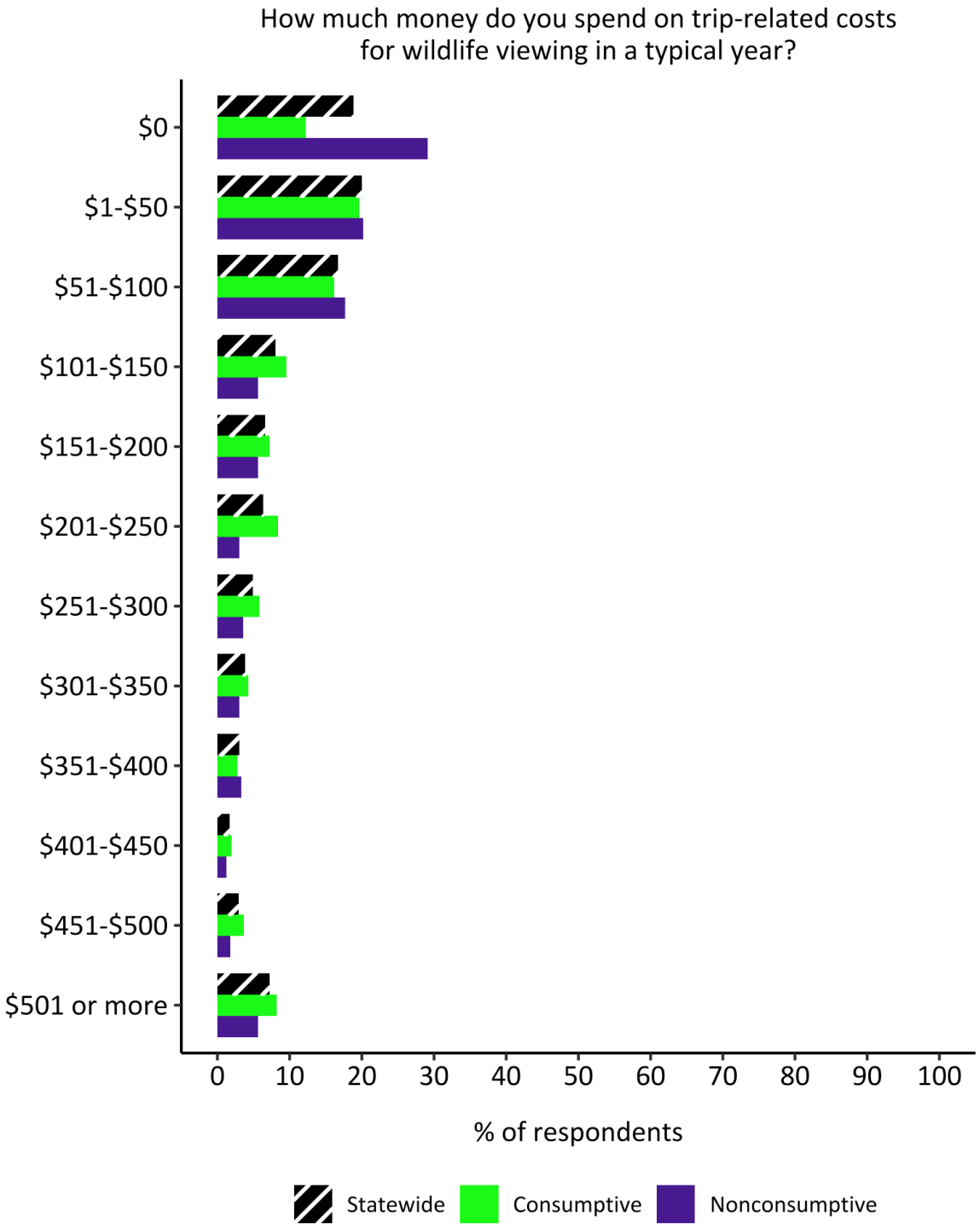


Figure 25: Trip-related wildlife viewing expenditures

Trip-related expenditures for wildlife viewing in a typical year reported by wildlife viewers in Arkansas for statewide, consumptive, and nonconsumptive groups. A chi-square test indicated that wildlife viewing trip-related expenditures varied significantly when comparing consumptive and nonconsumptive wildlife viewers (Table 19).

We also asked wildlife viewers about their other wildlife viewing-related costs, such as binoculars, hiking or boating equipment for viewing, field guides, bird feeders or bird foods, or membership dues for wildlife viewing organizations. More than half of respondents (54%) indicated spending $100 or less on other wildlife viewing-related expenses. Around 17% of respondents reported spending no money annually, with slightly more spending $1-50 in a typical year (23%). Only 5.5% of respondents reported spending $501 or more during a typical year.

Another chi-square test indicated that other wildlife viewing-related expenditures were significantly different between consumptive and nonconsumptive viewers, with far more nonconsumptive viewers spending between $0-50 in comparison to consumptive viewers, whose expenditures were generally higher ($\chi^2 = 59.77$, $df = 11$, $p < .001$; Table 20; Figure 26).

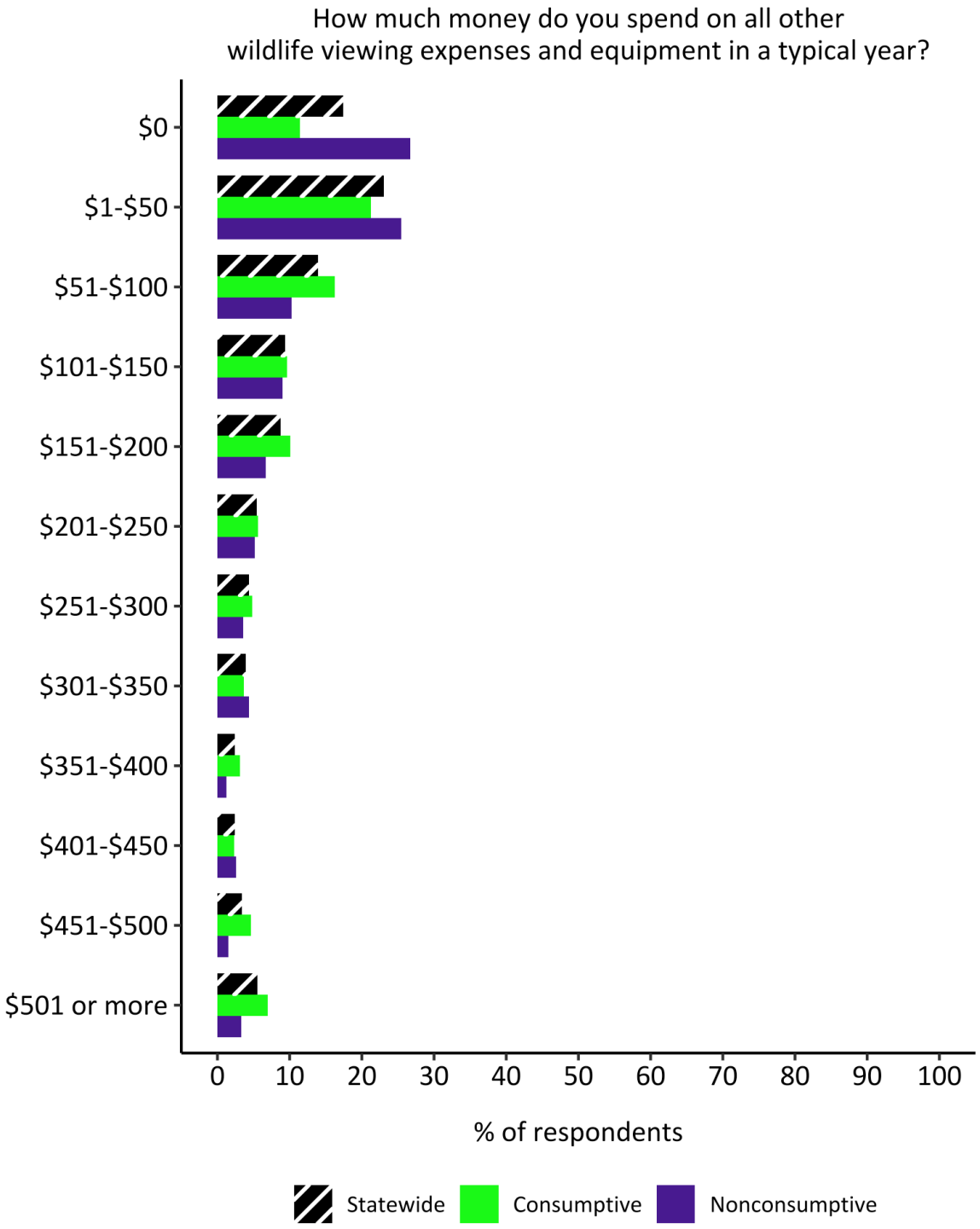


Figure 26: Other wildlife viewing-related expenditures

Other wildlife viewing-related expenditures in a typical year reported by wildlife viewers in Arkansas for statewide, consumptive. and nonconsumptive groups. A chi-square test indicated that other wildlife viewing-related expenditures varied significantly when comparing consumptive and nonconsumptive wildlife viewers (Table 20).

Other outdoor recreation

Recent research has demonstrated that many wildlife recreationists participate in multiple forms of outdoor recreation that may include both consumptive and nonconsumptive uses of wildlife (Grooms et al., 2019). In order to explore this overlap in recreation participation among wildlife viewers, we asked respondents to indicate which other form(s) of outdoor recreational activity, out of a list of 17 options, they participate in during a typical year besides wildlife viewing. The list of other outdoor recreation activities used in the survey was adapted from the Virginia Wildlife Recreation Survey (Grooms et al., 2019).

Overall in Arkansas, 85% of viewers indicated that they participate in at least one other form of outdoor recreation. On average, respondents indicated participation in five other forms of outdoor recreation (M = 4.79, SD = 2.91). Only 5.3% of wildlife viewers did not participate in any other forms of outdoor recreation. Over half of wildlife viewers reported participating in running, walking, or jogging (57%), as well as camping (52%). Just less than half (47%) of respondents participated in hiking or backpacking. In Arkansas, the least popular forms of outdoor recreation among wildlife viewers were winter sports (such as skiing, snowboarding, or snowshoeing; 8.0%), geocaching (9.3%), and rock climbing or bouldering (11%).

As the classification of consumptive and nonconsumptive viewers used throughout this report was generated with the responses from this survey question, additional analyses on differences between consumptive and nonconsumptive viewers could not be performed for hunter-viewers, angler-viewers, or viewers who did not participate in any other forms of outdoor recreation. In Arkansas, over 60% of respondents indicated that they participated in hunting (30%) or fishing (57%), with fishing being more popular. Specifically, 31% of wildlife viewers in Arkansas only fish, 4.0% only hunt, and 26% hunt and fish.

Chi-square tests indicated many statistically significant differences between consumptive and nonconsumptive wildlife viewers, although with low number of respondents for several of the categories for both consumptive and nonconsumptive viewers (Table 21; Figure 27). Significantly more consumptive viewers participated in most other forms of outdoor recreation in comparison to nonconsumptive viewers, except for geocaching, botanizing, road/mountain biking, and running, jogging, or walking, for which frequencies were not statistically significantly different between viewer categories. In addition, we found that 13% of nonconsumptive viewers did not participate in any of the forms of outdoor recreation listed in our survey, which is over twice the proportion of all survey respondents (5.3%).

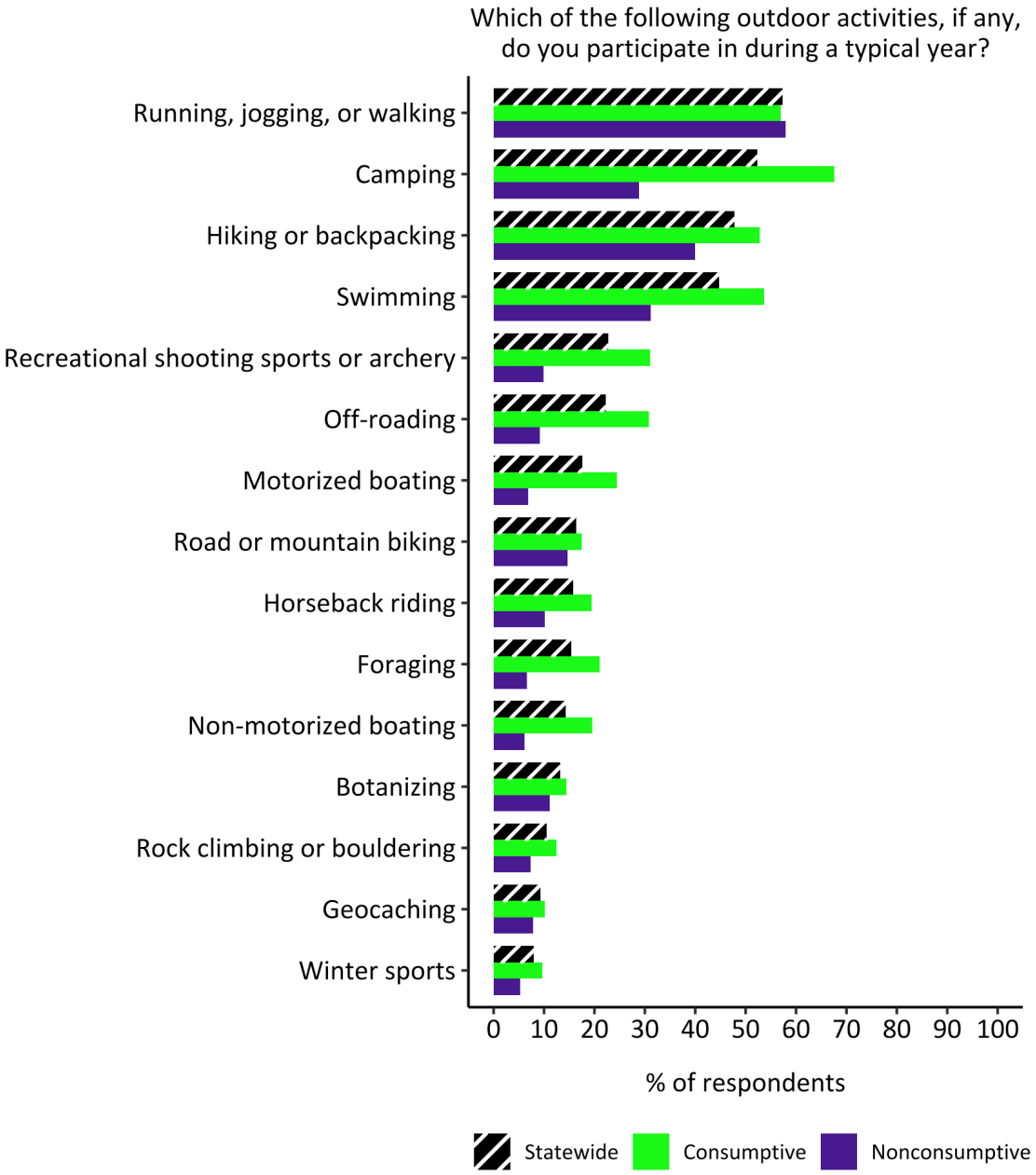


Figure 27: Other outdoor recreation activities

Outdoor activities that wildlife viewers in Arkansas report participating in during a typical year for statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one option. Hunting and fishing are omitted from the figure as these activities were used to generate the consumptive and nonconsumptive group definitions and the category for no other activities is excluded since all of these viewers are "nonconsumptive" by default. Chi-square tests indicated statistically significant differences between consumptive and nonconsumptive wildlife viewers for all testable forms of outdoor recreation, except for geocaching, botanizing, road/mountain biking, and running, jogging, or walking (Table 21).

Conservation behaviors

The literature shows that wildlife viewers, particularly those who participate in both birdwatching and hunting (similar to our consumptive viewers, which also includes anglers and wildlife viewers other than birdwatchers), are more likely to engage in pro-environmental behaviors, or conservation behaviors, than non-wildlife viewers (Cooper et al., 2015). We asked respondents to indicate how likely they would be to participate in seven different conservation behaviors within the next five years, if they had the opportunity to do so. These conservation behaviors were adapted from survey items used by Larson et al. (2015) and were selected to represent each of the four pro-environmental behavior domains identified in that study. Larson et al. (2015) described pro-environmental behaviors in the following four domains: 1) conservation lifestyle, which includes private, household activities with environmental benefits, such as recycling and green consumerism; 2) land stewardship, which involves interaction with local ecosystems to create, manage, or monitor wildlife habitats; 3) social environmentalism, which refers to activities that center on social interaction, such as communicating with or teaching others about the environment or environmental actions; and 4) environmental citizenship, which refers to financial or political contributions to environmental causes through donations, voting, and other forms of advocacy.

Wildlife viewers most often reported being likely to clean up trash or litter, with 59% of respondents selecting that they were *very likely* or *extremely likely* to participate in this conservation behavior (Table 22; Figure 28). Arkansans were next most likely to participate in civic engagement (such as voting or advocating) related to wildlife conservation, with 34% of respondents selecting that they were *very likely* or *extremely likely* to participate in this conservation behavior. Similarly, 34% of respondents reported that they were *very likely* or *extremely likely* to purchase products that benefit wildlife or whose proceeds support conservation. Respondents least often reported being *very likely* or *extremely likely* to collect data on wildlife or habitats to contribute to science or management (22%) or to inform or teach others about wildlife conservation (21%).

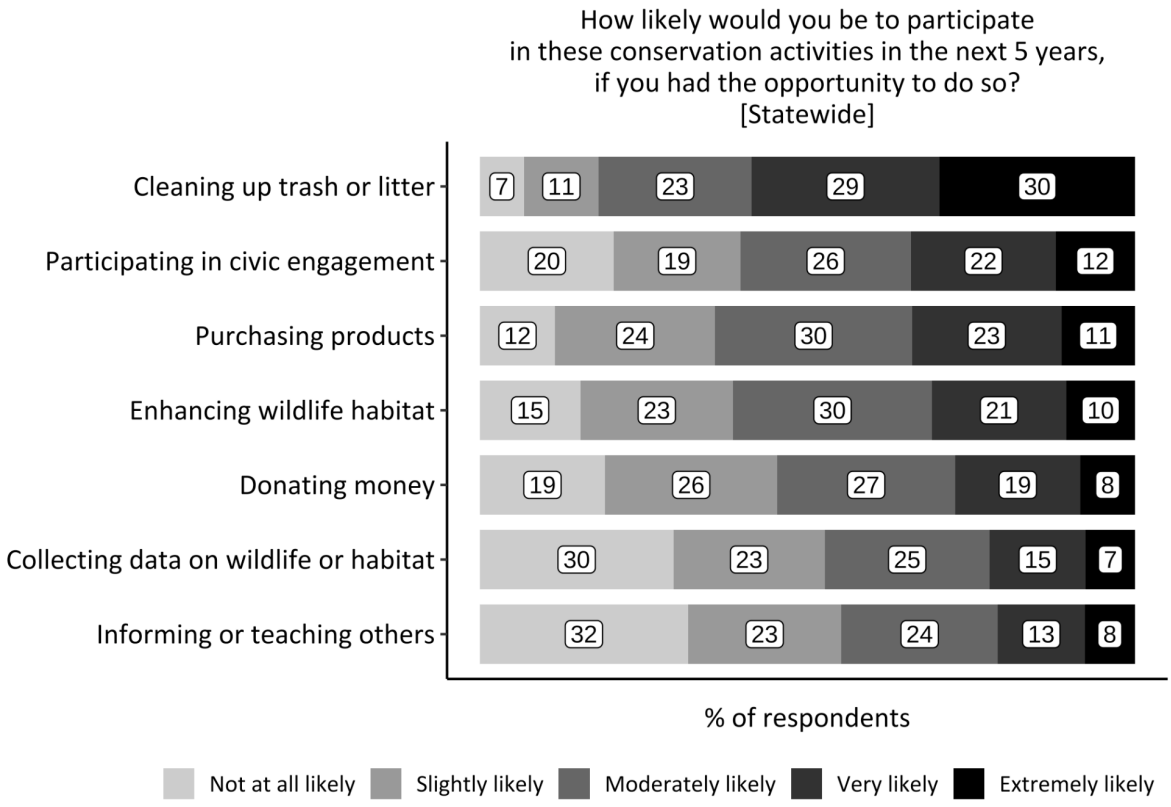


Figure 28: Likelihood of participating in conservation behaviors, statewide sample

Wildlife viewers' reported likelihood of participating in different conservation behaviors at the statewide level in the next 5 years, if they had the opportunity to do so. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of gray darkens with increasing likelihood of participation.

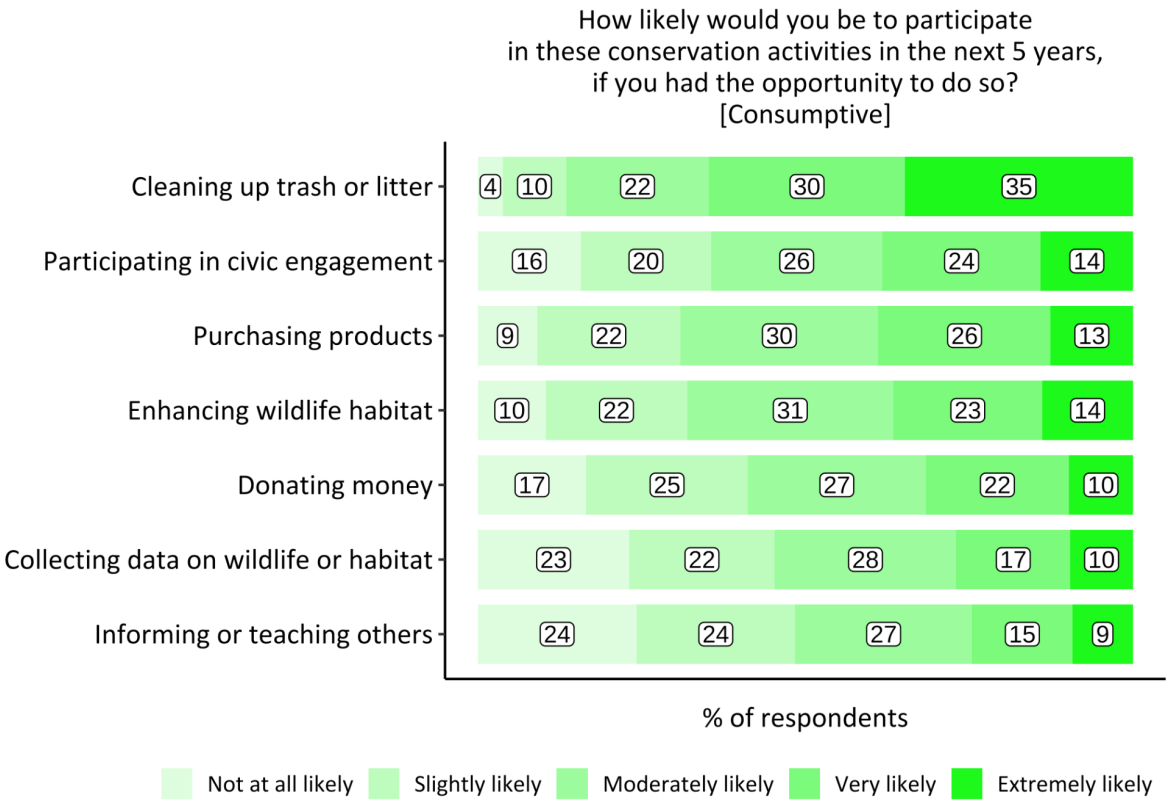


Figure 29: Likelihood of participating in conservation behaviors, consumptive respondents

Consumptive wildlife viewers' reported likelihood of participating in different conservation behaviors in the next 5 years, if they had the opportunity to do so. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of green darkens with increasing likelihood of participation.

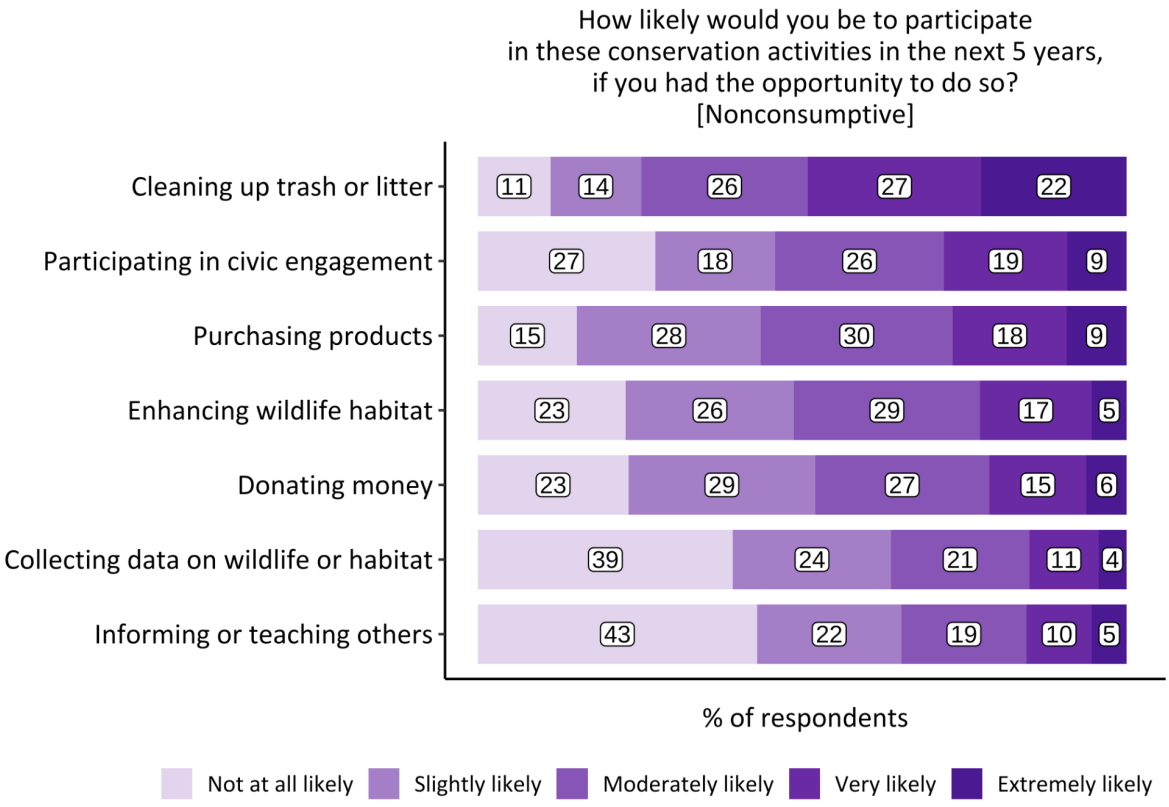


Figure 30: Likelihood of participating in conservation behaviors, nonconsumptive respondents

Nonconsumptive wildlife viewers' reported likelihood of participating in different conservation behaviors in the next 5 years, if they had the opportunity to do so. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of purple darkens with increasing likelihood of participation.

We also asked respondents to indicate how likely they would be to participate in these same seven conservation behaviors with or in support of AGFC within the next five years if they had the opportunity to do so. Again, wildlife viewers most often reported being *very likely* or *extremely likely* to clean up trash or litter (58%), participate in civic engagement (such as voting or advocating) related to wildlife conservation (35%), or purchase products that benefit wildlife or whose proceeds support conservation (34%). They least often reported being *very likely* or *extremely likely* to work with or for their state agencies to collect data on wildlife or habitat (25%) or to inform or teach others about wildlife conservation (22%; Table 24; Figure 31).

Response patterns for this question were similar to the likelihood of wildlife viewers to conduct these activities independent of their state agencies. Chi-square tests indicated statistically significant differences for consumptive and nonconsumptive viewers for all conservation behaviors listed in the survey, with and without AGFC support. For all conservation behaviors,

more consumptive wildlife viewers reported higher levels of likelihood of participating (Table 23; Table 25; Figures 29; Figure 30; Figure 32; Figure 33).

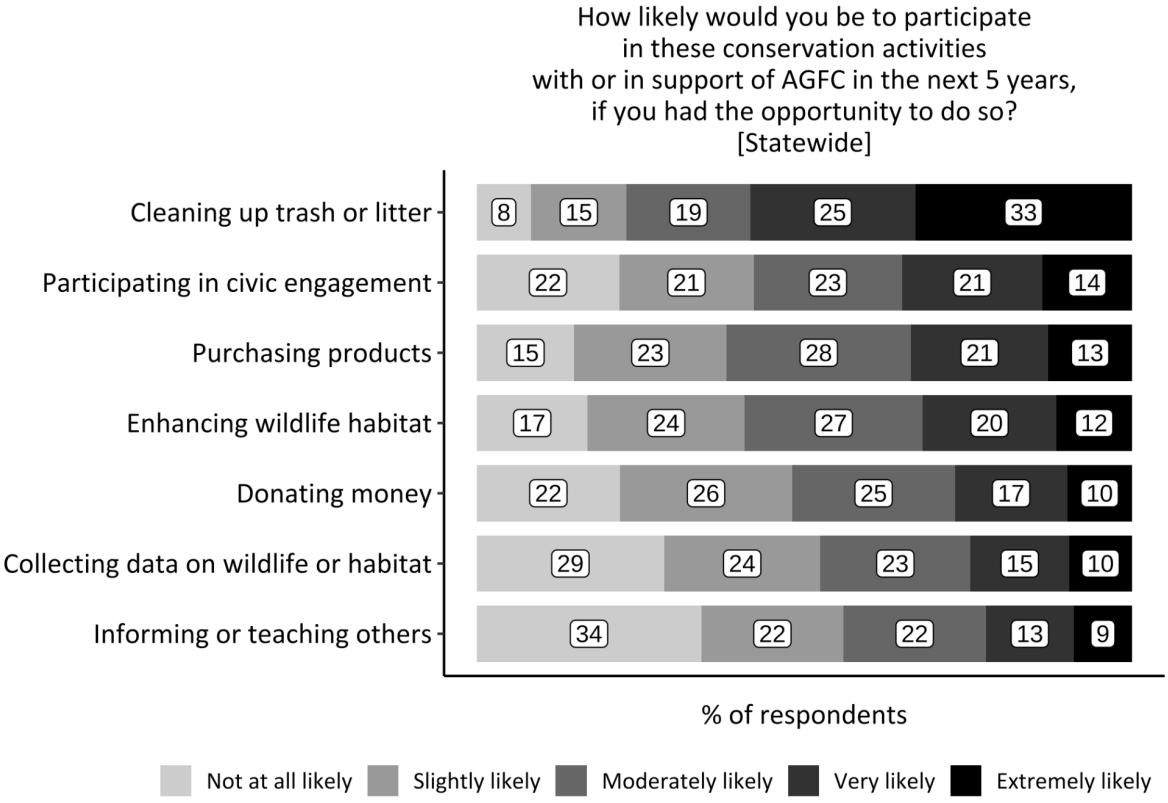


Figure 31: Likelihood of participating in conservation behaviors with or in support of state agency, statewide sample

Wildlife viewers' reported likelihood of participating in different conservation behaviors at the statewide level with or in support of AGFC in the next 5 years, if they had the opportunity to do so. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of gray darkens with increasing likelihood of participation.

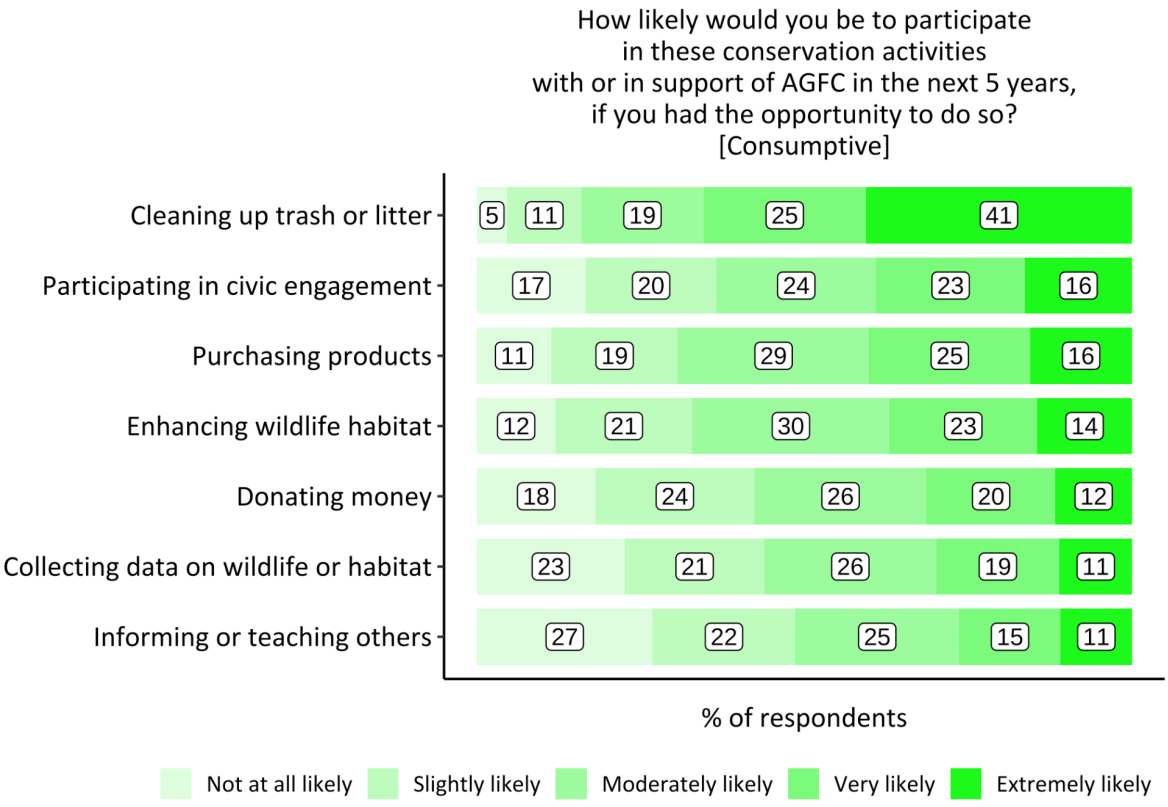


Figure 32: Likelihood of participating in conservation behaviors with or in support of state agency, consumptive respondents

Consumptive wildlife viewers' reported likelihood of participating in different conservation behaviors with or in support of AGFC in the next 5 years, if they had the opportunity to do so. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of green darkens with increasing likelihood of participation.

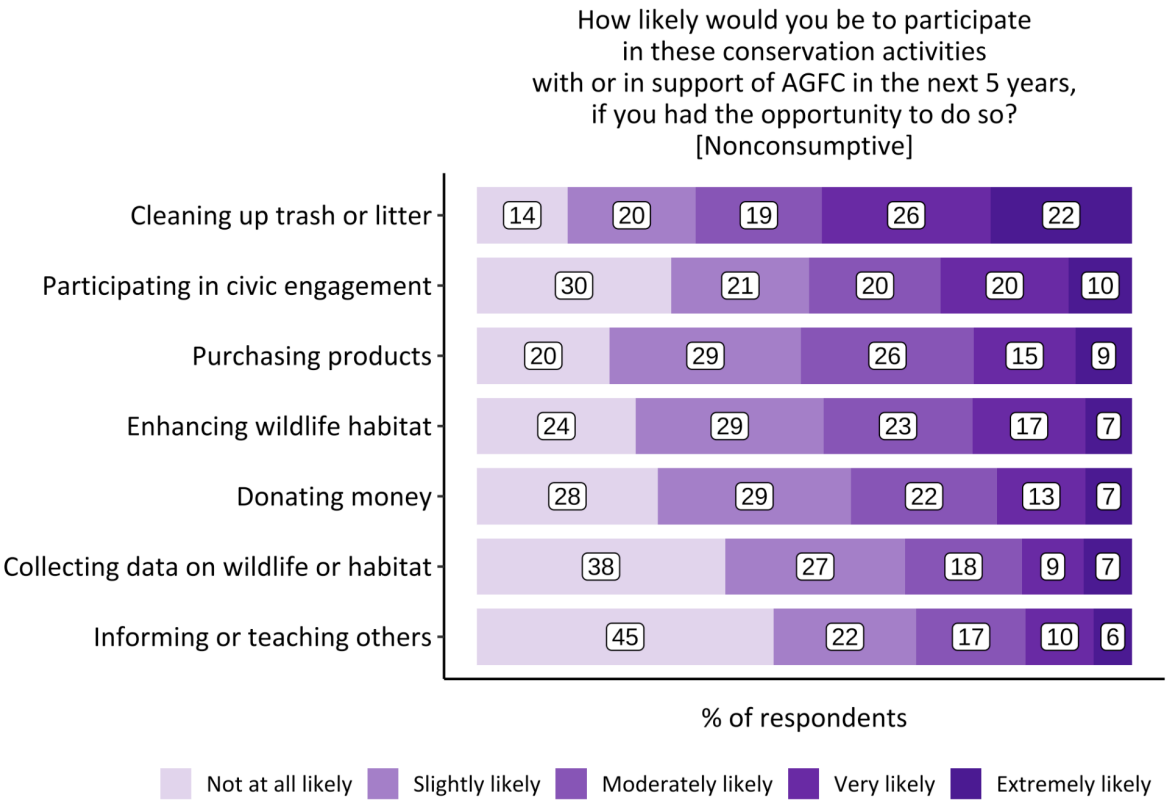


Figure 33: Likelihood of participating in conservation behaviors with or in support of state agency, nonconsumptive respondents

Nonconsumptive wildlife viewers' reported likelihood of participating in different conservation behaviors with or in support of AGFC in the next 5 years, if they had the opportunity to do so. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of purple darkens with increasing likelihood of participation.

Barriers to wildlife viewing

Wildlife viewers experience a variety of barriers to their participation in the activity including but not limited to time, lack of financial or transportation resources, or not knowing where to view wildlife (U.S. DOI et al., 2016; Grooms et al., 2019; NAWMP, 2021). To examine barriers to participation in wildlife viewing, we provided respondents with a list of 14 common barriers and asked them to indicate the extent to which each of the barriers limited their participation in wildlife viewing, with response options ranging from 1 (*not at all*) to 5 (*a great deal*). We adapted the list from the National Survey of Birdwatchers (NAWMP, 2021) with input from our Multi-State Steering Committee.

Our results indicate that lack of free time is the greatest barrier of those examined in this study, with over half (56%) of respondents indicating that this limited participation in wildlife viewing

somewhat, *quite a bit*, or *a great deal*. This was followed by distance to high-quality locations for wildlife viewing (54% limited *somewhat*, *quite a bit*, or *a great deal*) and financial costs associated with wildlife viewing (48% limited *somewhat*, *quite a bit*, or *a great deal*; Table 26; Figure 34). The barrier that limited wildlife viewers in Arkansas the least was a lack of transportation to wildlife viewing locations, with only 32% of respondents indicating that this barrier limited their participation in wildlife viewing *somewhat*, *quite a bit*, or *a great deal*.

Chi-square tests indicated a few statistically significant differences for consumptive and nonconsumptive wildlife viewers. Generally, consumptive viewers were limited to a greater extent than nonconsumptive viewers by lack of free time, lack of organized opportunities for wildlife viewing, and accessibility challenges for themselves or the people they go wildlife viewing with (Table 27; Figures 35-36).

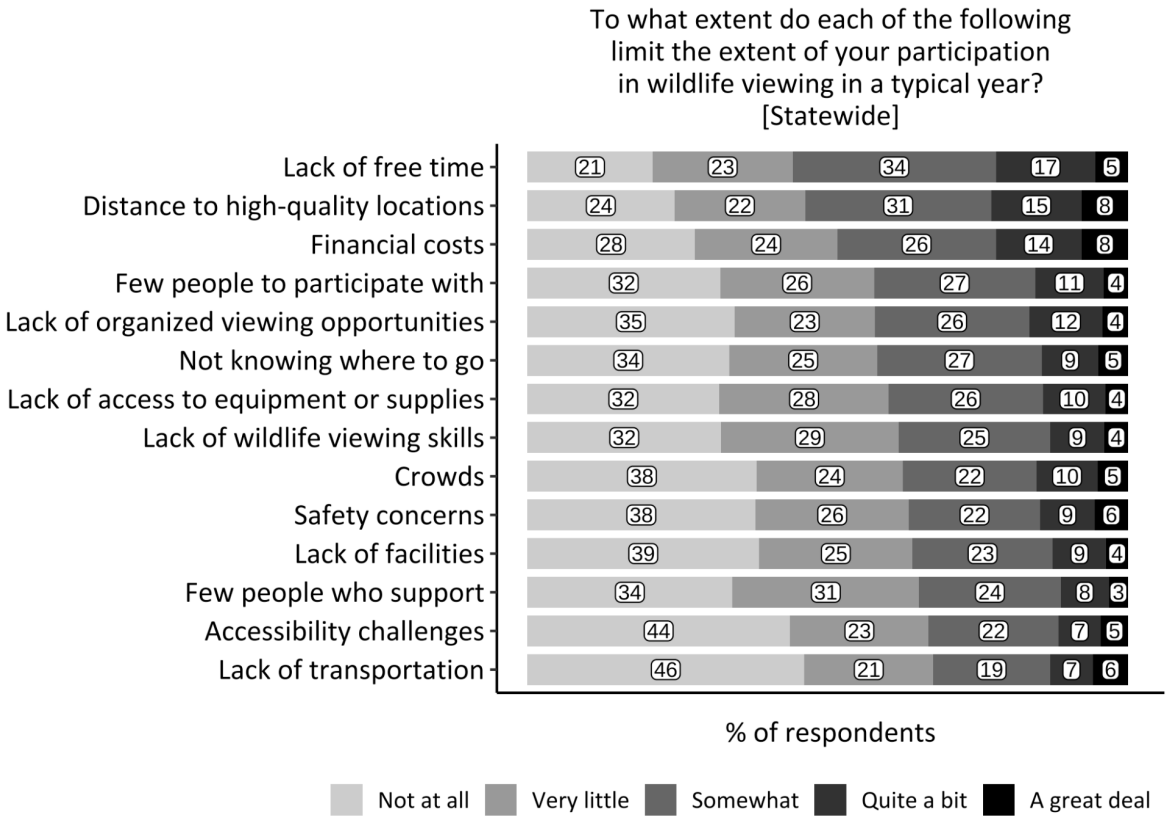


Figure 34: Barriers to wildlife viewing, statewide sample

Wildlife viewers' reported extent to which each of the barriers limited their participation in wildlife viewing at the statewide level. Blocks represent the percentage of respondents who fell into each of the five categories: *not at all* to *a great deal*. The lightest gray boxes represent the viewers that indicated an item as being *not at all* a barrier to their participation; boxes darken as the level of barrier increases.

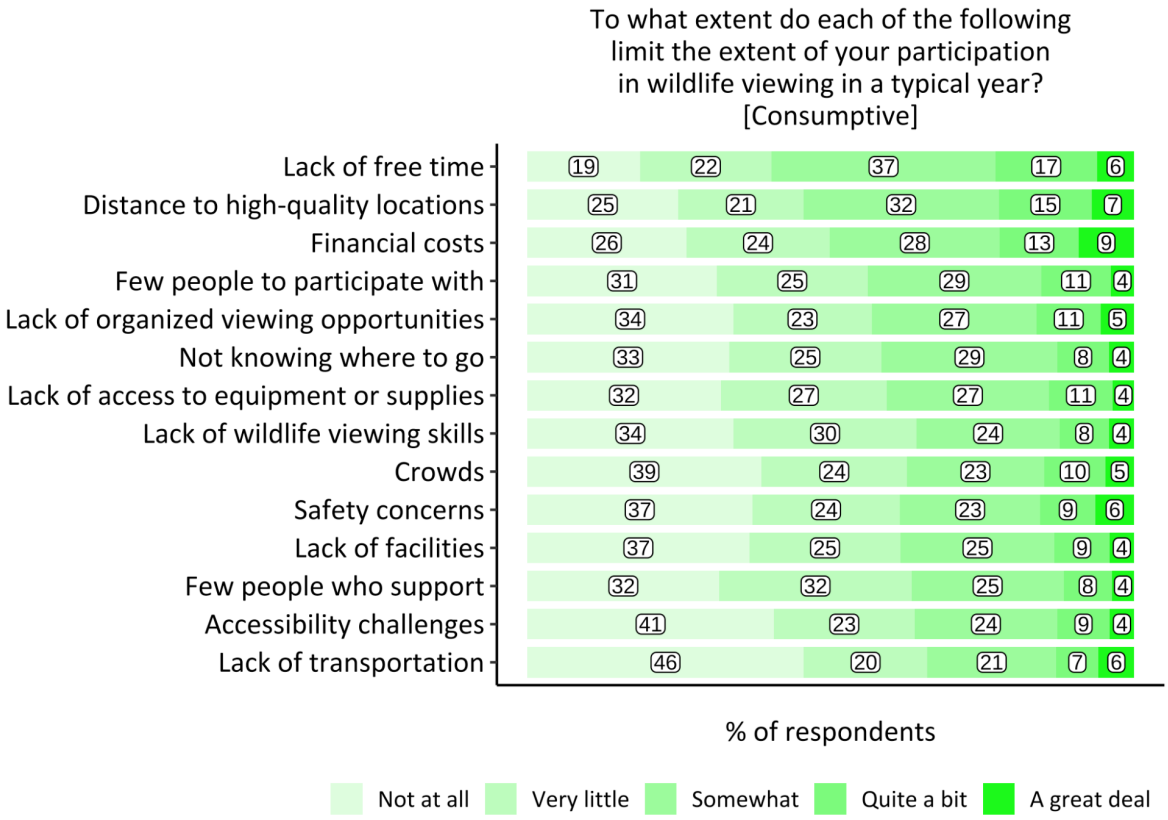


Figure 35: Barriers to wildlife viewing, consumptive respondents

Consumptive wildlife viewers' reported extent to which each of the barriers limited their participation in wildlife viewing. Blocks represent the percentage of respondents who fell into each of the five categories: *not at all* to *a great deal*. The lightest green boxes represent the viewers that indicated an item as being *not at all* a barrier to their participation; boxes darken as the level of barrier increases.

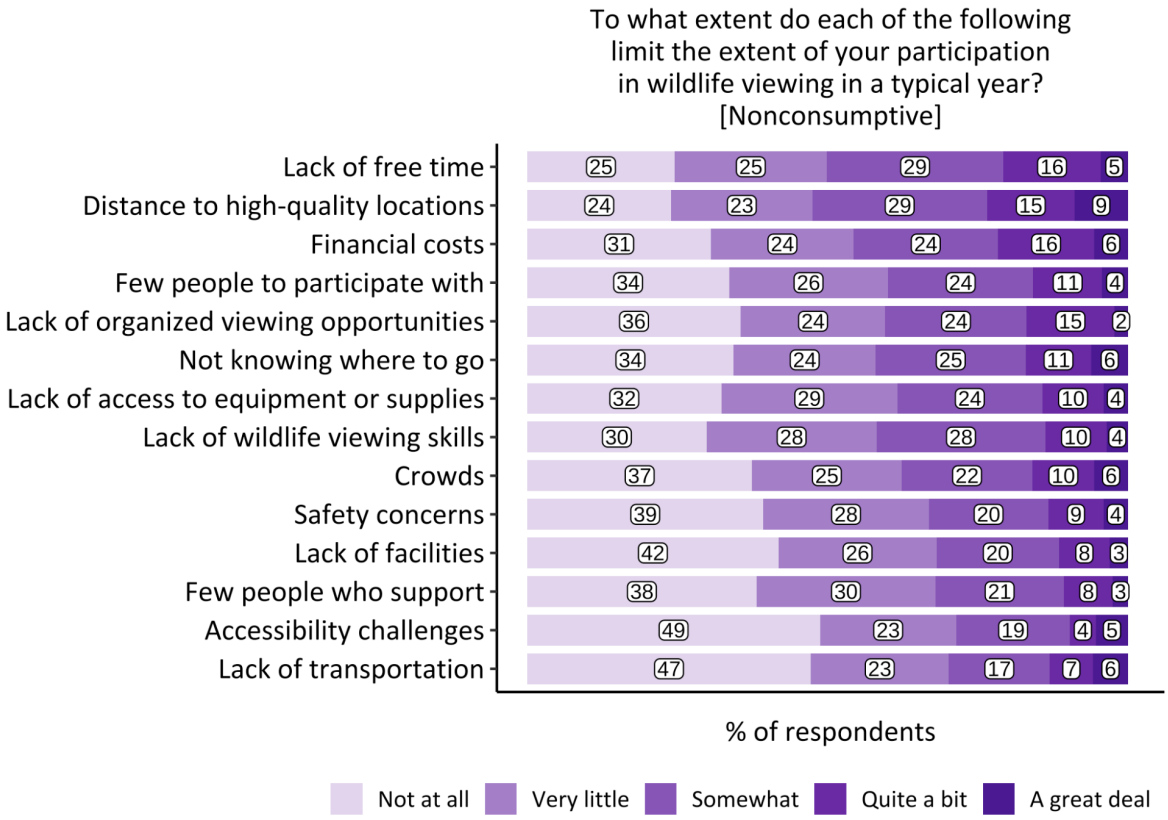


Figure 36: Barriers to wildlife viewing, nonconsumptive respondents

Nonconsumptive wildlife viewers' reported extent to which each of the barriers limited their participation. Blocks represent the percentage of respondents who fell into each of the five categories: *not at all* to *a great deal*. The lightest purple boxes represent the viewers that indicated an item as being *not at all* a barrier to their participation; boxes darken as the level of barrier increases.

Groups that encourage participation in wildlife viewing

Social support, or the resources either perceived or provided by friends, family, mentors, peers, and other groups (Gottlieb & Bergen, 2010), is linked to sustained higher levels of participation in outdoor recreation. For example, birders who have a friend or relative who also birds spend more time birding and have more birding knowledge than those who do not (Schoffman et al. 2015; Rutter et al., 2021). To further understand mechanisms of social support for wildlife viewing, we asked our respondents to what extent family, friends, peers, and mentors encourage their participation, with response options ranging from 1 (*not at all*) to 5 (*a great deal*).

Respondents indicated that family provided the greatest extent of encouragement to participate, with 72% indicating that family members encouraged their wildlife viewing *somewhat*, *quite a bit*, or *a great deal*. This was followed by friends at 60%, peers at 47%, and

mentors at 43%. Respondents relied on social support from mentors the least out of all four groups, with 40% of all respondents indicating that mentors did not encourage their participation at all.

Chi-square tests indicated that the extent to which each social group encouraged respondents' participation in wildlife viewing differed significantly between consumptive and nonconsumptive viewers for all social support groups (Tables 28-31; Figures 38-39). In all four cases, more nonconsumptive viewers reported that they felt no social support at all from the groups in comparison to consumptive viewers. Additionally, in all cases, more consumptive viewers reported that they felt that these social groups encouraged their participation in wildlife viewing *quite a bit* and *a great deal*.

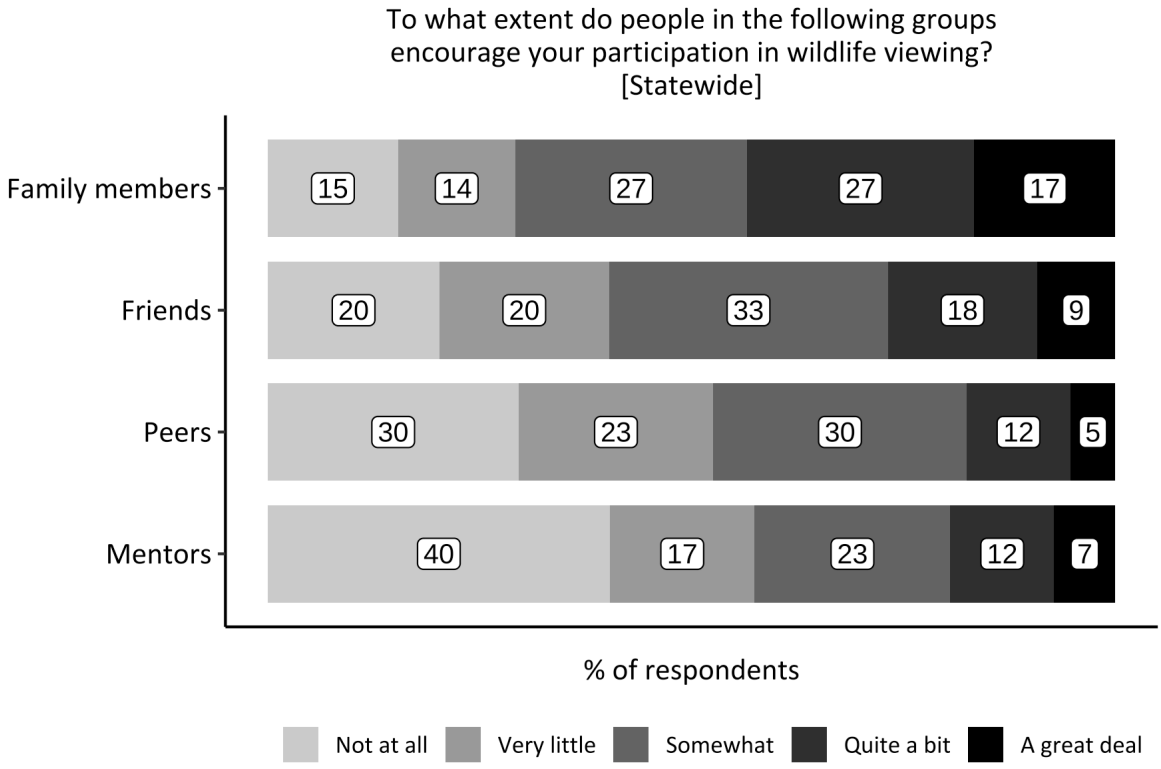


Figure 37: Groups that encourage viewing, statewide sample

The degree to which wildlife viewers at the statewide level feel encouraged to participate in wildlife viewing by four groups of people: family, friends, peers, and mentors. Blocks represent the percentage of respondents who fell into each of the five categories. The lightest shade of gray represents viewers that indicated the least amount of social support: *not at all*; blocks darken with increasing levels of support.

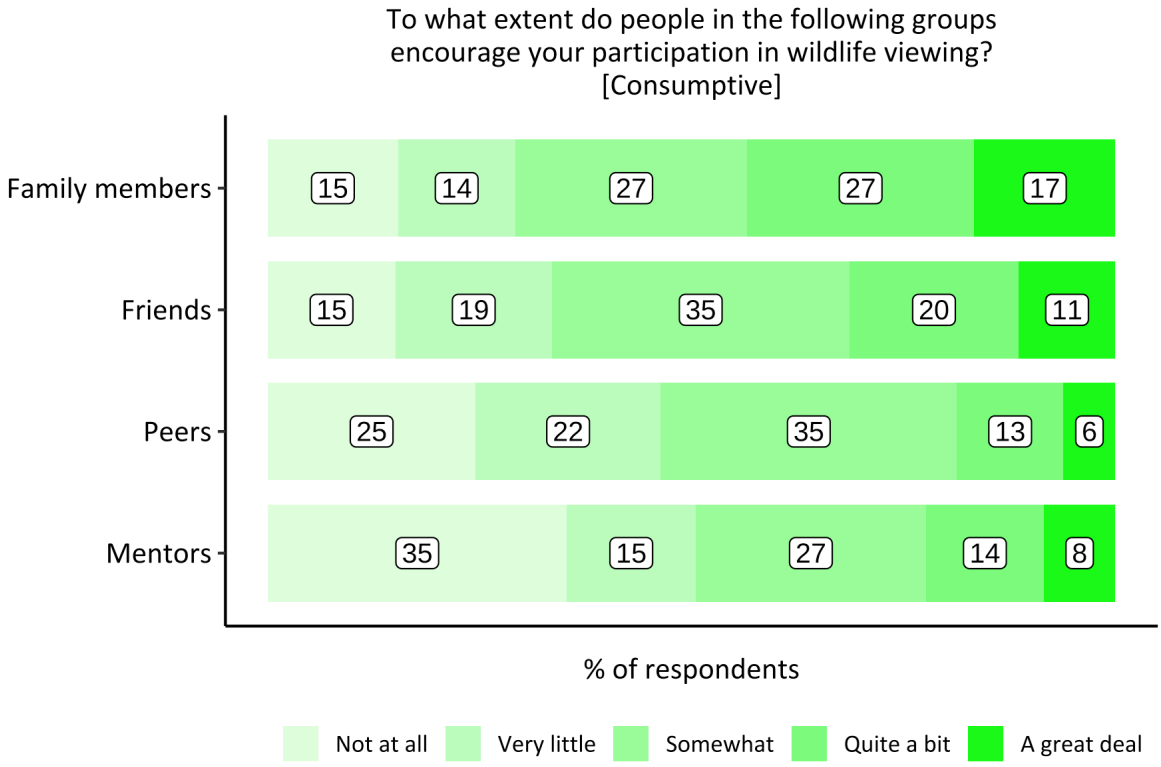


Figure 38: Groups that encourage viewing, consumptive respondents

The degree to which consumptive wildlife viewers in Arkansas feel encouraged to participate in wildlife viewing by four groups of people: family, friends, peers, and mentors. Blocks represent the percentage of respondents who fell into each of the five categories. The lightest shade of green represents viewers that indicated the least amount of social support: *not at all*; blocks darken with increasing levels of support.

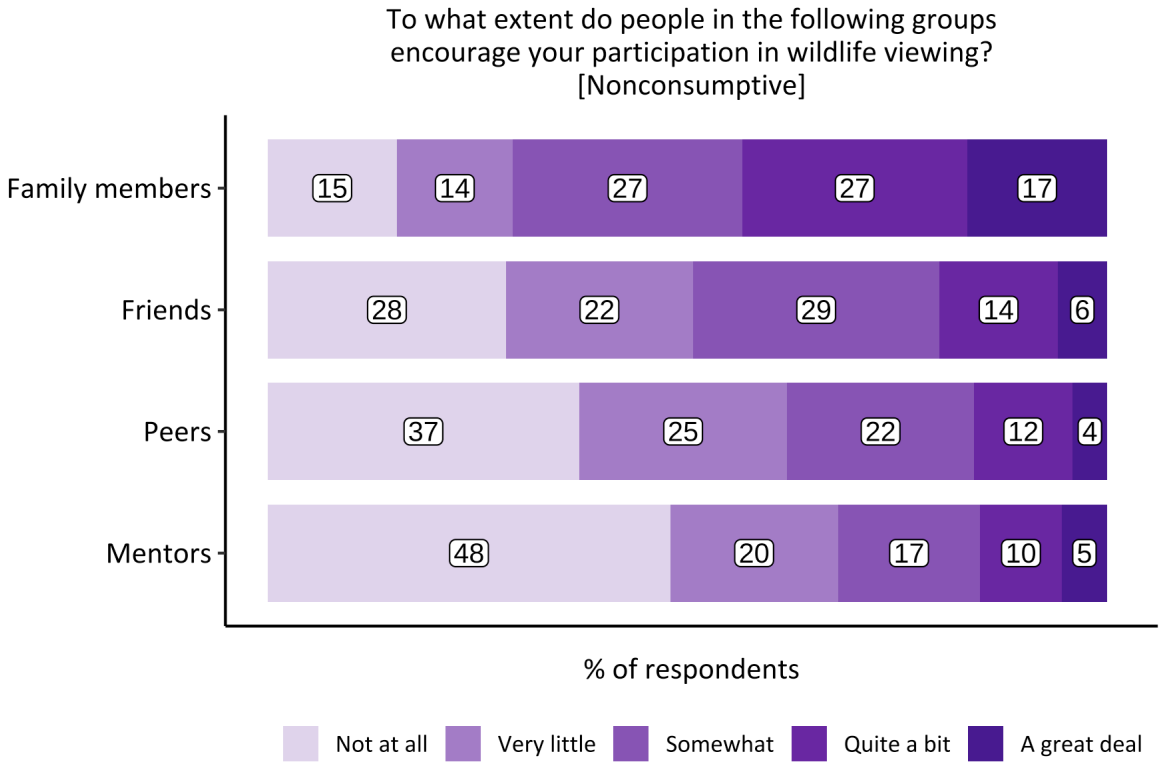


Figure 39: Groups that encourage viewing, nonconsumptive respondents

The degree to which nonconsumptive wildlife viewers in Arkansas feel encouraged to participate in wildlife viewing by four groups of people: family, friends, peers, and mentors. Blocks represent the percentage of respondents who fell into each of the five categories. The lightest shade of purple represents viewers that indicated the least amount of social support: *not at all*; blocks darken with increasing levels of support.

Accessibility and wildlife viewing

According to the Centers for Disease Control, 26% of American adults experience some type of disability (CDC, 2020). Historically, surveys and planning efforts for wildlife viewing have largely overlooked the needs and concerns of wildlife viewers with disabilities, beyond achieving Americans with Disabilities Act compliance (Williams et al., 2004; Michopoulou et al., 2015). As people with disabilities comprise a significant portion of the adult U.S. population, we considered how this lack of focus on addressing their needs impacts their wildlife viewing experience. To do so, we asked respondents about the extent to which they experience accessibility challenges related to wildlife viewing. We used a definition of the term "accessibility challenges" developed by Birdabilty (Rose & McGregor, 2021). Birdability defines accessibility challenges as:

> The difficulties someone experiences in interacting with or while using the physical or social environment while trying to engage in a meaningful activity (such as wildlife

viewing). This may be a result of a mobility challenge, blindness or low vision, intellectual or developmental disabilities (including Autism), mental illness, being Deaf or Hard of Hearing, or other health concerns.

We found that 34% of wildlife viewers in Arkansas experience *somewhat*, *quite a bit*, or *a great deal* of accessibility challenges (Table 32; Figure 40). A chi-square test indicated no statistically significant difference in the experience of accessibility challenges for consumptive and nonconsumptive viewers ($\chi^2 = 5.82$, $df = 4$, $p = .21$, Table 32; Figure 40).

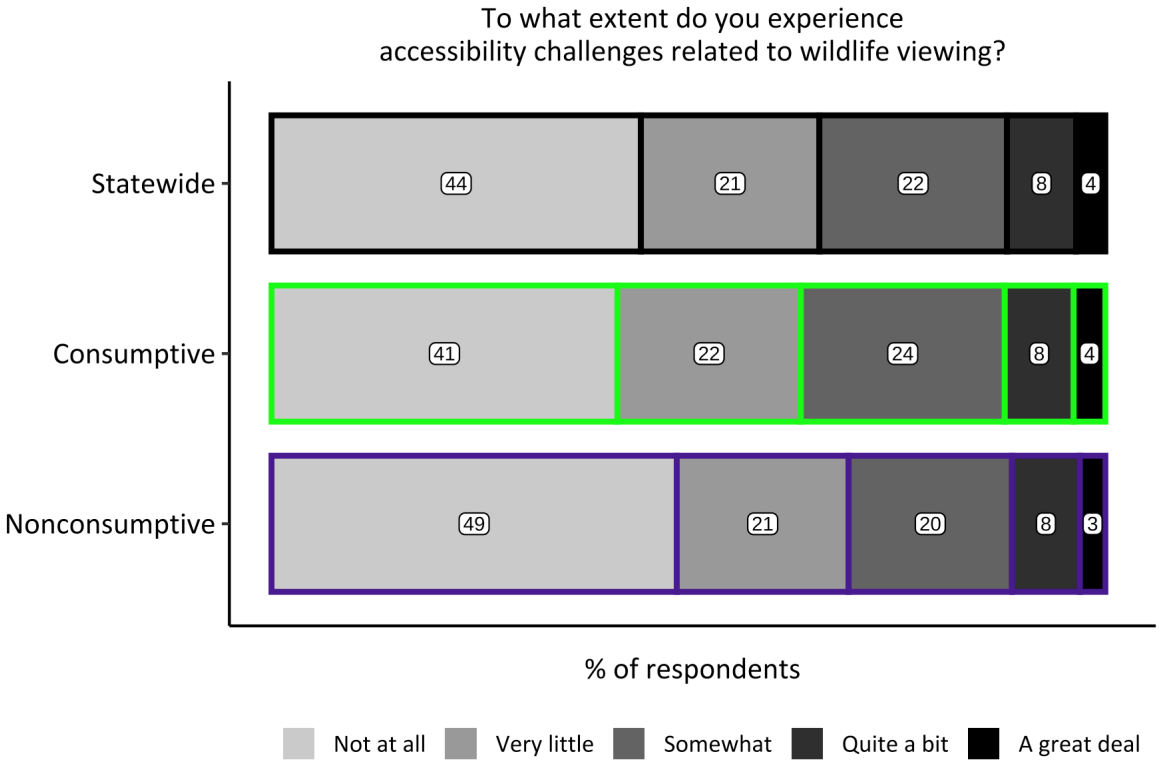


Figure 40: Accessibility challenges and wildlife viewing, all respondents

Wildlife viewers' extent to which they experience accessibility challenges for statewide, consumptive, and nonconsumptive groups. Blocks represent the percentage of respondents who fell into each of the five categories: *not at all* to *a great deal*. A chi-square test indicated no statistically significant difference in the experience of accessibility challenges for consumptive and nonconsumptive viewers (Table 32).

Familiarity

An individual's familiarity with an organization or entity may serve as an indicator of likelihood to contribute financially and a metric of that individual's perception of the entity (Katz, 2017). As state agencies endeavor to increase their engagement with a broader constituency (AFWA & WMI, 2016), familiarity may serve as an important indicator in measuring viewers' relationships

with agencies and likelihood to provide financial support (Katz, 2017; Grooms, 2021). Consumptive viewers, such as hunters and anglers, may have more interaction with state fish and wildlife agencies due to permitting and license regulations (Grooms, 2021).

We utilized a variety of questions to thoroughly examine familiarity. We asked wildlife viewers to indicate their level of familiarity with their state fish and wildlife agency, with five unipolar options ranging from *not at all familiar* to *extremely familiar.* Over half of wildlife viewers were *slightly* or *moderately familiar* with AGFC (55%). About 14% of respondents were *extremely familiar* with AGFC and only 8% were not familiar with the agency at all (Table 33; Figure 41). A chi-square test indicated a statistically significant difference in familiarity with AGFC across consumptive and nonconsumptive viewers, with more nonconsumptive viewers being *not at all familiar* or only *slightly familiar* with the state agency ($\chi^2 = 87.16$, $df = 4$, $p < .001$; Table 33; Figure 41). Nearly half (48%) of consumptive viewers were *very familiar* or *extremely familiar* with AGFC, in comparison to only 22% of nonconsumptive viewers (Table 33; Figure 41).

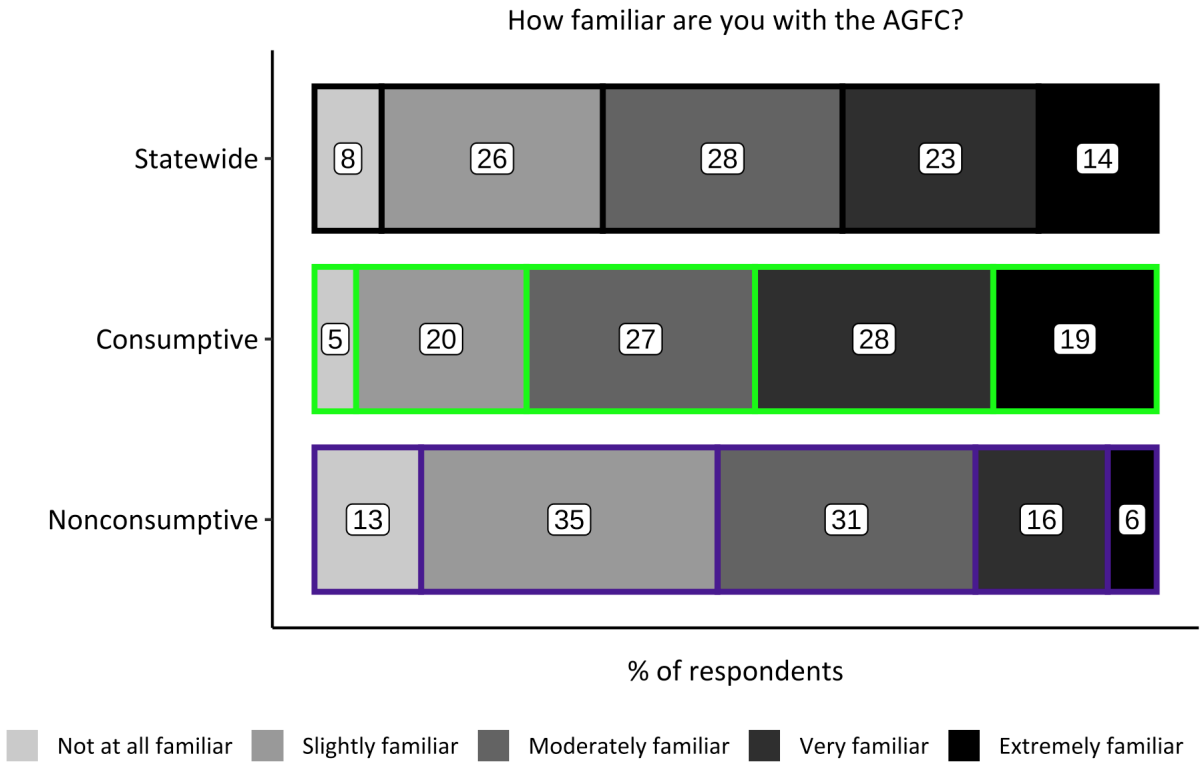


Figure 41: Familiarity with AGFC, all respondents

Wildlife viewers' self-reported level of familiarity with AGFC for statewide, consumptive, and nonconsumptive groups. Blocks represent the percentage of respondents who fell into each of the five categories: *not at all familiar* to *extremely familiar*. A chi-square test indicated a statistically significant difference in familiarity with the AGFC for consumptive and nonconsumptive viewers (Table 33).

Next, we investigated specific aspects of familiarity, including familiarity with AGFC staff, programs, lands, and mission. We found that 37% of respondents reported being *not at all familiar* with AGFC staff. Slightly more respondents, 46%, reported that they were *slightly* or *moderately* familiar with agency staff, and 17% were *very* or *extremely familiar* with agency staff. Under one-quarter of respondents were *not at all familiar* with AGFC programs, lands, and mission (Figure 42). Over half (56%) of respondents were *slightly* or *moderately* familiar with AGFC programs and 22% were *very* or *extremely familiar* (Figure 42).

Chi-square tests indicated highly statistically significant differences in familiarity between consumptive and nonconsumptive viewers for all four aspects of AGFC (Tables 34-37; Figure 42). In all cases, nonconsumptive viewers were more likely to be *not at all familiar* with state agency lands, programs, staff, and mission than consumptive viewers. Indeed, nearly half (48%) of nonconsumptive viewers were *not at all familiar* with AGFC staff.

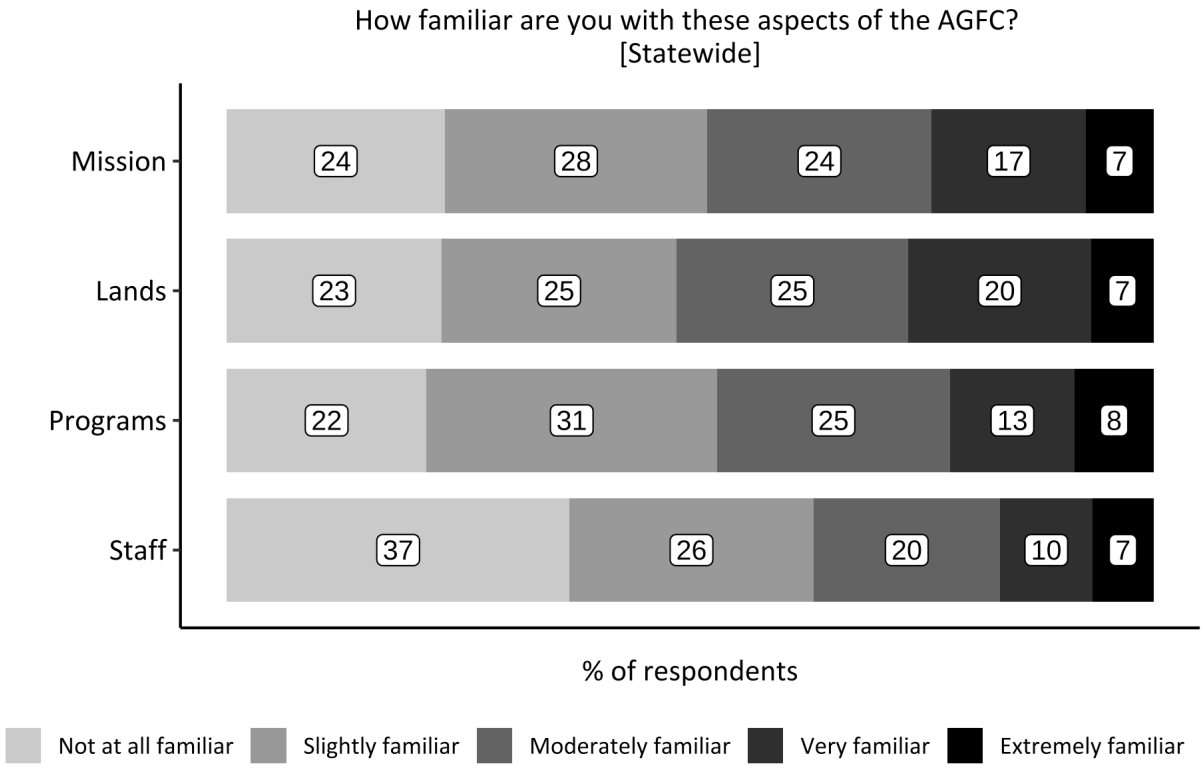


Figure 42: Familiarity with different aspects of AGFC, statewide sample

Wildlife viewers' self-reported level of familiarity with specific aspects of AGFC (mission, lands, programs, and staff) at the statewide level. Blocks represent the percentage of respondents who fell into each of the five categories: *not at all familiar* to *extremely familiar*.

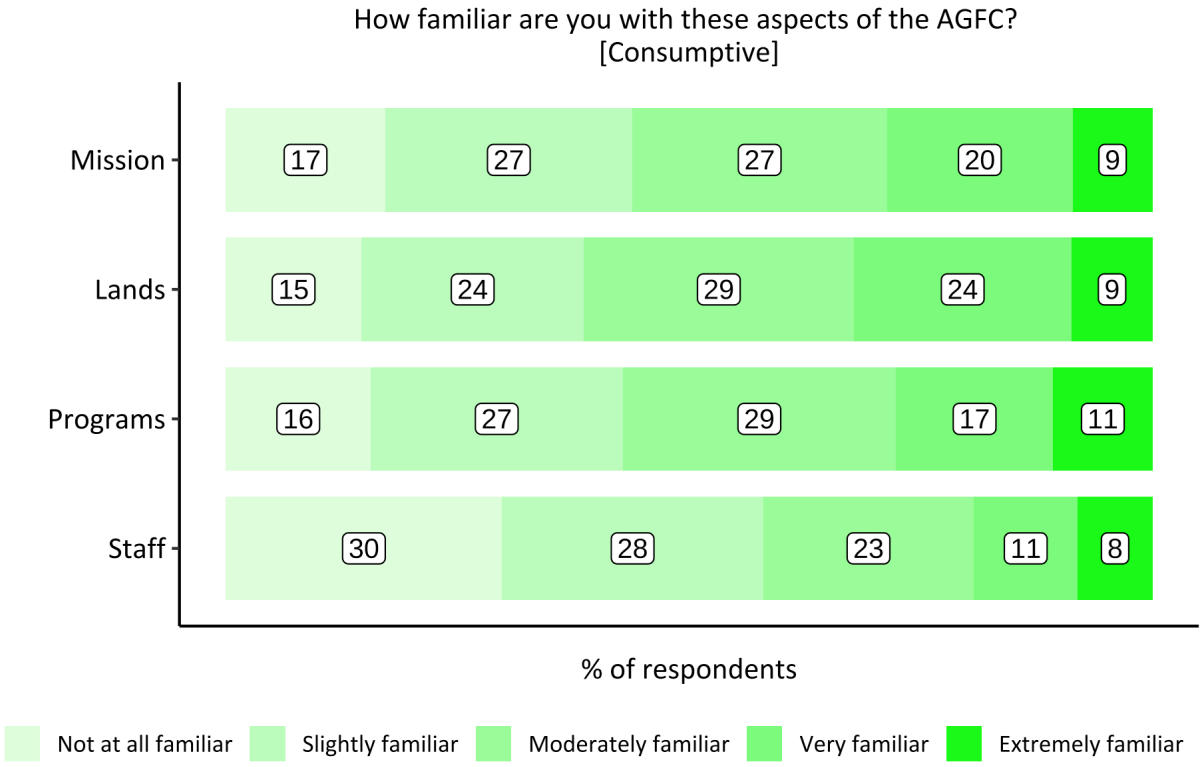


Figure 43: Familiarity with different aspects of AGFC, consumptive respondents

Consumptive wildlife viewers' self-reported level of familiarity with specific aspects of AGFC (mission, lands, programs, and staff). Blocks represent the percentage of respondents who fell into each of the five categories: *not at all familiar* to *extremely familiar*.

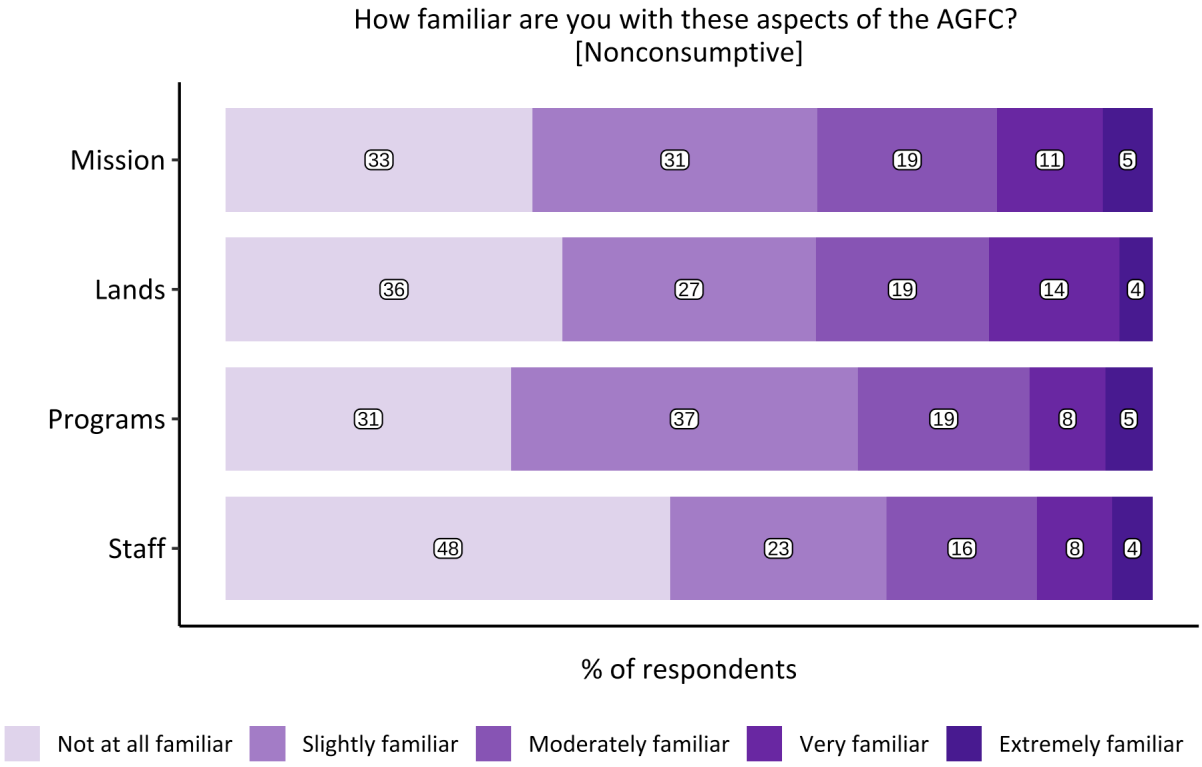


Figure 44: Familiarity with different aspects of AGFC, nonconsumptive respondents

Nonconsumptive wildlife viewers' self-reported level of familiarity with specific aspects of AGFC (mission, lands, programs, and staff). Blocks represent the percentage of respondents who fell into each of the five categories: *not at all familiar* to *extremely familiar*.

As our final measure of familiarity, we utilized a logo recognition question (Van Grinsven & Das, 2016). We asked respondents, "Have you seen this logo before?", accompanied with an image of the AGFC logo. Statewide, 92% of respondents indicated "Yes, I have seen this logo before." A chi-square test indicated that significantly more consumptive viewers (94%) than nonconsumptive viewers (89%) had seen the AGFC logo before ($\chi^2 = 9.47$, $df = 1$, $p = .002$; Table 38; Figure 45).

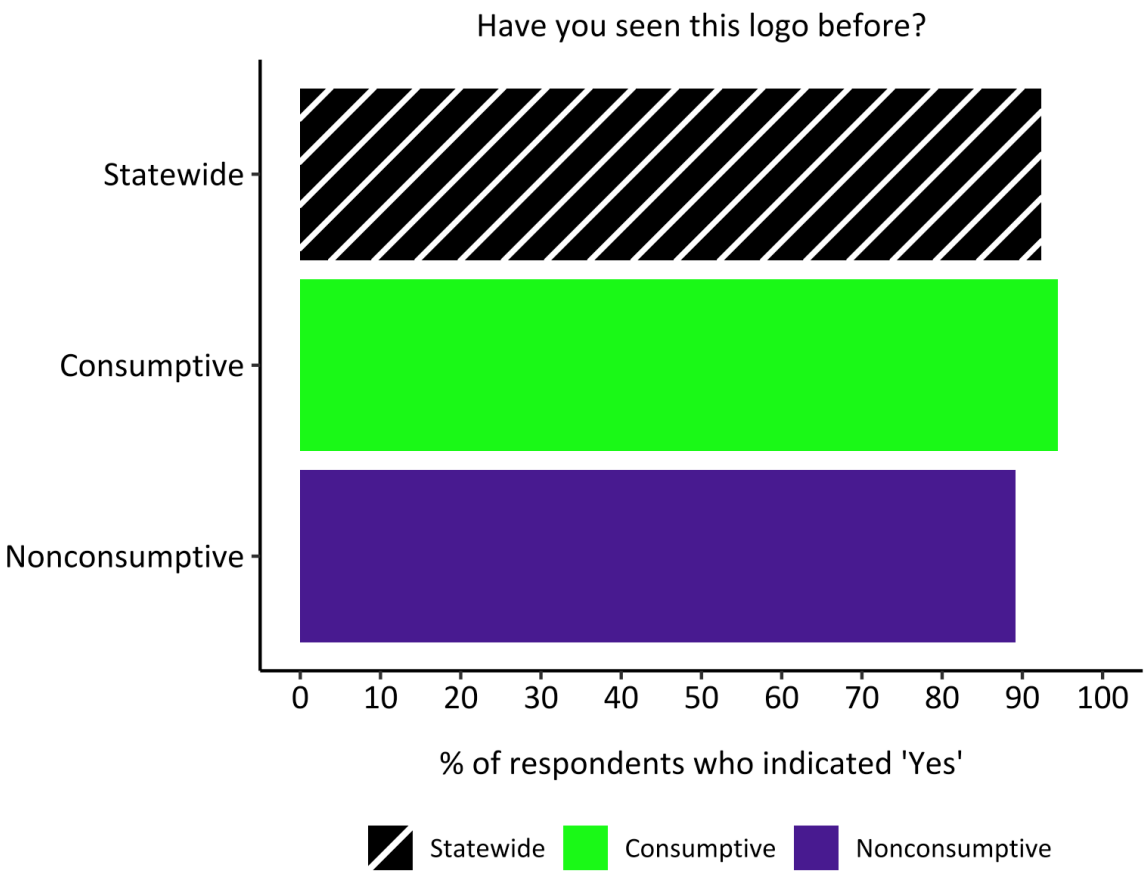


Figure 45: AGFC Logo recognition, all respondents

Wildlife viewers' recognition of the AGFC logo for statewide, consumptive, and nonconsumptive groups. Bars indicate the percentage of respondents who indicated "Yes, I have seen this logo before." A chi-square test indicated that significantly more consumptive viewers than nonconsumptive viewers had seen the AGFC logo before (Table 38).

Perception of state agency prioritization of programs and services for wildlife viewing

To further examine wildlife viewer perceptions of AGFC, we examined viewers' thoughts on AGFC's prioritization of programs and services that support wildlife viewing. In previous research in Virginia, no differences between birder-viewers and hunter-anglers were found when comparing the prioritization of programs and services that support wildlife viewing (Grooms et al., 2021). The majority of both consumptive and nonconsumptive viewers in Virginia felt that the agency was giving about the right level of prioritization to programs and services that support wildlife viewers, followed by about a quarter who thought that it was not high enough (Grooms et al., 2021). In this survey, we evaluated respondents' perceptions of AGFC by examining how wildlife viewers perceive the level of prioritization the state agency places on programs and services that support wildlife viewing. We provided respondents with a

five-point bipolar scale ranging from 1 (*far too low*) to 5 (*far too high*), with *about right* as the middle third option and a sixth option of "I don't have an opinion," which 16% (*n* = 158) of respondents from the state level selected and were treated as missing values in the following analysis.

The majority of respondents in Arkansas reported that they felt the level of prioritization of programs and services for wildlife viewing was *about right* (72%). Just over one-fifth of respondents (22%) reported the level of prioritization was *too low* or *far too low*, indicating interest in seeing additional efforts from the State of Arkansas to support wildlife viewing. Only 6% of respondents felt that the level of prioritization was *too high* or *far too high*. Due to low sample sizes in the *far too high* category, these responses were combined with *too high* responses for analysis. A chi-square test (with *too high* and *far too high* combined) indicated that the differences between consumptive and nonconsumptive viewers regarding the perceived levels of prioritization of consumptive and nonconsumptive viewers were not statistically significant ($\chi^2 = 2.12$, $df = 3$, $p = .55$; Table 39; Figure 46).

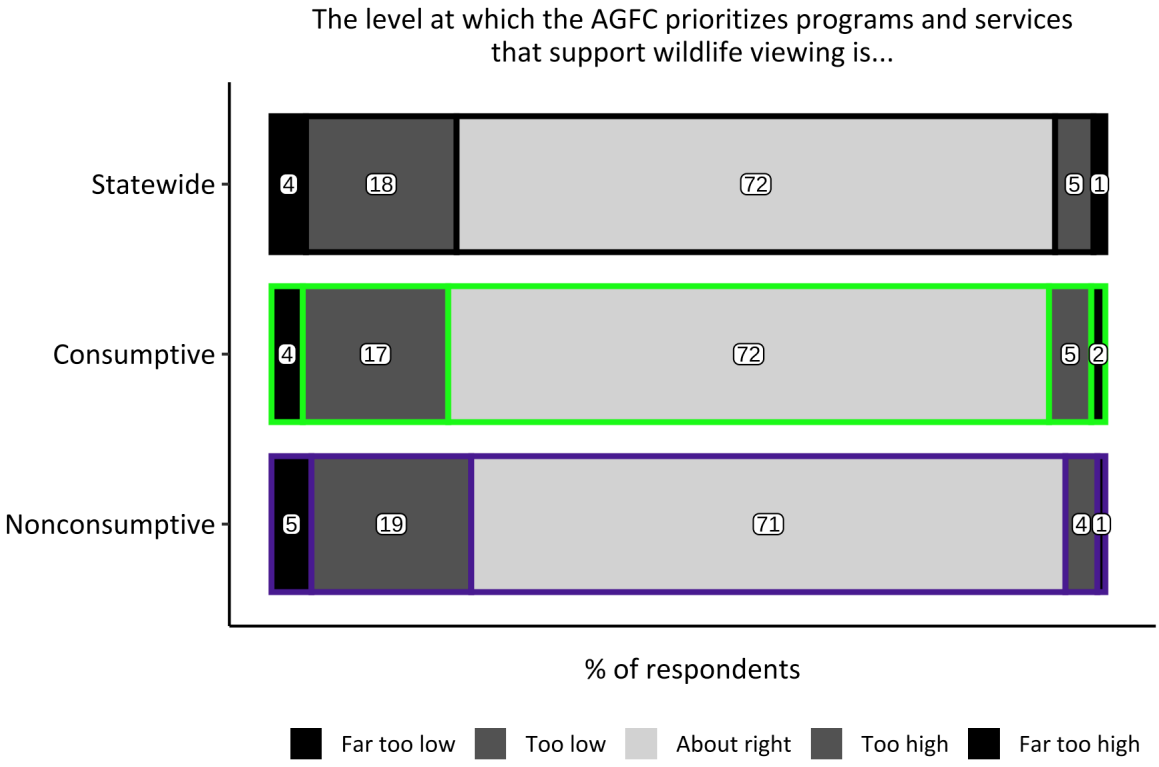


Figure 46: Perception of AGFC prioritization of programs and services for wildlife viewing, all respondents

Wildlife viewers' perception of AGFC's prioritization of programs and services for wildlife viewing for statewide, consumptive, and nonconsumptive groups. Blocks represent the percentage of respondents who fell into each of the five categories: *far too low* to *far too high*. The lightest shade of gray indicates the percentage of respondents who felt the level of prioritization was *about right*. Due to low sample sizes in the *far too high* category, these responses were combined with *too high* responses for analysis. A chi-square test indicated that the differences between consumptive and nonconsumptive viewers regarding the perceived levels of prioritization of viewer programing and services by the state agency were not statistically significant (Table 39).

Experiences with state agency programs and services

We further explored wildlife viewer relationships with AGFC by asking about which state agency programs and services, out of a list of nine, they had engaged with in the past five years. This list was modified by state agency representatives from Arkansas to reflect the items offered by AGFC. A 10th option, "I have not used or engaged in any of these agency programs and services in the last five years," was provided, which was selected by 38% of all survey respondents in Arkansas.

Of the remaining 62% of respondents who reported utilizing at least one agency program and service, 28% of them selected only one response option. Wildlife viewers in Arkansas most commonly used information about wildlife in the state (38%). The next most used agency

service was AGFC nature, education, or visitor centers (30%) and information about wildlife viewing opportunities in the state (25%). The least used agency programs were volunteer opportunities, not related to research or data collection (10%) and conservation law enforcement (8.7%).

Chi-square tests indicated statistically significant differences in participation for consumptive and nonconsumptive viewers for all listed agency programs, except for volunteer opportunities, not related to research or data collection (Table 40; Figure 47). For all other response options, consumptive viewers were more likely to have utilized the agency program or service than nonconsumptive viewers. Notably, half of nonconsumptive viewers had no experience with AGFC programs or services (50%), in comparison to only 30% of consumptive viewers (χ^2 = 38.31, *df* = 1, *p* < .001; Table 40; Figure 47).

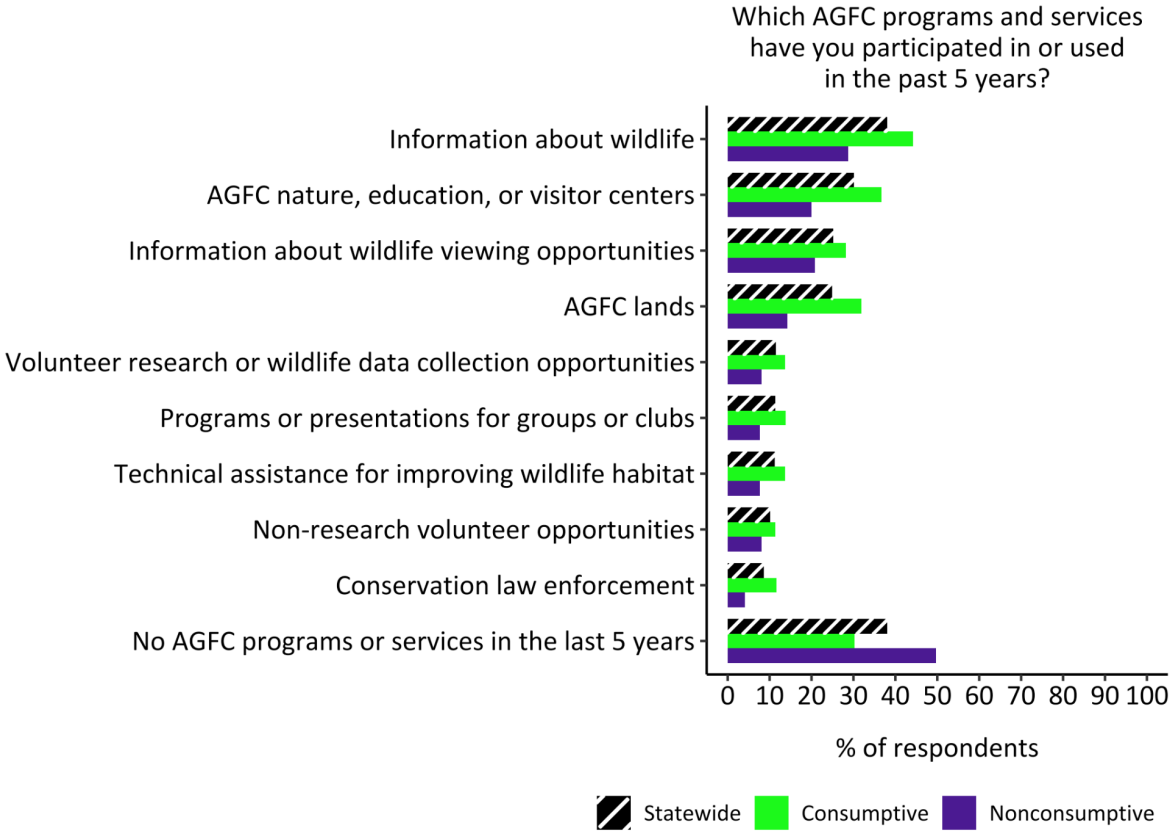


Figure 47: Experience with AGFC programs and services, all respondents

AGFC programs and services utilized by wildlife viewers in Arkansas for statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one option to reflect which programs and services they utilized. Chi-square tests indicated statistically significant differences in participation for consumptive and nonconsumptive viewers for all listed agency programs and services, except for volunteer opportunities, not related to research or data collection (Table 40).

Programs and services for children and youth

A follow-up question asked wildlife viewers if children or youth in their household had engaged in any AGFC programming, such as school-based programs, camps, or youth and family events. Respondents were provided with three options: "Yes, children or youth in my household have engaged in some of these programs," "No, children or youth in my household have not engaged in any of these programs," and "Not applicable." Just less than half (48%) of respondents reported the question was not applicable. Just under half of respondents (47%) who had youth or children in their household reported them engaging in AGFC programs and services and 53% reported they had not engaged in any programming (Table 41; Figure 48). A chi-square test indicated that, for respondents with children or youth in their household, consumptive wildlife viewers (50% indicating 'yes' that their children had participated in programs) were significantly more likely to have engaged in AGFC programming compared to nonconsumptive viewers (40% indicating 'yes' for program participation; $\chi^2 = 4.67$, $df = 1$, $p = .03$; Table 41; Figure 48).

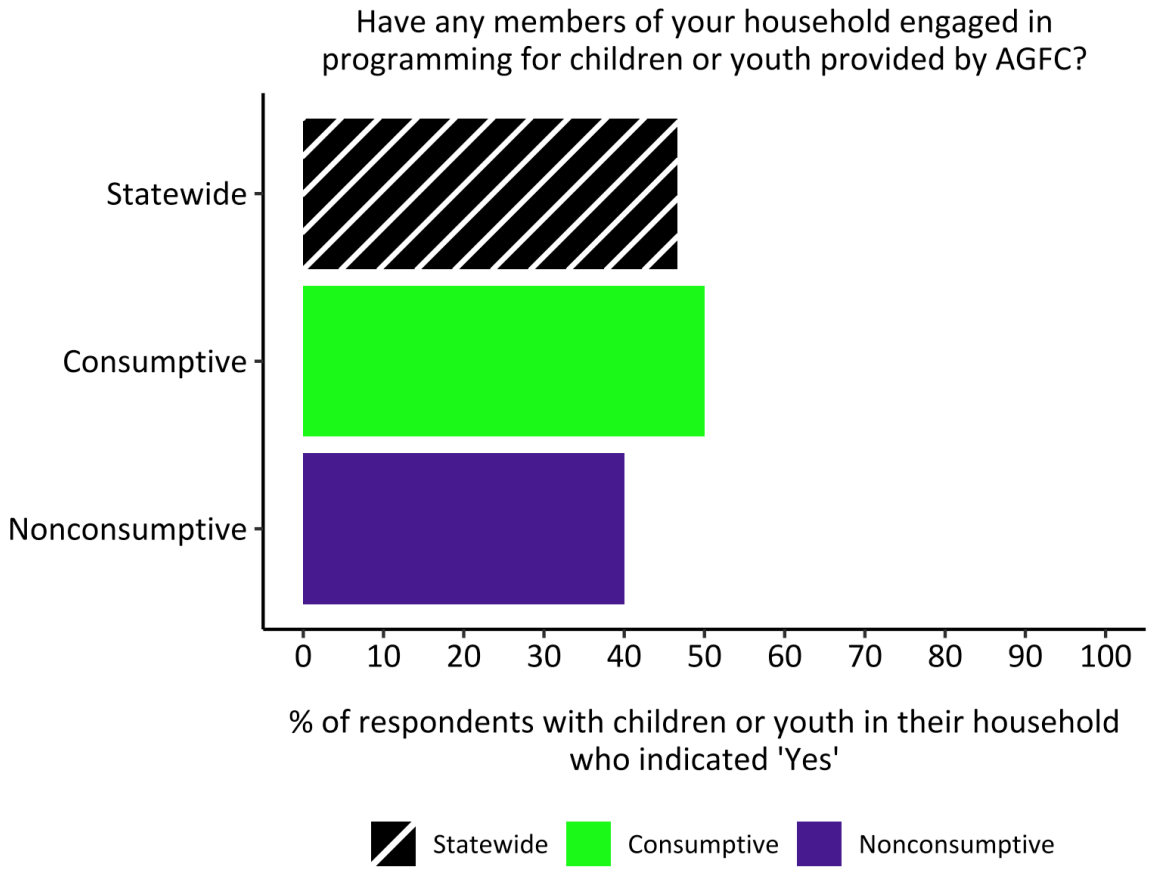


Figure 48: Experience with programs and services for youth, all respondents

Wildlife viewers' engagement with AGFC youth programming for statewide, consumptive, and nonconsumptive groups. Respondents without children or youth in their household are excluded. Bars represent the percentage of respondents with children or youth in their household who indicated "Yes; children or youth in my household have engaged in some of these programs." A chi-square test indicated that, for respondents with children or youth in their household, consumptive wildlife viewers were significantly more likely to have engaged in AGFC programming in comparison to nonconsumptive viewers (Table 41).

Trust

Trust is defined as the willingness to "accept vulnerability to the actions of the trusted party," meaning an individual expects an entity or agency to fulfill a task or action (Gefen, 2002). Past research indicates that Americans are more trusting of their state fish and wildlife agencies than local and federal governments and elected officials (Manfredo et al., 2018). Birders specifically are twice as trusting of state agencies and federal wildlife and land management agencies than elected officials (NAWMP, 2021).

As an overall measure of trust, we first asked wildlife viewers to indicate their trust in 1) their state agency as an entity and 2) the staff at their state agency. For trust in the state agency as

an entity and in state agency staff, we measured trust on a five-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The mean level of trust in the agency was 4.01 ± 0.97, which, on our scale, almost exactly corresponds to *slightly agree* (4). Similarly, trust in agency staff was 3.92 ± 0.96. When comparing consumptive and nonconsumptive viewers, two t-tests indicated that mean levels of trust in AGFC and AGFC staff were statistically significantly different (Table 42; Figures 49-50). Consumptive viewers had a significantly higher mean level of trust in both AGFC and AGFC staff than consumptive viewers.

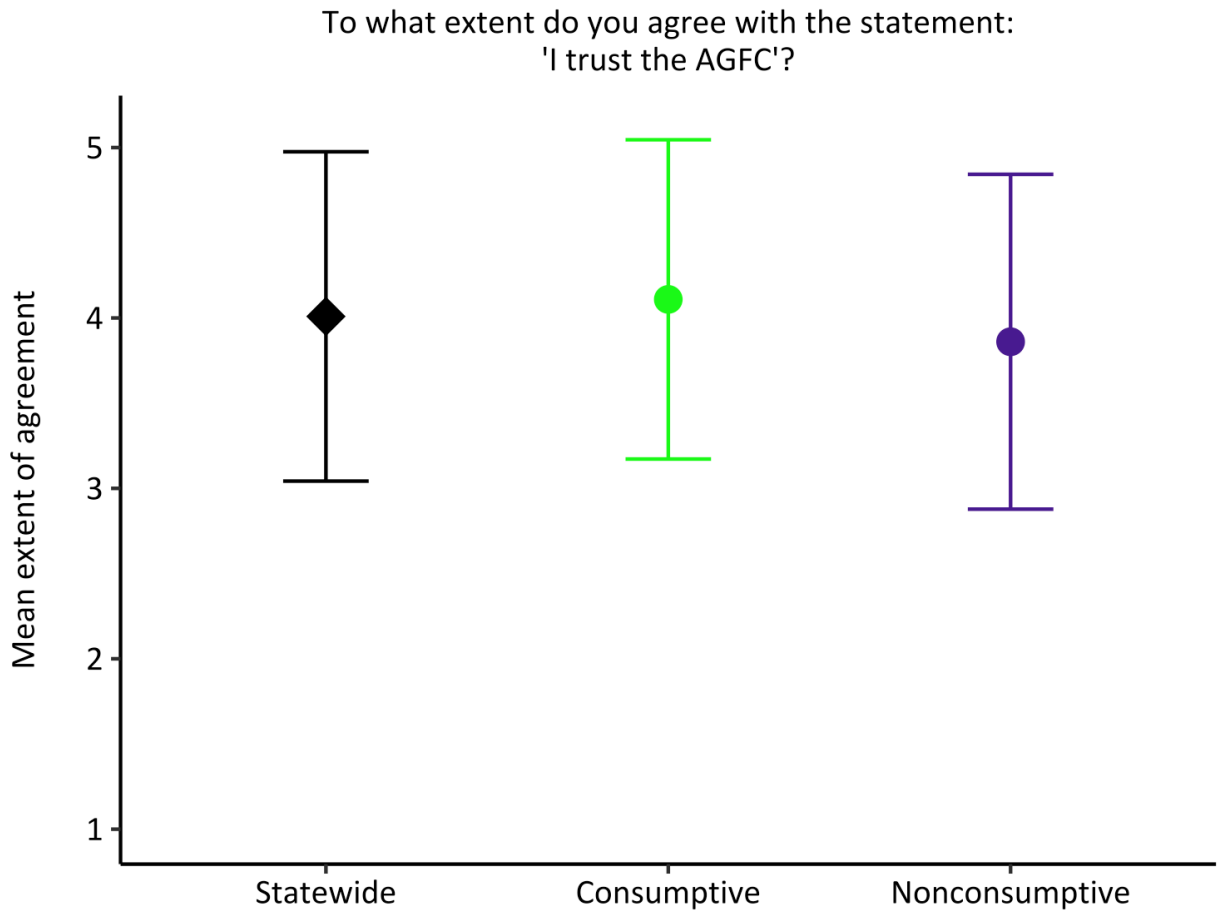


Figure 49: Mean trust in AGFC, all respondents

The mean extent to which wildlife viewers in Arkansas agree with the statement "I trust the Arkansas Game and Fish Commission" on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). Points (diamond for statewide group, circles for consumptive and nonconsumptive group) indicate the mean extent of agreement on a 5-point scale and error bars indicate one standard deviation. A t-test indicated a statistically significant difference in the mean level of trust in AGFC as an entity for consumptive and nonconsumptive wildlife viewers.



Figure 50: Mean trust in AGFC staff, all respondents

The mean extent to which wildlife viewers in Arkansas agree with the statement "I trust Arkansas Game and Fish Commission staff" on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). Points (diamond for statewide group, circles for consumptive and nonconsumptive group) indicate the mean extent of agreement on a 5-point scale and error bars indicate one standard deviation. A t-test indicated a statistically significant difference in the mean level of trust in AGFC staff for consumptive and nonconsumptive wildlife viewers.

Then we measured three aspects of trust according to Gefen (2002): capability, benevolence, and integrity. In our survey, we included 12 items asking wildlife viewers to indicate "the extent to which they agreed with the following statements." Three of these items were reverse-coded attention checks and removed from analysis. The remaining nine items were dedicated to the three components of the Gefen Trust Framework. The first component, benevolence, included three statements: "I expect that Arkansas Game and Fish Commission intentions are benevolent," "I expect that Arkansas Game and Fish Commission is well meaning," and "I expect that Arkansas Game and Fish Commission has good intentions toward viewers." Benevolence had a mean extent of agreement score of 3.95 ± 0.76 out of 5, which, on our scale,

nearly corresponds to *slightly agree* (4). The second component, capability, included three statements: “Arkansas Game and Fish Commission understands the environment they work in,” “Arkansas Game and Fish Commission knows about wildlife viewing,” and “Arkansas Game and Fish Commission knows how to support wildlife viewing.” Our capability measure had a mean extent of agreement score of 4.07 ± 0.80, which, on our scale, nearly corresponds to *slightly agree* (4). The final component, integrity, included three statements “I do not doubt the honesty of Arkansas Game and Fish Commission,” “I expect that Arkansas Game and Fish Commission will keep the promises they make,” and “Promises made by Arkansas Game and Fish Commission are likely to be reliable.” This item had the lowest mean extent of agreement score of the three Gefen components of trust: 3.30 ± 0.52 which, on our scale, most closely corresponds to *neither agree nor disagree* (3). T-tests indicated two statistically significant differences in the Gefen trust scores when comparing consumptive and nonconsumptive viewers; consumptive viewers had statistically significantly higher mean Gefen capability and integrity measures (Table 42; Figures 51-53).

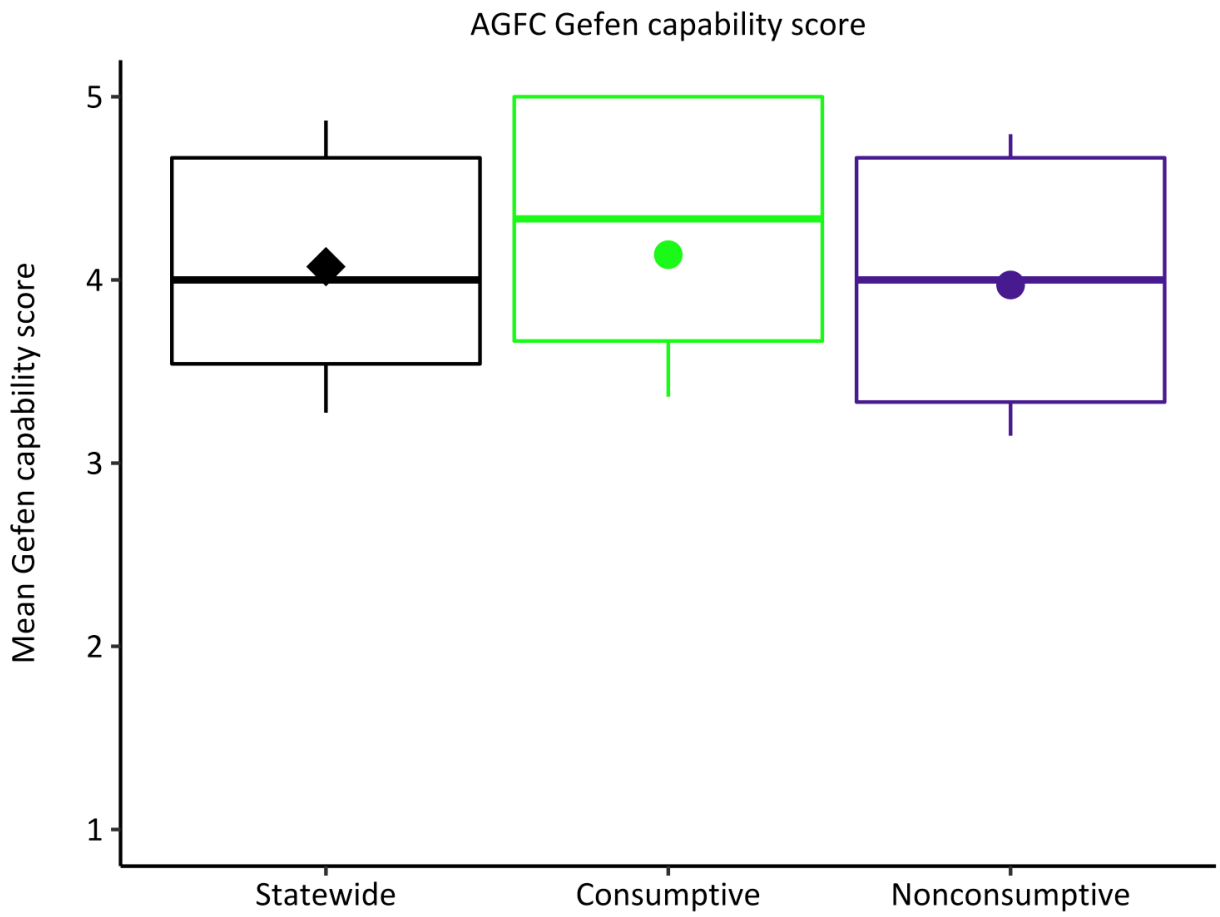


Figure 51: Gefen capability score, all respondents

Boxplots (median and interquartile ranges within the boxes) showing the differences in wildlife viewers' mean Gefen capability score on a 5-point scale. Points represent the mean Gefen capability measure (diamond for statewide group, circles for consumptive and nonconsumptive groups) calculated as the mean of respondents' extent of agreement with three statements about the capability of the state agency on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). A t-test indicated a statistically significant difference between the Gefen capability scores of consumptive and nonconsumptive viewers (Table 42).

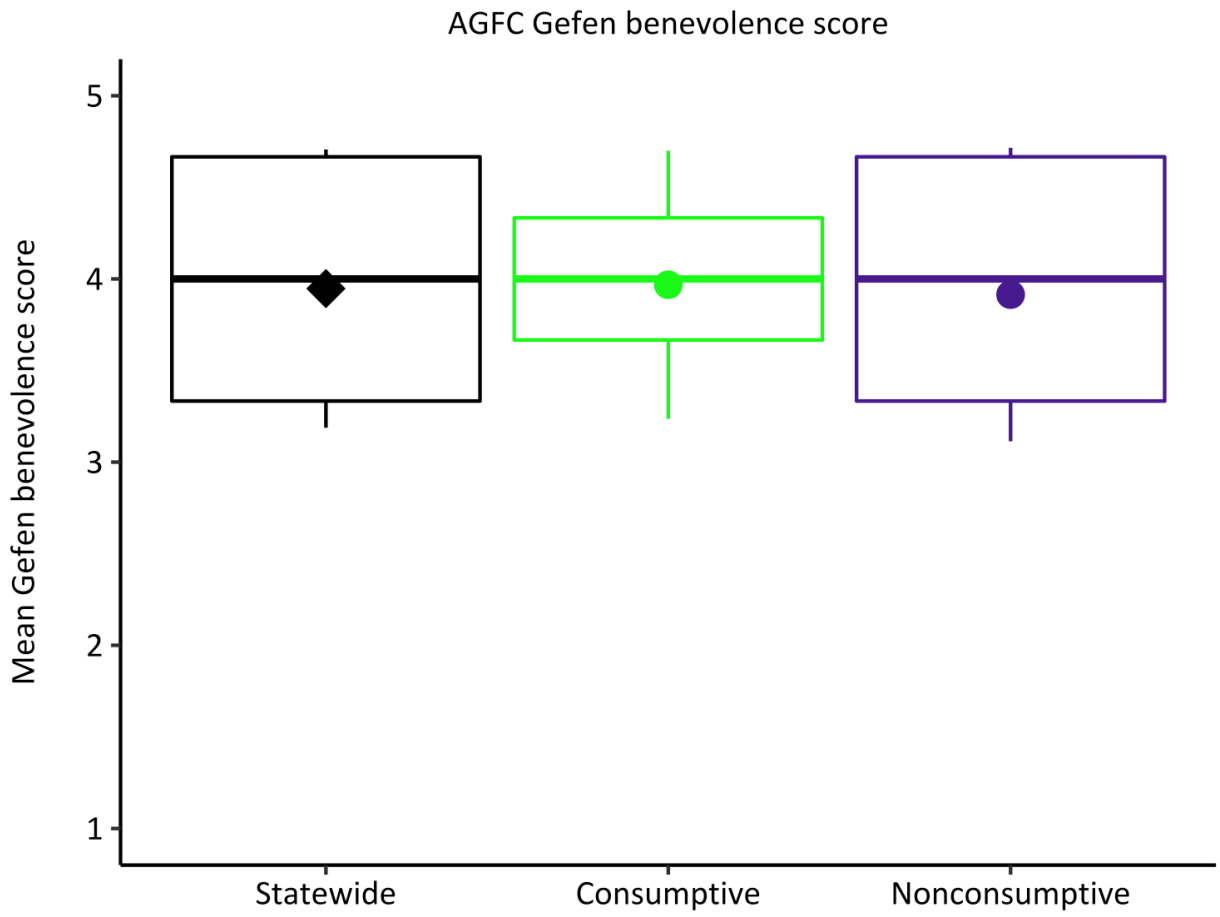


Figure 52: Gefen benevolence score, all respondents

Boxplots (median and interquartile ranges within the boxes) showing the differences in wildlife viewers' mean Gefen benevolence score on a 5-point scale. Points represent the mean Gefen benevolence measure (diamond for statewide group, circles for consumptive and nonconsumptive groups) calculated as the mean of respondents' extent of agreement with three statements about the benevolence of the state agency on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). A t-test indicated no statistically significant difference between the Gefen benevolence scores of consumptive and nonconsumptive viewers (Table 42).

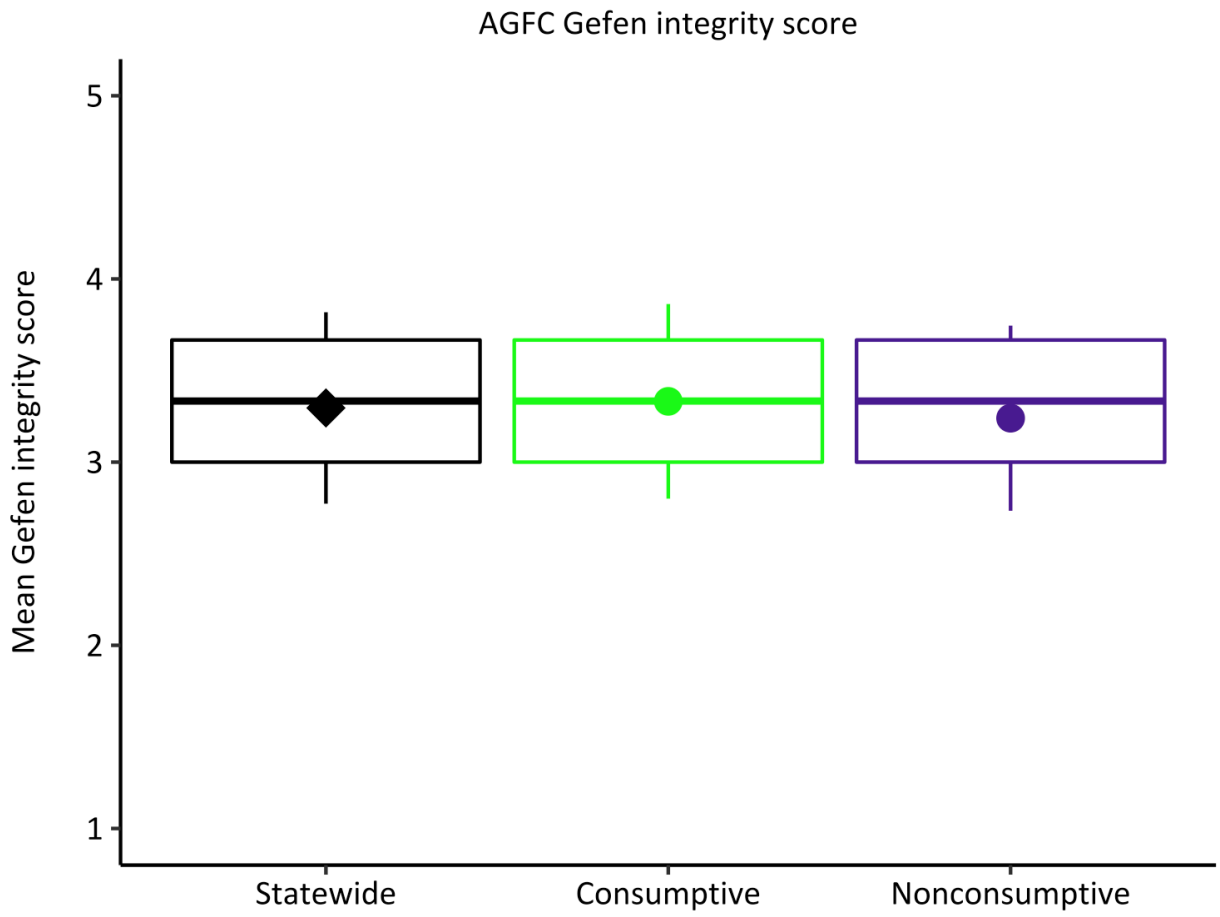


Figure 53: Gefen integrity score, all respondents

Boxplots (median and interquartile ranges within the boxes) showing the differences in wildlife viewers' mean Gefen integrity score on a 5-point scale. Points represent the mean Gefen integrity measure (diamond for statewide group, circles for consumptive and nonconsumptive groups) calculated as the mean of respondents' extent of agreement with three statements about the integrity of the state agency on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). A t-test indicated a statistically significant difference between the Gefen integrity scores of consumptive and nonconsumptive viewers (Table 42).

Past purchases and contributions

State agencies are closely tied to their constituency for funding to support programming and conservation (Grooms et al., 2021). State agencies have relied, and many still rely, heavily on hunters and anglers to support these efforts, through the North American Model of Conservation (Price Tack et al., 2015). As participation in wildlife viewing continues to grow, it is important to understand the mechanisms viewers use to financially support state agencies, as they may be different from those used by the traditional hunter and angler constituency. In this section of the survey, we asked viewers how they had financially contributed to their state fish

and wildlife agencies, listing a variety of potential expenditures or purchases. The literature shows that wildlife viewers are both conservationists (Cooper et al., 2015) and interested in supporting their state agencies financially; however, few funding avenues exist for wildlife viewers to contribute directly to state agencies (Grooms et al., 2021).

We developed a list of 13 potential purchases or contributions and asked wildlife viewers to select all that they made in the last five years. Based on feedback from AGFC, we removed five options that were not available in Arkansas: a conservation or habitat stamp required with purchase of a hunting license, a lands access pass/permit/entrance fee, a voluntary donation of a portion of state income tax return to the state agency, a lottery ticket for which the proceeds go to habitat conservation, and virtual products (such as podcasts, e-books, and other online materials). Due to a programming error, conservation or wildlife license plates were not included in the list despite being currently available in Arkansas. In our nationwide survey sample of wildlife viewers, we found that 13% of respondents in the Southeastern U.S., including respondents from Arkansas, reported that they had purchased a conservation license plate in the past five years. A 14th, mutually exclusive option, "I have not made any of these purchases or contributions" was also provided, which 28% of respondents selected (Table 43). A chi-square test indicated that significantly far more nonconsumptive viewers (50%) had not made any purchases or contributions in the past five years in comparison to consumptive viewers (13%; $\chi^2 = 159.34$, $df = 1$, $p < .001$; Table 43). For analysis purposes, we further split the contributions into voluntary (contributions made as more of a donation) and nonvoluntary (contributions required in order to receive access to an area or activity; as in Grooms et al., 2021). Understanding preferences towards voluntary and nonvoluntary funding mechanisms may aid state agencies in developing targeted strategies for increasing contributions from wildlife viewers.

First, we examined what nonvoluntary funding mechanisms wildlife viewers utilized. The highest proportion of wildlife viewers reported contributing through any AGFC fishing license (58%). This pattern held for consumptive and nonconsumptive viewers, although nonconsumptive viewers most commonly had not contributed via any funding mechanism in the past five years. About 32% of wildlife viewers had purchased any AGFC hunting license in the past five years. In addition, the least used nonvoluntary funding mechanism were fees for a program or event hosted by AGFC (14%). Chi-square tests indicated highly statistically significant differences when comparing all past nonvoluntary purchases or contributions of consumptive and nonconsumptive viewers, with more consumptive viewers purchasing any item than nonconsumptive viewers (Table 43; Figure 54).

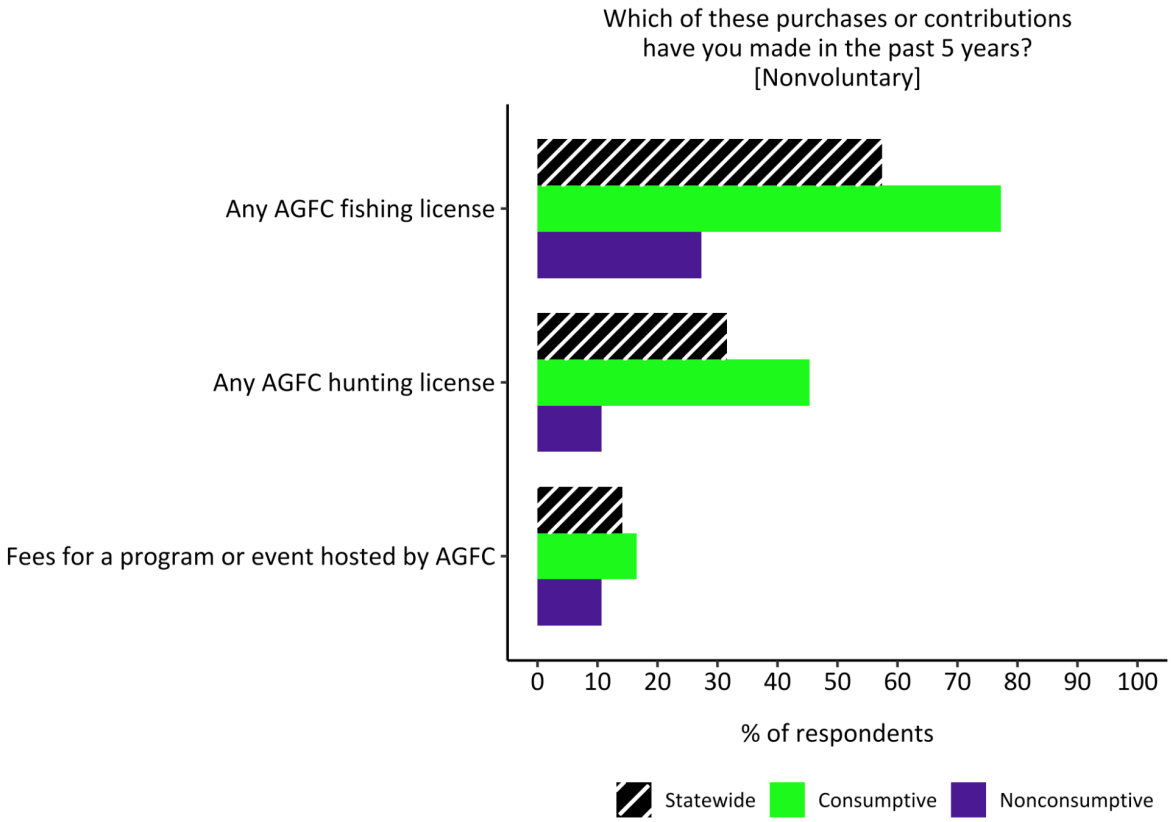


Figure 54: Past nonvoluntary financial contributions to AGFC, all respondents

Nonvoluntary purchases or contributions made towards AGFC in the past five years by wildlife viewers in Arkansas in statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one option to reflect their contributions. Chi-square tests indicated statistically significant differences when comparing all past nonvoluntary purchases or contributions of consumptive and nonconsumptive viewers (Table 43).

Next, we examined voluntary mechanisms of contributions. Just under one-quarter (24%) of wildlife viewers reported contributing through the most common voluntary mechanism, which was tangible products (such as books, maps, and other merchandise) from AGFC. This was followed by a direct donation of money to AGFC, which was selected by 13% of wildlife viewers. About 12% of wildlife viewers contributed via a conservation or habitat stamp voluntarily purchased independent of a hunting license. Finally, 9.4% of wildlife viewers contributed via a donation of land to AGFC through a conservation easement. Chi-square tests indicated significant differences for most voluntary mechanisms, except for a direct donation of money to AGFC. Significantly more consumptive viewers contributed via tangible products, conservation or habitat stamps voluntarily purchased independent of a hunting license, and donations of

land to AGFC through a conservation easement than nonconsumptive viewers (Table 43; Figure 55).

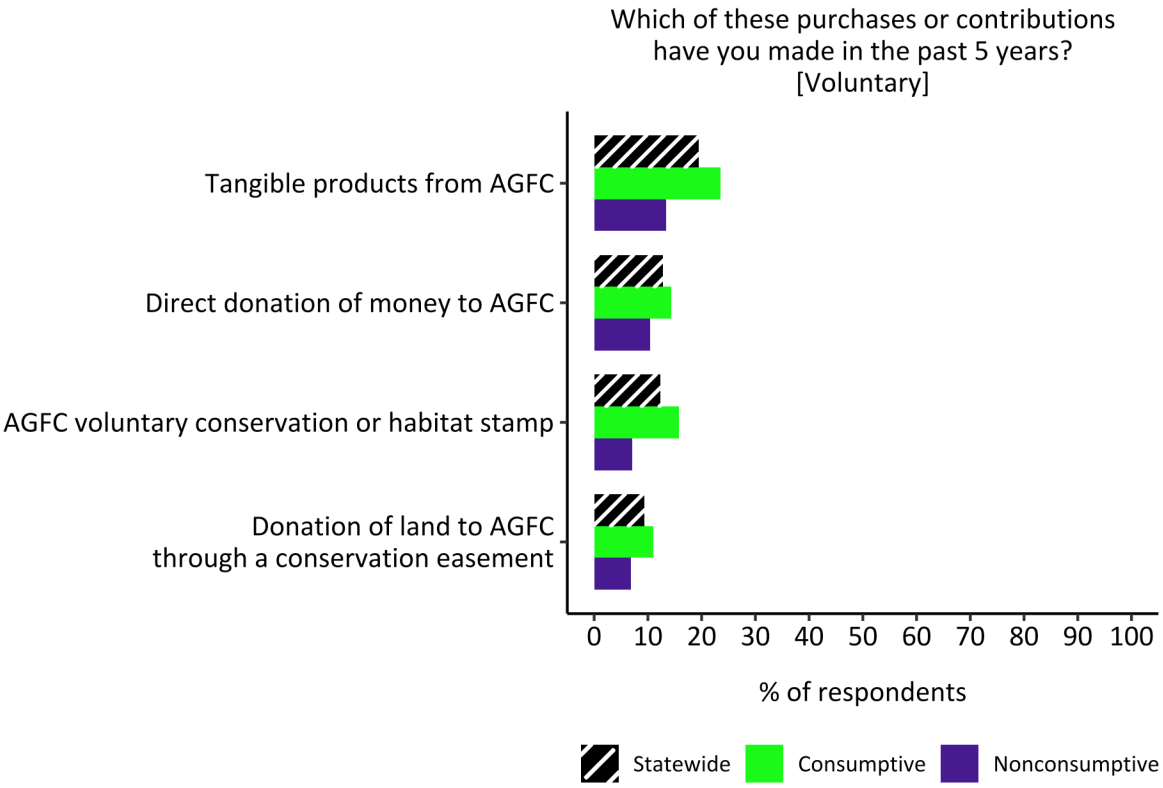


Figure 55: Past voluntary contributions to AGFC, all respondents

Voluntary purchases or contributions made towards AGFC in the past five years by wildlife viewers in Arkansas in statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one option to reflect their contributions. Chi-square tests indicated statistically significant differences when comparing all past voluntary purchases or contributions of consumptive and nonconsumptive viewers, except for a direct donation of money to AGFC (Table 43).

Lifetime hunting and fishing licenses

If a respondent indicated that they had purchased any hunting or fishing license, we used display logic to ask the question, "Have you purchased a lifetime hunting or fishing license?" Of the respondents in Arkansas who indicated purchasing a hunting or fishing license (n = 609), 31% indicated purchasing a lifetime hunting or fishing license. A chi-square test indicated no statistically significant difference when comparing responses of consumptive and nonconsumptive viewers who had purchased hunting and fishing licenses ($\chi^2 = 0.57$, $df = 1$, $p = .45$; Table 44; Figure 56).

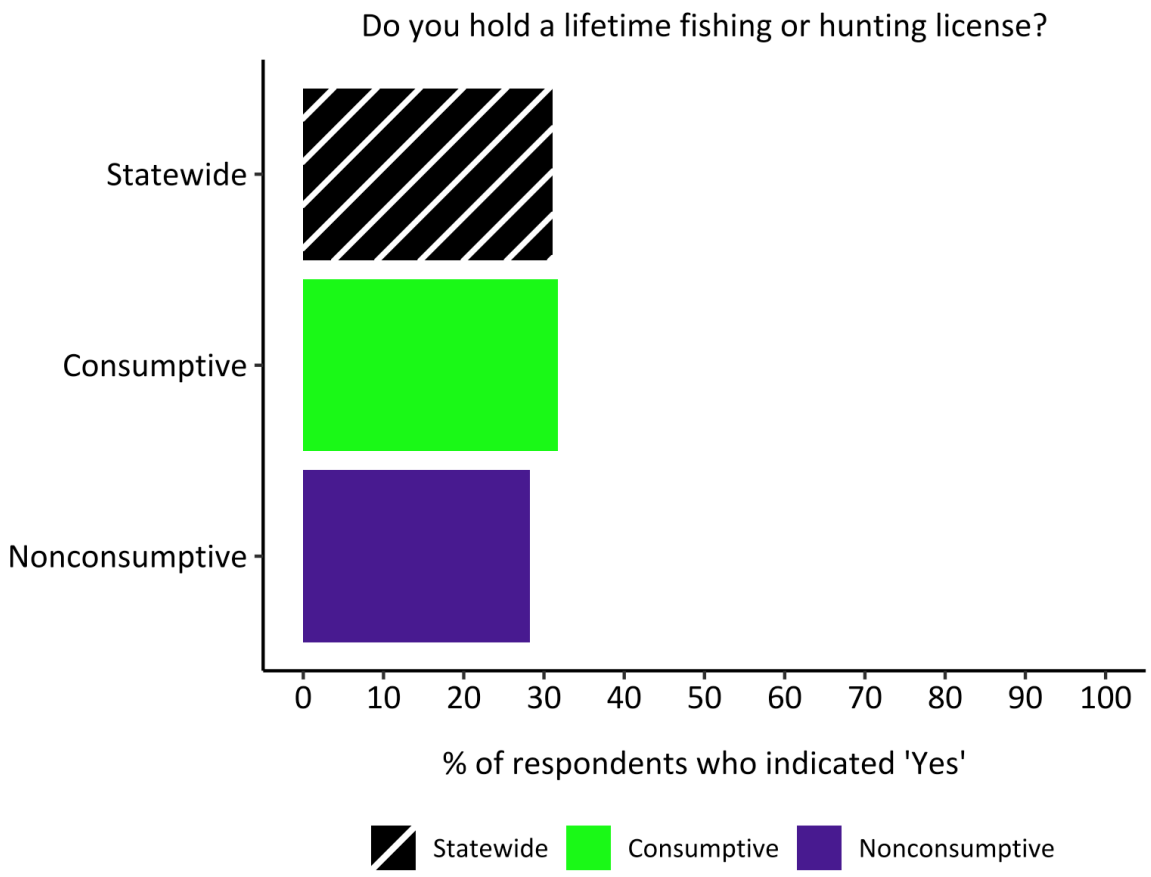


Figure 56: Lifetime hunting and fishing license, all respondents

Wildlife viewers in Arkansas who indicated purchasing a hunting or fishing license (*n* = 436) that hold a lifetime license for statewide, consumptive, and -nonconsumptive groups. Bars represent the percentage of respondents who have purchased a hunting or fishing license in the past five years that indicated "Yes, I have a lifetime fishing or hunting license." A chi-square test indicated no statistically significant difference when comparing responses of consumptive and nonconsumptive viewers who had purchased hunting and fishing licenses (Table 44).

Future purchases and contributions

Next, we assessed the likelihood of respondents making any of the following purchases or expenditures in the upcoming five years with the question, "How likely are you to make the following purchases or contributions in the next 5 years, assuming these options are available in Arkansas?" The question was similar to the previous item about past purchases, with the modification to a unipolar scale from 1 (*not at all likely*) to 5 (*extremely likely*). In addition, the hidden response options from the previous section (a conservation or habitat stamp required with purchase of a hunting license, a lands access pass/permit/entrance fee, a voluntary donation of a portion of state income tax return to the state agency, a lottery ticket for which the proceeds go to habitat conservation, and virtual products (such as podcasts, e-books, and

other online materials) were included in this question in order to gauge wildlife viewers' likelihood to purchase these currently unavailable items if they were made available in the future.

First, we examined wildlife viewers' likelihood to financially contribute to AGFC via nonvoluntary funding mechanisms in the next five years. Over two-thirds (68%) of respondents in Arkansas were *moderately, very, or extremely likely* to purchase any AGFC fishing license in the next five years. Next, over half of respondents in Arkansas indicated that they were *moderately, very, or extremely likely* to purchase AGFC lands access passes, permits, or entrance fees (54%) in the next five years. The least popular nonvoluntary financial mechanism was a conservation or habitat stamp required with purchase of a hunting license, with 27% of respondents indicating that they were *moderately, very, or extremely likely* to purchase a required conservation or habitat stamp in the next five years. Chi-square tests indicated statistically significant differences in the likelihood to contribute to AGFC financially in the future when comparing consumptive and nonconsumptive viewers for all nonvoluntary funding mechanisms, with far more nonconsumptive viewers indicating that they were *not at all likely* to purchase or contribute via any item (Table 46; Figure 59). For example, the majority of nonconsumptive viewers reported that they were *not at all likely* to purchase any AGFC hunting license (63%) or AGFC required conservation or habitat stamp (63%; Table 46; Figure 59).

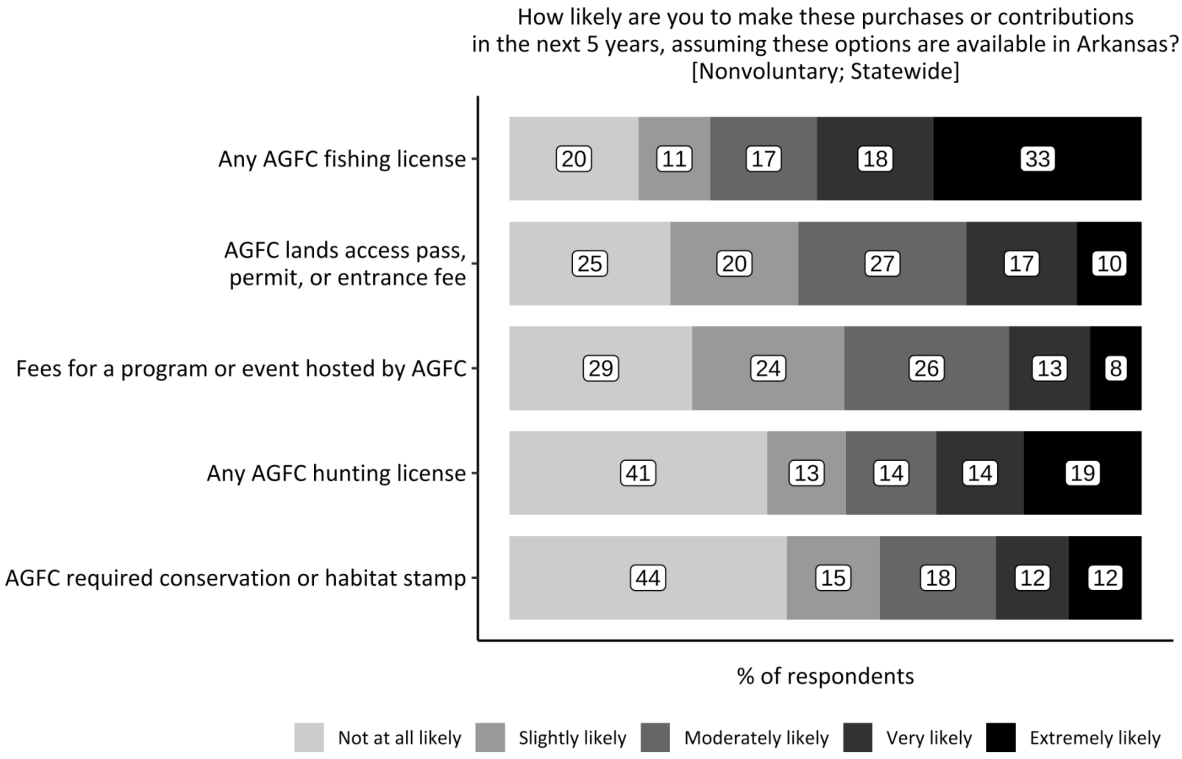


Figure 57: Likelihood of future nonvoluntary contributions, statewide sample

Wildlife viewers' reported likelihood of making nonvoluntary purchases or contributions at the statewide level in the next 5 years, assuming all options are available in Arkansas. Each block represents the percentage of respondents who fell into each of the five categories: *not at likely* to *extremely likely*. The shade of gray darkens with increasing likelihood to purchase or contribute to AGFC via nonvoluntary funding mechanisms.

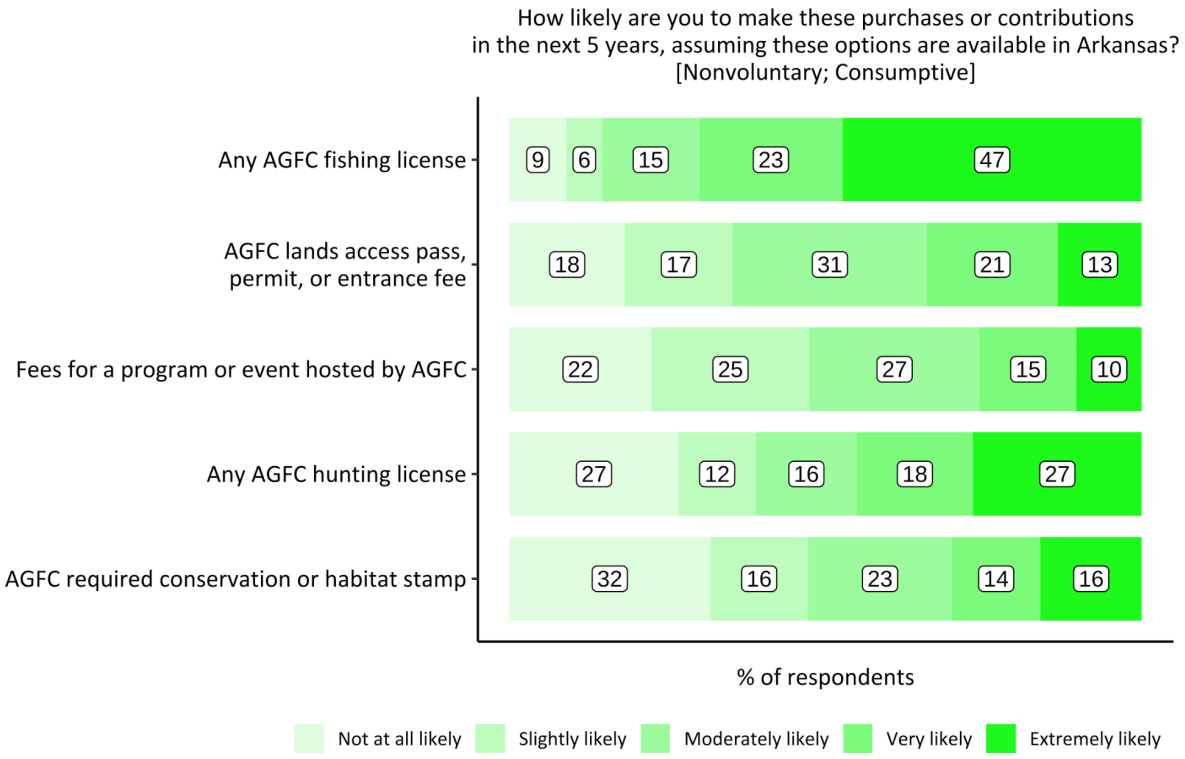


Figure 58: Likelihood of future nonvoluntary contributions, consumptive respondents

Consumptive wildlife viewers' reported likelihood of making nonvoluntary purchases or contributions in the next 5 years, assuming all options are available in Arkansas. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of green darkens with increasing likelihood to purchase or contribute to AGFC via nonvoluntary funding mechanisms.

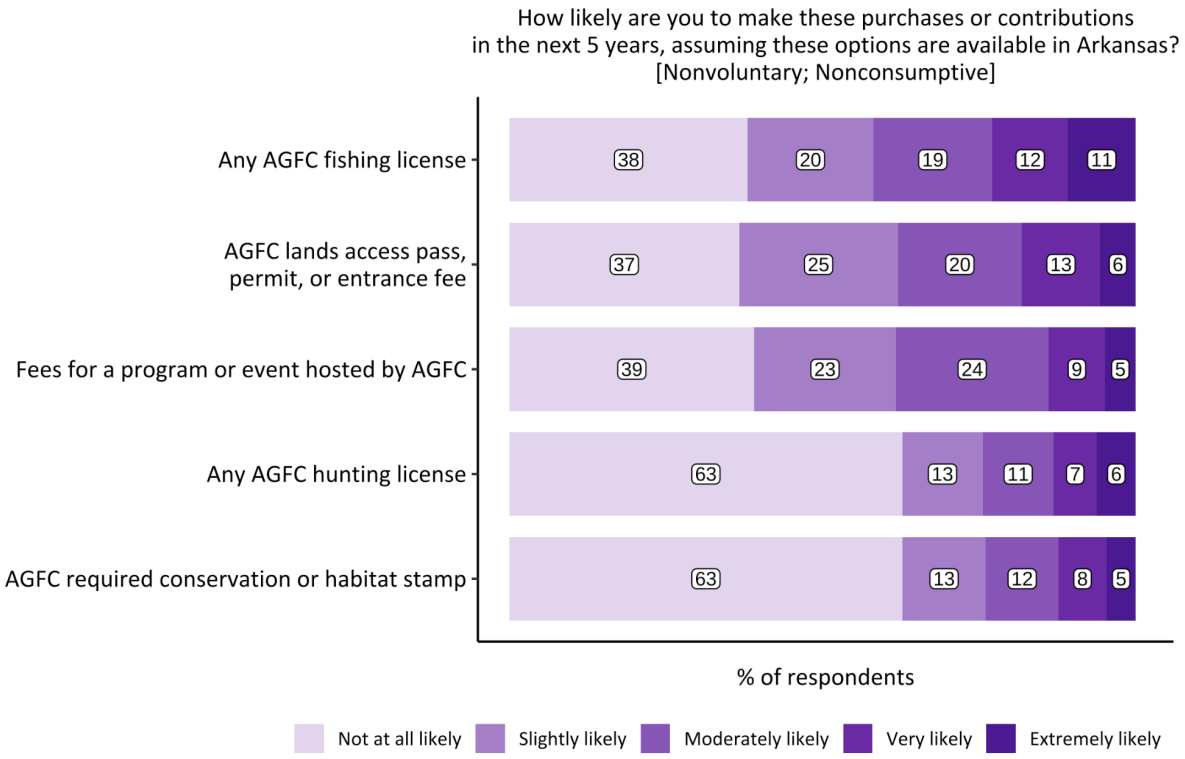


Figure 59: Likelihood of future nonvoluntary contributions, nonconsumptive respondents

Nonconsumptive wildlife viewers' reported likelihood of making nonvoluntary purchases or contributions in the next 5 years, assuming all options are available in Arkansas. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of purple darkens with increasing likelihood to purchase or contribute to AGFC via nonvoluntary funding mechanisms.

We also examined wildlife viewers' likelihood to financially contribute to AGFC via voluntary funding mechanisms in the next five years. The top voluntary contribution in Arkansas was tangible products (such as books, maps, and other merchandise), for which 54% of survey respondents indicated that they were *moderately, very,* or *extremely likely* to purchase in the next five years. This was closely followed by a mechanism which is not currently available in the state; 53% of survey respondents indicated that they were *moderately, very,* or *extremely likely* to purchase a lottery ticket for which the proceeds go to conservation, if they were given the opportunity to do so. Arkansans expressed the least interest in a donation of land to AGFC through a conservation easement, with 59% of respondents indicating they were *not at all likely* to contribute in this manner. Statewide, Arkansans were nearly equally likely to contribute via a AGFC voluntary conservation or habitat stamp (40% of respondents were *moderately, very,* or *extremely likely* to purchase) as they were to contribute via a required AGFC conservation or habitat stamp (41% of respondents were *slightly, moderately, very,* or *extremely likely* to purchase). As with nonvoluntary funding mechanisms, chi-square tests indicated highly statistically significant differences in the likelihood to contribute to AGFC financially in the

future when comparing consumptive and nonconsumptive viewers for all voluntary funding mechanisms, with far more nonconsumptive viewers indicating that they were *not at all likely* to purchase or contribute via any item (Table 46; Figure 62).

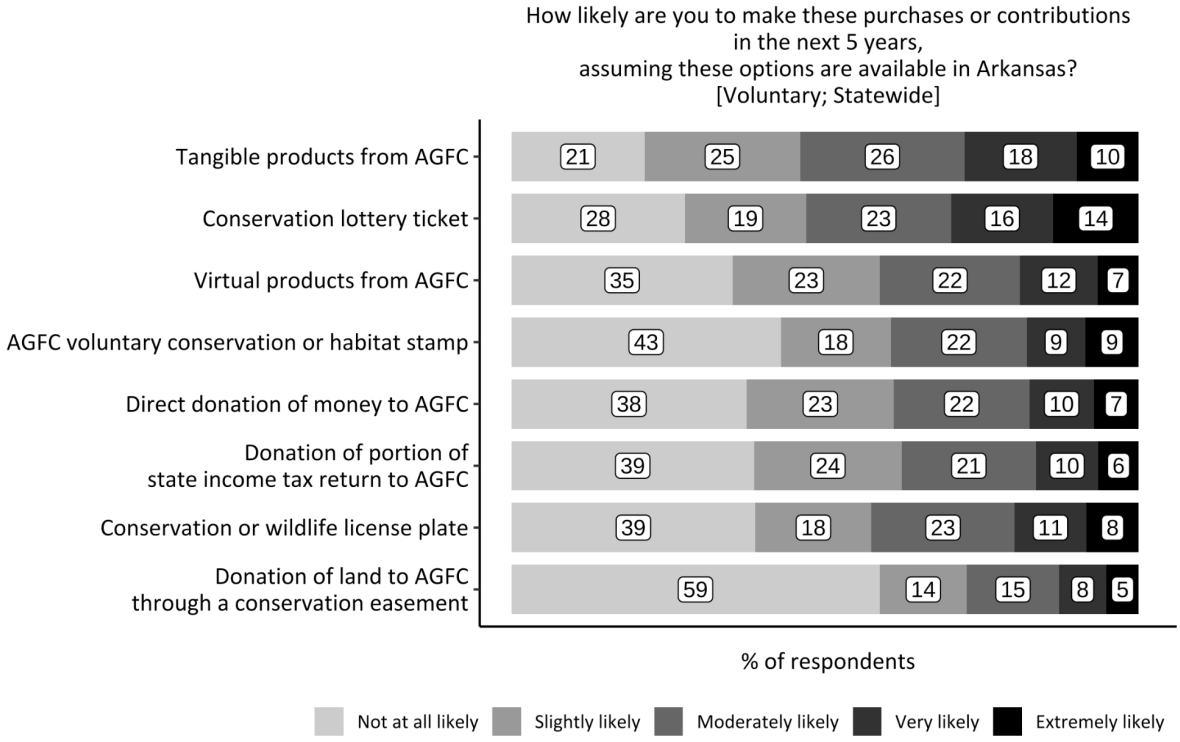


Figure 60: Likelihood of future voluntary contributions, statewide sample

Wildlife viewers' reported likelihood of making voluntary purchases or contributions at the statewide level in the next 5 years, assuming all options are available in Arkansas. Each block represents the percentage of respondents who fell into each of the five categories: *not at likely* to *extremely likely*. The shade of gray darkens with increasing likelihood to purchase or contribute to AGFC via voluntary funding mechanisms.

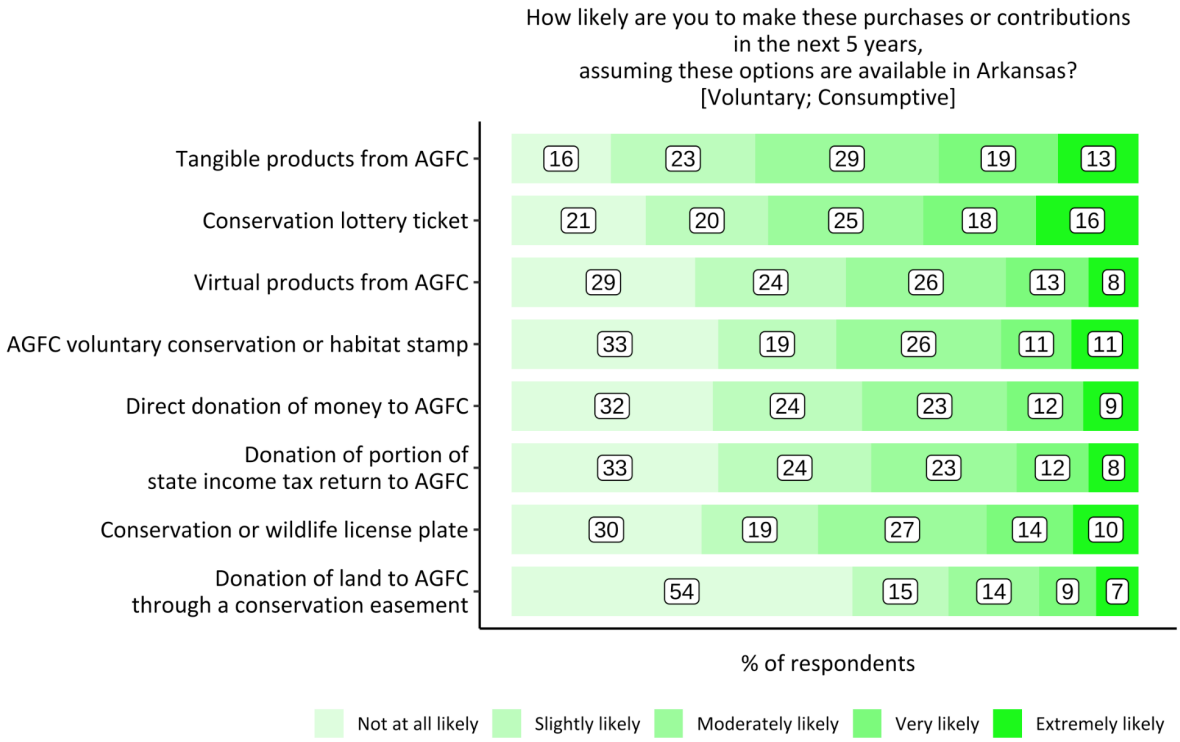


Figure 61: Likelihood of future voluntary contributions, consumptive respondents

Consumptive wildlife viewers' reported likelihood of making voluntary purchases or contributions in the next 5 years, assuming all options are available in Arkansas. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of green darkens with increasing likelihood to purchase or contribute to AGFC via voluntary funding mechanisms.

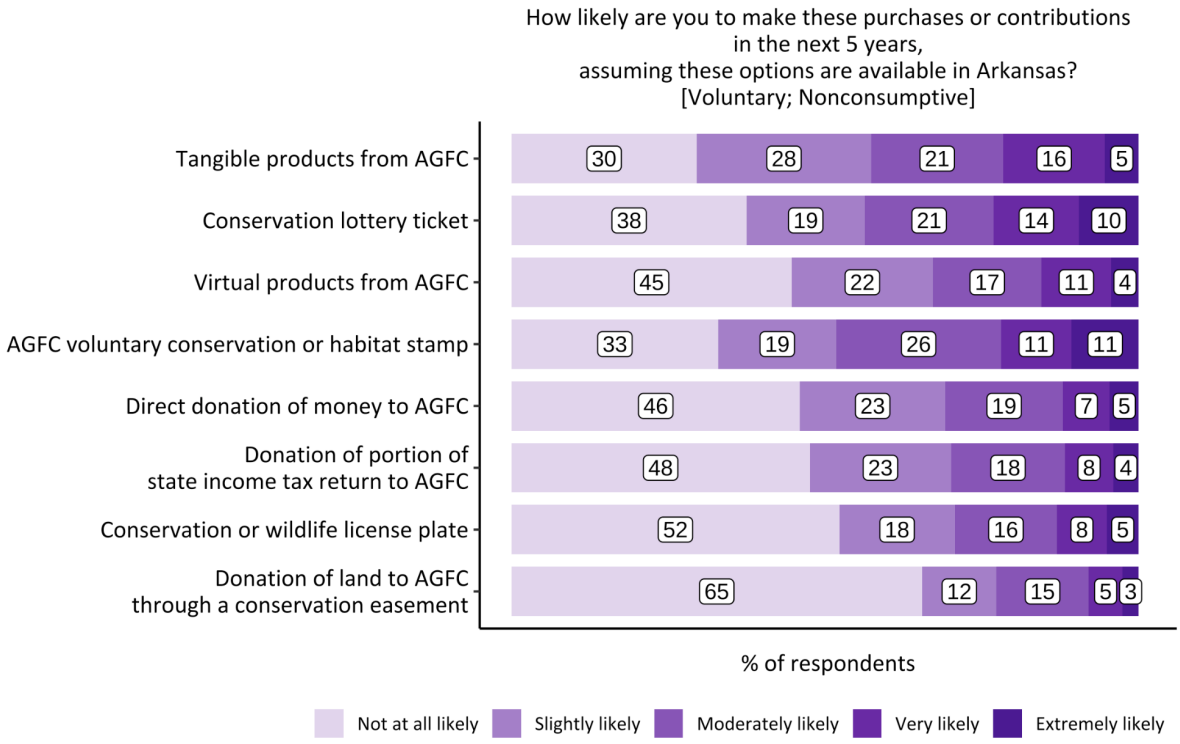


Figure 62: Likelihood of future voluntary contributions, nonconsumptive respondents

Nonconsumptive wildlife viewers' reported likelihood of making voluntary purchases or contributions in the next 5 years, assuming all options are available in Arkansas. Each block represents the percentage of respondents who fell into each of the five categories: *not at all likely* to *extremely likely*. The shade of purple darkens with increasing likelihood to purchase or contribute to AGFC via voluntary funding mechanisms.

Encouraging additional financial support

Wildlife viewers have expectations for how state agencies use their funds (Grooms et al., 2020). In this section, we further investigate those expectations. We asked, "How likely would you be to provide more financial support than you currently do to the Arkansas Game and Fish Commission, if your contributions were used in the following ways?" We provided respondents with a list of seven potential mechanisms for agencies utilizing their funds. The 5-point scale for respondent answers ranged from 1 (*not at all likely*) to 5 (*extremely likely*).

In Arkansas, respondents indicated that they were most likely to provide additional financial support to AGFC if their contributions were used to support conservation of the types of wildlife they like to view (64% *moderately, very,* or *extremely likely*), conservation of rare or vulnerable species (62% *moderately, very,* or *extremely likely*), and more opportunities or resources for wildlife viewing (60% *moderately, very,* or *extremely likely*). The least popular response option was if viewers' contributions were matched with funding from a different source (56% *moderately, very,* or *extremely likely*). Chi-square tests indicated highly statistically

significant differences in the likelihood of consumptive and nonconsumptive viewers to provide additional financial support, with nonconsumptive viewers consistently reporting, more than consumptive users, that they were *not at all likely* or only *slightly likely* to provide more support given any of the various possible uses of their contributions (Table 48; Figures 63-65).

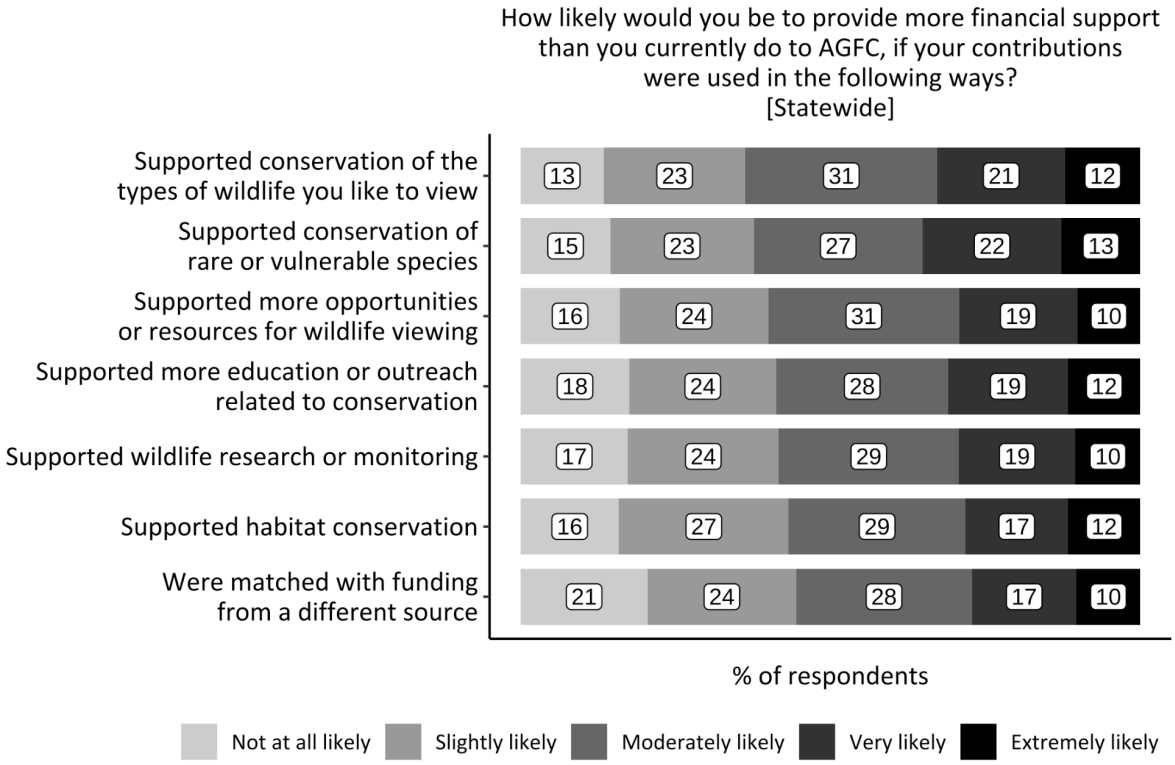


Figure 63: Encouraging additional support, statewide sample

Wildlife viewers' reported likelihood of providing more financial support than they currently do to AGFC, at the statewide level, if their contributions were used in various ways. Each block represents the percentage of respondents who fell into each of the five categories: *not at likely* to *extremely likely*. The shade of gray darkens with increasing likelihood to provide additional financial support to AGFC, given these potential uses of funds.

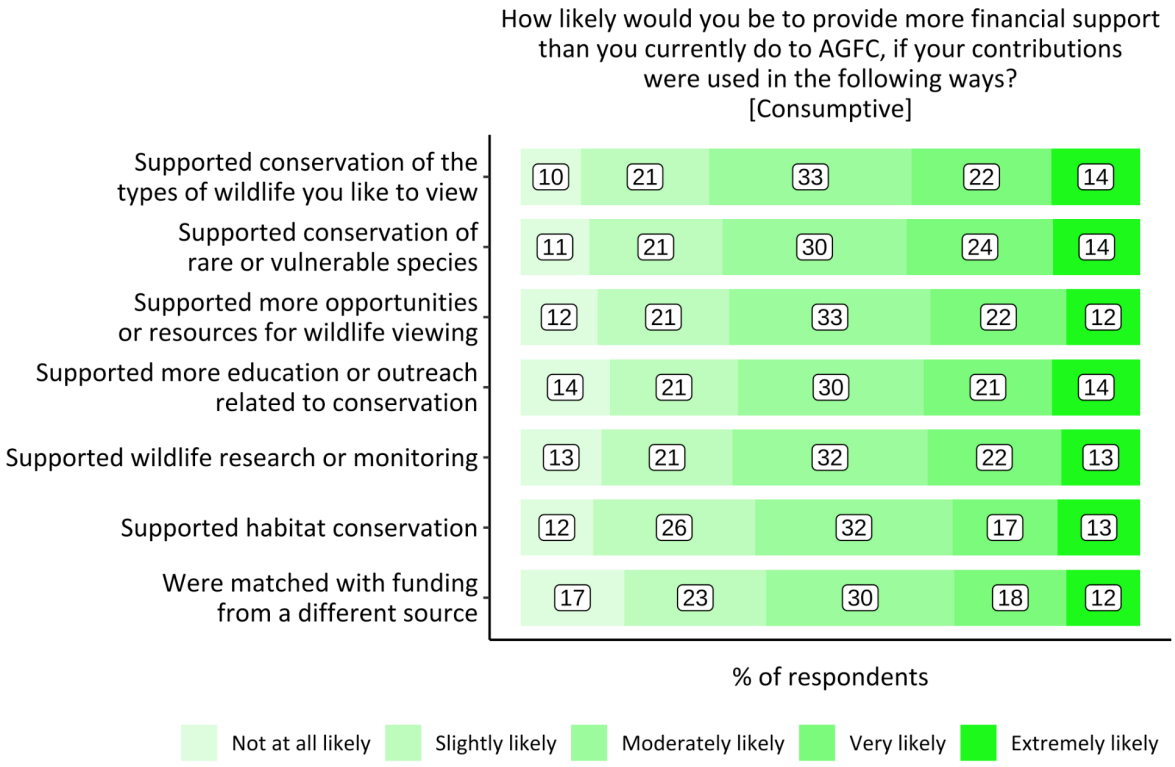


Figure 64: Encouraging additional support, consumptive respondents

Consumptive wildlife viewers' reported likelihood of providing more financial support than they currently do to AGFC, if their contributions were used in various ways. Each block represents the percentage of respondents who fell into each of the five categories: *not at likely* to *extremely likely*. The shade of green darkens with increasing likelihood to provide additional financial support to AGFC, given these potential uses of funds.

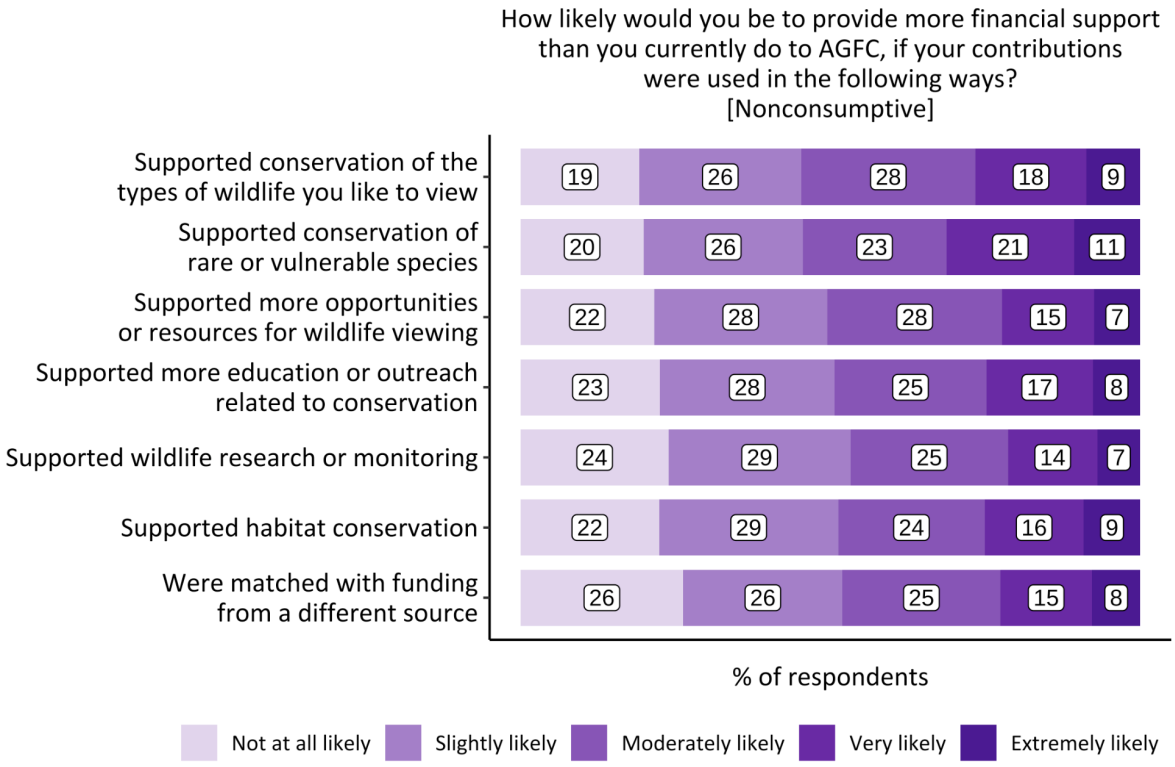


Figure 65: Encouraging additional support, nonconsumptive respondents

Nonconsumptive wildlife viewers' reported likelihood of providing more financial support than they currently do to AGFC, if their contributions were used in various ways. Each block represents the percentage of respondents who fell into each of the five categories: *not at likely* to *extremely likely*. The shade of purple darkens with increasing likelihood to provide additional financial support to AGFC, given these potential uses of funds.

State agency support for wildlife viewing

AFWA's Relevancy Roadmap outlines broad recommendations for state fish and wildlife agencies to engage a broader constituency, including "increased and improved partnering and collaboration to increase engagement with, and service to, a broader constituency" (AFWA, 2016). Understanding what programs and services wildlife viewers prefer enables agencies to identify and prioritize programs to better engage this constituency. In addition, supporting wildlife viewers, through management programs and other changes, may help increase relationships between viewers and agencies (AFWA, 2016; Grooms et al., 2021). To this end, we provided respondents with a list of 17 programs and services that may be available to support wildlife viewing and asked the question, "Which of the following potential programs or services from Arkansas Game and Fish Commission would better support your wildlife viewing activities in Arkansas?" This list of items was initially developed based on focus groups conducted for a study of wildlife recreationists in Virginia (Grooms et al., 2019), which we then adapted based on feedback from our multi-state Steering Committee including AGFC representatives. An 18th,

mutually exclusive option, "I am not interested in any of these options to support my wildlife viewing activities" (8.8% of respondents selected this option), was also provided.

Statewide, respondents were most interested in receiving more information about wildlife in Arkansas (47%) and more information about where to go to see wildlife (46%). These response options were followed by access to more places to go wildlife viewing (41%) and information about how to view various types of wildlife (36%). In addition, respondents were also interested in more information about where and when to view wildlife where there is no hunting (34%), more accessible features in wildlife viewing locations (such as paved trails, accessible parking, or tactile signage; 32%), and more amenities for wildlife viewing (such as viewing platforms, blinds, or signs; 30%). Respondents were least interested in more opportunities to be involved in other volunteer activities not related to research or data collection (9.4%).

Chi-square tests indicated quite a few statistically significant differences when comparing consumptive and nonconsumptive viewers for the additional support items explored in this survey (Table 49; Figure 66). Consumptive viewers were significantly more interested in many more potential programs and services in comparison with nonconsumptive viewers. Significantly more consumptive viewers were interested in the provision of more information about where to go to see wildlife, access to more places to go wildlife viewing, more amenities to support wildlife viewing, more accessible features in wildlife viewing locations, more opportunities for youth to learn how to participate in wildlife viewing, more wildlife viewing events or festivals, more programs to interact with other wildlife viewers, more programs to improve wildlife viewing skills, more training opportunities for wildlife viewing guides or mentors, more opportunities to be involved in volunteer research or wildlife data collection activities, more opportunities to be involved in other volunteer activities (not related to research or data collection), and more agency staff to support wildlife viewing (Table 49; Figure 66). In addition, significantly more nonconsumptive viewers indicated they were not interested in any of the response options provided regarding ways AGFC can support their wildlife viewing activities (13%) in comparison to consumptive viewers (6.1%; $\chi^2 = 14.01$, $df = 1$, $p < .001$; Table 49; Figure 66).

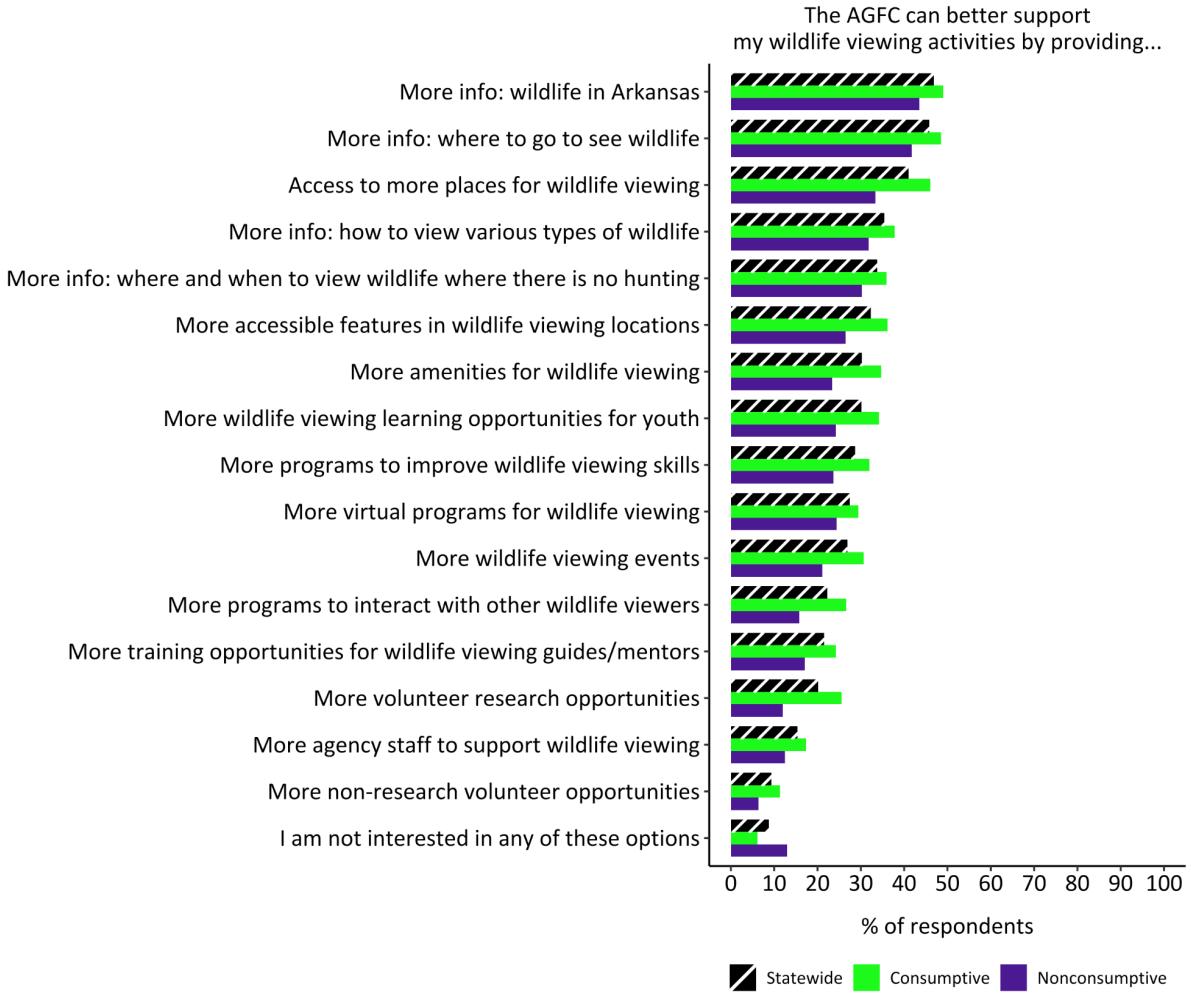


Figure 66: AGFC support for wildlife viewing, all respondents

AGFC programs and services indicated by wildlife viewers that would better support their wildlife viewing activities for statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one program or service to reflect their opinion. Chi-square tests indicated that significantly more consumptive viewers were interested in the provision of more information about where to go to see wildlife, access to more places to go wildlife viewing, more amenities to support wildlife viewing, more accessible features in wildlife viewing locations, more opportunities for youth to learn how to participate in wildlife viewing, more wildlife viewing events or festivals, more programs to interact with other wildlife viewers, more programs to improve wildlife viewing skills, more training opportunities for wildlife viewing guides or mentors, more opportunities to be involved in volunteer research or wildlife data collection activities, more opportunities to be involved in other volunteer activities (not related to research or data collection), and more agency staff to support wildlife viewing (Table 49). Significantly more nonconsumptive viewers indicated they were not interested in any of the response options provided to support their wildlife viewing activities (Table 49).

Preferred communication

We examined viewers' interest in methods of receiving information from state agencies to understand how AGFC can best communicate with wildlife viewers in Arkansas about recreation opportunities and conservation issues. In this question, we provided wildlife viewers with a list of 15 popular virtual and non-virtual communication channels and asked through which, if any, they were interested in receiving information from AGFC. A 16th, mutually exclusive option of, "I would prefer not to receive information from Arkansas Game and Fish Commission" was selected by 8.1% of respondents in Arkansas (Table 50; Figure 67).

Around half or over half of respondents preferred the AGFC website (59%), printed materials (such as brochures and maps; 54%), and email updates or e-newsletters (49%) as communication channels. Over one-third of respondents expressed interest in receiving communication from Facebook (45%), mailed newsletters or other subscriptions (37%), local news (35%), and online magazines (34%). The least popular form of state agency communication was podcasts (9.2%). We asked respondents about a variety of social media platforms, including YouTube (29%), Instagram (18%), Twitter (13%), and TikTok (13%), with Facebook being the most popular (45%; Table 50; Figure 67).

Chi-square tests indicated statistically significant differences, in terms of the popularity of state agency communication channels for consumptive and nonconsumptive viewers, for many of our response options. Significantly more consumptive viewers were interested in receiving information from the AGFC website, printed materials, online magazines, email updates or e-newsletters, Facebook, mailed newsletters or other subscriptions, YouTube, TikTok, blogs, one-on-one interaction with agency staff, podcasts, and text alerts (Table 50; Figure 67). In addition, significantly more nonconsumptive viewers (13%) indicated that they preferred not to receive information from AGFC in comparison to consumptive viewers (4.8%; $\chi^2 = 22.70$, $df = 1$, $p < .001$; Table 50; Figure 67).

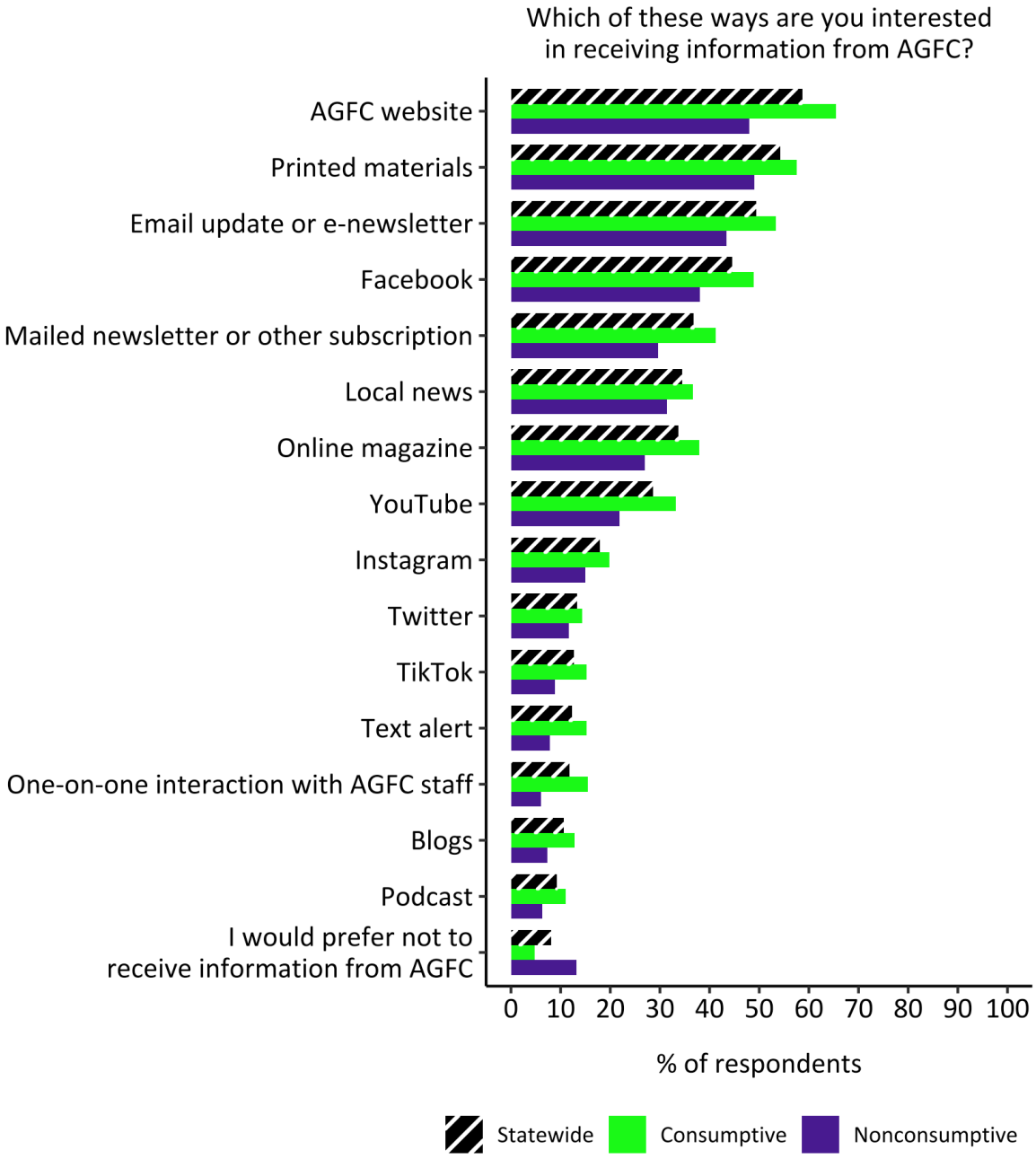


Figure 67: Preferred communication from AGFC, all respondents

Preferred method of communication for AGFC information of wildlife viewers in Arkansas for statewide, consumptive, and nonconsumptive groups. Note that individual categories sum to more than 100% because respondents were able to select more than one option to reflect their preferred method of communication. Chi-square tests indicated that significantly more consumptive viewers were interested in receiving information from the AGFC website, printed materials, online magazines, email updates, Facebook, mailed newsletters or other subscriptions, YouTube, TikTok, blogs, one-on-one interaction with agency staff, podcasts, and text alerts (Table 50). Significantly more nonconsumptive viewers indicated that they preferred not to receive information from AGFC in comparison to consumptive viewers (Table 50).

DISCUSSION AND CONCLUSION

The Arkansas Results of the Wildlife Viewer Survey provides a profile of wildlife viewers that can be utilized by AGFC to overcome barriers to broader relevance, public engagement, and support (AFWA & WMI, 2019). In the following subsections, we apply this profile to discuss how AGFC may best support wildlife viewers in Arkansas, broaden their relevance to wildlife viewers who do not hunt or fish, and develop opportunities for wildlife viewers to financially support the agency's work.

Supporting wildlife viewers in Arkansas

We recommend three general approaches to better engage wildlife viewers in Arkansas and establish a lasting and equitable relationship: 1) provide more wildlife viewing information and access, 2) promote around-the-home viewing opportunities, and 3) develop social support networks for wildlife viewers.

Provide wildlife viewing information and access

Wildlife viewers in Arkansas were particularly interested in more information on when, where, and how to view wildlife, as well as increased access to wildlife viewing locations. There is an apparent desire for AGFC to play a key role as an information resource on wildlife viewing in Arkansas, as the agency has started to do on its website through the "Be the First to Know" pop-up, which offers website visitors the option to select "watchable wildlife" as an option to receive further information via email that is tailored to their interests. In addition, there are pages with resources for wildlife viewing opportunities (https://www.agfc.com/en/explore-outdoors/wildlife-viewing/), including Arkansas Water Trails, Arkansas Nature Trails, and Auto Tours. Increasing accessibility, expanding awareness, continuing to build out this information (e.g., adding information on the kinds of wildlife present in Arkansas, information on how to view, and wildlife viewing-specific information for around the home) could encourage enhanced participation in wildlife viewing in Arkansas, as most wildlife viewers classify their skill level as beginner to intermediate. Specific information on land mammal and bird viewing opportunities in Arkansas will appeal to the most wildlife viewers, although all types of wildlife were of interest to at least one-quarter of viewers. Wildlife viewers were most interested in receiving such information from AGFC via the AGFC website, printed materials (such as brochures and maps), or email updates. The Central Arkansas Urban Wildlife Project (https://storymaps.arcgis.com/stories/d5fc415e48184e61858a63e1658e8f22), Wings over Arkansas program (https://www.agfc.com/en/education/in-the-field/wingsoverarkansas/), and the Virtual Nature Center (https://www.agfcnaturecenter.com/?_ga=2.6429874.1033972970.1667584627-

1725999577.1667584627) are exemplary programs for introducing new resources and opportunities for wildlife viewers. Providing links to these programs on the Wildlife Viewing Opportunities are great first steps to increasing accessibility to wildlife viewing information. Finally, based on the finding that over 60% of survey respondents report participation in wildlife viewing on state-managed lands, including Wildlife Management Areas, these areas may have potential for development of additional infrastructure to further support access for wildlife viewing and enhanced outreach regarding their value as wildlife viewing areas.

Promote around-the-home viewing opportunities

AGFC may connect with more wildlife viewers if they develop means to serve those who view around their homes, where the majority of viewers participate in viewing. Over 80% of viewers participate around their home, with over half of viewers also participating in locally-managed areas, like county parks and trails. In addition, the predominant barrier to viewing reported by respondents was lack of free time and distance to viewing sites, which could be mitigated by promoting programs that viewers could easily do at or near their homes. One opportunity for growth in around-the-home viewing is for AGFC to encourage of planting wildlife habitat at home; repositioning AGFC Private Lands Programs like Acres for Wildlife to serve wildlife viewers with smaller backyards may be a potential avenue for success (https://www.agfc.com/en/wildlife-management/private-lands-program/acres-for-wildlife/). Importantly, backyard wildlife habitat creation and maintenance provides an opportunity to engage viewers with conservation and the wildlife they appreciate in a new way; compared to other forms of wildlife viewing explored in our survey, fewer wildlife viewers currently participate in establishing or maintaining wildlife habitat. In addition, including resources both on feeding wild birds (which was the second most popular form of wildlife viewing in Arkansas) along with information to encourage planting or otherwise creating wildlife habitat at home may be a way to develop deeper involvement with AGFC among wildlife viewers.

Develop social support networks for wildlife viewers

Finally, AGFC could develop and increase social support networks for all wildlife viewers, particularly those who have been historically underserved in wildlife recreation and by state and federal fish and wildlife agencies, including Black, Indigenous, and people of color (Flores et al., 2018; Loukaitou-Sideris & Mukhija, 2019; Winter et al., 2019; Sánchez et al., 2020; Thomas et al., 2022). Family and friends were the most commonly reported source of social support that influenced viewer participation. We identify a need for growth in social support from mentors in particular; a role AGFC could potentially place more resources in filling or fostering. Further promotion of the Watchable Wildlife component of the Outdoors Skills Program and offering beginner wildlife viewers access to a network of wildlife viewing mentors may be a successful way to foster this kind of social support and community, particularly for BIPOC

wildlife viewers (https://www.agfc.com/en/education/first-steps-outdoors/outdoors-skills/). Given that 34% of wildlife viewers in Arkansas experience somewhat to a great deal of accessibility challenges, AGFC also could look for opportunities to connect with local organizations dedicated to supporting people living with disabilities, such as Birdability (https://www.birdability.org/), to collaborate on developing further wildlife viewing opportunities.

Broadening relevance to wildlife viewers who do not hunt or fish

Engaging with nonconsumptive recreationists serves as an opportunity for AGFC to expand their constituency and achieve relevancy goals (AFWA 2016) by connecting with a group not currently involved in hunting and angling and thereby not as closely tied to the agency. Our analysis of consumptive viewers (viewers who also fish or, in fewer cases, also hunt, or both) and nonconsumptive viewers (viewers who do not engage in hunting or fishing) revealed variation in the degree to which wildlife viewers are familiar with AGFC and, possibly as a consequence, differences in wildlife viewers' likelihood to engage with or financially support AGFC. Generally, consumptive viewers in Arkansas are more active and involved in viewing than nonconsumptive viewers; consumptive viewers participate in wildlife viewing more, spend more on wildlife viewing, and are more broadly active in wildlife viewing and outdoor recreation. Consumptive viewers also tended to have higher levels of experience and familiarity with and financial contributions (past and future) to AGFC than nonconsumptive viewers. Thus, we identify nonconsumptive viewers as a key demographic for which their lack of familiarity with the agency likely drives a lack of connection to AGFC. Increasing familiarity of wildlife viewers with AGFC may also lead to increased interest in participating in conservation behaviors in collaboration with the AGFC and contributing financially to the agency. In addition to a need to increase basic agency familiarity, the provision of services that specifically serve nonconsumptive viewers, including support for around-the-home viewing, birding/land mammal viewing, and information on wildlife viewing tailored for beginners, is an important next step in developing relationships with this currently underserved group.

Benefits to current constituents who also view wildlife

While consumptive and nonconsumptive recreationists are often treated as separate groups, both our findings and research published elsewhere (e.g., Cooper et al., 2015; Grooms et al., 2021) indicate that interest in wildlife viewing is common ground for many wildlife recreationists. It is promising that only around one-fifth of both consumptive and nonconsumptive viewers believe AGFC is not prioritizing programs for wildlife viewers enough. Our findings show that consumptive recreationists desire all forms of support from AGFC related to wildlife viewing programs. In addition, we found that consumptive and nonconsumptive viewers are interested in similar programs, services, and support, with the

only differences being consumptive viewers were more enthusiastically interested in all forms of state agency support (most likely due to established viewer-agency relationships from their hunting and angling activities). Thus, we suggest that engaging with and providing further support to nonconsumptive viewers will additionally serve and align with the interests of consumptive viewers. Finally, we do note that there may be potential for nonconsumptive viewers to engage in fishing, as over 40% of nonconsumptive viewers reported being *moderately*, *very*, or *extremely likely* to purchase any AGFC fishing license in the next five years.

Developing financial contribution opportunities for wildlife viewers

We found a strong potential for AGFC to engage wildlife viewers in opportunities to contribute financially to the agency. This potential is notable as it may be the case that the sample for this survey had a higher representation of low income viewers as Qualtrics panel surveys can be biased toward lower income respondents interested in the compensation for survey-taking (T. Soule, personal communications, March 30, 2022). In addition, over half of wildlife viewers reported interest in purchasing tangible products or lottery tickets for which the proceeds would go to conservation, in the next five years. Notably, the conservation lottery ticket is unavailable from AGFC at this time. The agency may consider developing a small online store for products related to wildlife or supporting development of a lottery fund that contributes to conservation (for an example, see Great Outdoors Colorado; https://goco.org/). The online store could also be accomplished by developing products (such as logoed apparel or plushes) and using a third-party, such as Society6 or Spring, to manage sales and inventory.

Engaging wildlife viewers who do not hunt or fish in funding conservation

Engaging nonconsumptive viewers in supporting AGFC financially will require re-thinking current funding models. Wildlife viewing does not appear to be a "gateway" to consumptive activities like hunting and fishing, which traditionally fund AGFC, as nonconsumptive viewers expressed little to no interest in supporting most typical/currently available funding mechanisms in the next five years. One option is the development of a wildlife viewer pass or membership similar to the Virginia Department of Wildlife Resources' "Restore the Wild Membership" (see description in Sinkular et al., 2022). Such a membership could provide wildlife viewers with a specialized access pass, potentially to Wildlife Management Areas and/or other perks (e.g., merchandise, wildlife viewing equipment, tours of Wildlife Management Areas, etc.) based on purchase level. Wildlife viewer-specific funding mechanisms could provide a way for AGFC to increase their connection with viewers, particularly nonconsumptive viewers. But it is critical to keep in mind that people must feel that the money is going to a good cause–one that they believe in or that will serve their interests. For wildlife viewers in Arkansas, this means using funds for species-level conservation; viewers were most

likely to increase their contributions to AGFC if they knew their funds would be used for the conservation of the types of wildlife they like to view or rare and vulnerable species.

Conclusion

The Arkansas results of the Wildlife Viewer Survey fill multiple knowledge gaps about wildlife viewers in the state: what they like to participate in, how they view and trust AGFC as a state agency, what services and programs they wish AGFC provided, how they are most likely to support conservation through action and funding, and more. This baseline information can enable AGFC to start building, adapting, or strengthening programming, funding models, and other efforts to better connect and interact with wildlife viewers. In turn, these efforts will enable AGFC to become more relevant to a larger constituency than they are currently.

While much work can be done using the data already collected and analyzed in the report, many additional opportunities exist to take this study to the next level through implementing activities at the state level and diving deeper into the data collected. The WVNT Working Group is poised to support the implementation of these findings. However, the full implementation of the recommendations outlined above will be best realized with a phase 2 multi-state grant, allowing the Working Group and AGFC to continue to work in collaboration with Virginia Tech in implementing survey results.

REFERENCES

Abrams, K. M., Leong, K., Melena, S., & Teel, T. (2020). Encouraging safe wildlife viewing in national parks: Effects of a communication campaign on visitors' behavior. *Environmental Communication*, 14(2), 255-270.

Association of Fish and Wildlife Agencies (AFWA). (2017). The State Conservation Machine. https://www.fishwildlife.org/application/files/3615/1853/8699/The_State_Conservation_Machine-FINAL.pdf

Association of Fish and Wildlife Agencies (AFWA). (2019). Multistate Conservation Grant Program - Background and general information. https://www.fishwildlife.org/afwa-informs/multi-state-conservation-grants-program

Association of Fish and Wildlife Agencies (AFWA) & The Wildlife Management Institute (WMI). (2019). Fish and wildlife relevancy roadmap: Enhanced conservation through broader engagement. In M. Dunfee, A. Forstchen, E. Haubold, M. Humpert, J. Newmark, J. Sumners, & C. Smith (Eds.), Washington D.C., AFWA. 128 Pages.

Benson, D. E. (2001). Wildlife and recreation management on private lands in the United States. *Wildlife Society Bulletin*, 359-371.

Byrne, R., & Dunfee, M. (2018). Evolution and current use of the outdoor recreation adoption model. Council to advocate hunting and shooting sports (CAHSS). https://cahss.org/wpcontent/uploads/2022/07/RB_Evolution-and-Current-Use-of-the-ORAM_FINAL.pdf

Center for Disease Control (CDC). (2020). Disability impacts all of us. *Disability and Health Infographics.* https://www.cdc.gov/ncbddd/disabilityandhealth/infographic-disability-impacts-all.html

Cooper, C., Larson, L., Dayer, A., Stedman, R., & Decker, D. (2015). Are wildlife recreationists conservationists? Linking hunting, birdwatching, and pro-environmental behavior. *The Journal of Wildlife Management*, 79(3): 446–457.

Cucinotta, D. & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta Bio-Medica: Atenei Parmensis*, *91*(1), 157–160.

Czeisler, M. É., Howard, M. E., Robbins, R., Barger, L. K., Facer-Childs, E. R., Rajaratnam, S. M., &

Czeisler, C. A. (2020). COVID-19: public compliance with and public support for stay-at-home mitigation strategies. *MedRxiv*.

Duffus, D. A. & Dearden, P. (1990). Non-consumptive wildlife-oriented recreation: A conceptual framework. *Biological Conservation*, 53(3), 213-231.

Fulton, D., Slagle, K., & Raedeke, A. (2017). 2018 NAWMP update: Assessment/Implementation summary. https://nawmp.org/sites/default/files/2018-01/SUMM%20NAWMP%20Bird%20watcher%20Survey%20June%2020%202017_1.pdf

Gefen, D. (2002). Reflections on the dimensions of trust and trustworthiness among online consumers. *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, *33*(3), 38–53.

Gottlieb, B. H. & Bergen, A. E. (2010). Social support concepts and measures. *Journal of Psychosomatic Research*, 69(5), 511-520.

Green, R. J. & Higginbottom, K. (2000). The effects of non-consumptive wildlife tourism on free-ranging wildlife: a review. *Pacific Conservation Biology*, *6*(3), 183-197.

Grooms, B., Dayer, A. A., & Peele, A. (2019). Wildlife recreationists in Virginia: Focus group results. https://vtechworks.lib.vt.edu/handle/10919/98666.

Grooms, B., Rutter, J., Barnes, J. C., Peele, A., & Dayer, A. A. (2020). Supporting wildlife recreationists in Virginia: Survey report to inform the Virginia Department of Wildlife Resources' Wildlife Viewing Plan. http://hdl.handle.net/10919/101046.

Grooms, B. P. (2021). Exploring wildlife recreationists' conservation behaviors and perceptions of state fish and wildlife agencies to inform conservation engagement and support (Doctoral dissertation, Virginia Tech).

Harshaw, H. W., Cole, N. W., Dayer, A. A., Rutter, J. D., Fulton, D. C., Raedeke, A. H., ... & Duberstein, J. N. (2021). Testing a continuous measure of recreation specialization among birdwatchers. *Human Dimensions of Wildlife*, *26*(5), 472-480.

Hochachka, W. M., Alonso, H., Gutiérrez-Expósito, C., Miller, E., & Johnston, A. (2021). Regional

variation in the impacts of the COVID-19 pandemic on the quantity and quality of data collected by the project eBird. *Biological Conservation*, *254*, 108974.

Katz, H. (2017). The impact of familiarity and perceived trustworthiness and influence on donations to nonprofits: An unaided recall study. *Journal of Nonprofit & Public Sector Marketing*, 1–13.

Kellert S. R., Case, D. J., Escher, D. J., Witter, Mikels-Carrasco, J., & Seng, P. T. (2017). The nature of Americans: disconnection and recommendations for reconnection. *The Nature of Americans National Report*. Mishawaka, IN; DJ Case and Associates.

Larson, L. R., Cooper, C. B., Stedman, R. C., Decker, D. J., & Gagnon, R. J. (2018). Place-based pathways to proenvironmental behavior: Empirical evidence for a conservation–recreation model. *Society & Natural Resources*, *31*(8), 871-891.

Lee, J.H. & Scott, D. (2004). Measuring birding specialization: A confirmatory factor analysis. *Leisure Sciences, 26*, 245-260.

Needham, M. D., Sprouse, L. J., & Grimm, K. E. (2009). Testing a self-classification measure of recreation specialization among anglers. *Human Dimensions of Wildlife*, *14*(6), 448-455.

North American Wildfowl Management Plan (NAWMP). (2021). National survey of birdwatchers: Nationwide and flyway comparisons. *Report to the National Flyway Council from the Minnesota Cooperative Fish and Wildlife Research Unit and University of Minnesota*. St. Paul, MN 55108 https://nawmp.org/sites/default/files/2021-03/National%20Birdwatcher%20Survey.pdf

Manfredo, M. J., Sullivan, L., Don Carlos, A. W., Dietsch, A. M., Teel, T. L., Bright, A. D., & Bruskotter, J. (2018). America's wildlife values: The social context of wildlife management in the U.S. national report from the research project entitled "America's Wildlife Values". Fort Collins, CO: Colorado State University.

Maple, L. C., Eagles, P. F., & Rolfe, H. (2010). Birdwatchers' specialisation characteristics and national park tourism planning. *Journal of ecotourism*, *9*(3), 219-238.

Mathews, K., Phelan, J., Jones, N. A., Konya, S., Marks, R., Pratt, B. M., ... & Bentley, M. (2015). National content test: Race and ethnicity analysis report. *U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau*.

Michopoulou, E., Darcy, S., Ambrose, I., & Buhalis, D. (2015). Accessible tourism futures: The world we dream to live in and the opportunities we hope to have. *Journal of Tourism Futures*, *1*(3), 179–188.

Miller, C. A., Guidry, J. P., Dahman, B., & Thomson, M. D. (2020). A tale of two diverse qualtrics samples: information for online survey researchers. *Cancer Epidemiology and Prevention Biomarkers*, *29*(4), 731-735.

Organ, J. F., Geist, V., Mahoney, S. P., Williams, S., Krausman, P. R., … & Decker, D. J. (2012). *The North American Model of Wildlife Conservation*. The Wildlife Society Technical Review 12-04. The Wildlife Society, Bethesda, Maryland, U.S.A. http://wildlife.org/wp-content/uploads/2014/05/North-American-model-of-Wildlife-Conservation.pdf

Pearson, A. R., Schuldt, J. P., Romero-Canyas, R., Ballew, M. T., & Larson-Konar, D. (2018). Diverse segments of the U.S. public underestimate the environmental concerns of minority and low-income Americans. *Proceedings of the National Academy of Sciences*, 115(49), 12429-12434.

Poudel, J., Munn, I. A., & Henderson, J. E. (2017). Economic contributions of wildlife watching recreation expenditures (2006 & 2011) across the U.S. South: An input-output analysis. *Journal of Outdoor Recreation and Tourism*, 17: 93–99.

Price Tack, J. L., McGowan, C. P., Ditchkoff, S. S., Morse, W. C., & Robinson, O. J. (2018). Managing the vanishing North American hunter: A novel framework to address declines in hunters and hunter-generated conservation funds. *Human Dimensions of Wildlife*, *23*(6), 515–532.

Rice, W. L., Meyer, C., Lawhon, B., Taff, B. D., Mateer, T., Reigner, N., & Newman, P. (2020). The COVID-19 pandemic is changing the way people recreate outdoors: Preliminary report on a national survey of outdoor enthusiasts amid the COVID-19 pandemic [Preprint]. *SocArXiv*.

Robinson, J. C. (2005). Relative prevalence of African Americans among bird watchers. In C. J. Ralph, T. D. Rich (Eds.), Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference, 20-24; Asilomar, California, Volume 2 Gen. Tech. Rep. PSW-GTR-191. Albany, CA: U.S. Dept. of Agriculture, Forest Service, Pacific Southwest Research Station: p. 1286-1296.

Rose, V. & McGregor, F. (2021). *Birdability... Because birding is for everyone! Birdability*. https://www.birdability.org

Rutter, J. D., Dayer, A. A., Harshaw, H. W., Cole, N. W., Duberstein, J. N., Fulton, D. C., ... & Schuster, R. M. (2021). Racial, ethnic, and social patterns in the recreation specialization of birdwatchers: An analysis of United States eBird registrants. *Journal of Outdoor Recreation and Tourism*, 35, 100400.

Schoffman, D. E., Kaczynski, A. T., Forthofer, M., Wilcox, S., Hutto, B., Child, S. T., & Hughey, S. M. (2015). Longitudinal associations with changes in outdoor recreation area use for physical activity during a community-based intervention. *Preventive medicine*, 78, 29-32.

Scott, D., & Shafer, C. S. (2001). Recreational specialization: A critical look at the construct. *Journal of Leisure Research*, 33, 319–343.

Sinkular, E. N., Jennings, K. K., & Dayer, A. A. (2021). Multi-State wildlife viewing study: Literature review. https://vtechworks.lib.vt.edu/handle/10919/105661

Sinkular, E.N., Dayer, A.A., Barnes, J.C., Pototsky, P.C., Plante., S.D., Jennings. K.K., and Chaves W.A. 2022. National and Regional Results from the Wildlife Viewer Survey: Enhancing Relevancy and Engaging Support from a Broader Constituency. Virginia Tech; Blacksburg, Virginia.

Spiel, K., Haimson, O. L., & Lottridge, D. (2019). How to do better with gender on surveys: a guide for HCI researchers. *Interactions*, *26*(4), 62-65.

Tremblay, P. (2001). Wildlife tourism consumption: consumptive or non-consumptive?. *The International Journal of Tourism Research*, *3*(1), 81.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, U.S. Department of Commerce, & U.S. Census Bureau. (2011). National survey of fishing, hunting, and wildlife-associated recreation: Arkansas. https://www2.census.gov/programs-surveys/fhwar/publications/2011/fhw11-ar.pdf

U.S. Department of the Interior (U.S. DOI), et al. (2016). National survey of fishing, hunting, and wildlife-associated recreation.

https://www.census.gov/content/dam/Census/library/publications/2018/demo/fhw16-nat.pdf.

U.S. Census Bureau. (2010). Census urban and rural classification and urban area criteria. *Library Catalog: www.census.gov Section: Government*.

U.S. Census Bureau. (2021, August 12). 2020 census statistics highlight local population changes and nation's racial and ethnic diversity [Press release]. https://www.census.gov/newsroom/press-releases/2021/population-changes-nations-diversity.html

Wardropper, C. B., Dayer, A. A., Goebel, M. S., & Martin, V. Y. (2021). Conducting conservation social science surveys online. *Conservation Biology*, *35*(5), 1650-1658.

Williams, R., Vogelsong, H., Green, G., & Cordell, K. (2004). Outdoor recreation participation of people with mobility disabilities: Selected results of the national survey of recreation and the environment. *Journal of Park and Recreation Administration, 2004, Volume 22, No. 2, 84-100*. http://www.fs.usda.gov/treesearch/pubs/21304

Van Grinsven, B., & Das, E. (2016). Logo design in marketing communications: Brand logo complexity moderates exposure effects on brand recognition and brand attitude. *Journal of marketing communications*, *22*(3), 256-270.

Vaske, J. J. (2019). Survey research and analysis. *Sagamore-Venture*. 1807 North Federal Drive, Urbana, IL 61801.

Vaske, J. J., & Roemer, J. M. (2013). Differences in overall satisfaction by consumptive and nonconsumptive recreationists: A comparative analysis of three decades of research. *Human Dimensions of Wildlife*, *18*(3), 159-180.

Zeppel, H., & Muloin, S. (2008). Conservation benefits of interpretation on marine wildlife tours. *Human Dimensions of Wildlife*, *13*(4), 280-294.

APPENDIX A. Survey Instrument

FISH AND WILDLIFE CONSERVATION
VIRGINIA TECH



Thank you for your interest in taking this survey! Before we get started, we would like to share some information about this research study with you.

ABOUT THIS STUDY

This survey is being conducted by researchers at Virginia Tech, with funding from the Association of Fish and Wildlife Agencies (AFWA) and individual fish and wildlife agencies across the United States. **The goal of this research is to learn about the activities, experiences, and preferences of people who recreationally participate in wildlife viewing**, which includes observing, photographing, or feeding wildlife; improving or maintaining wildlife habitat; or visiting parks and natural areas for the primary purpose of wildlife viewing.

This survey should take you about 15-25 minutes to complete. Your participation in this research study is **voluntary and anonymous**. Your responses will never be presented in a way that they can be connected to your identity. The results of the survey will be published in summary form in reports, graduate theses, and journal articles. Anonymous survey data will be made available to state fish and wildlife agencies and may be archived online in a publicly accessible format. There are **no known risks** associated with this research; there are **no right or wrong answers** to survey questions; and **you can leave the survey at any time**, for any reason.

For questions about this survey, please contact Emily Sinkular at wildlifeviewingsurvey@vt.edu or (540) 358-0346. This research has been approved by Virginia Tech's IRB committee (Protocol #20-1018). If you have any questions or concerns about this study's conduct or your rights as a research subject, you may contact the Virginia Tech IRB at 540-231-3732 or at irb@vt.edu.

Do you consent to participate in this research study?

(Please select one.)

- ◯ Yes
- ◯ No

>>



First, we would like to know about your participation in different kinds of wildlife viewing.

In which, if any, of the following forms of **wildlife viewing** have you participated in the past 5 years?

Note: *For this survey,* ***"wildlife"*** *refers to all animals, such as birds, fish, insects, mammals, amphibians, and reptiles, that are living in natural environments, including in urban and semi-urban places. Wildlife does not include animals living in artificial or captive environments, such as aquariums, zoos, or museums, or domestic animals such as farm animals or pets.* ***"Wildlife viewing"*** *refers to intentionally observing, photographing, or feeding wildlife; improving or maintaining wildlife habitat; or visiting parks and natural areas for the primary purpose of wildlife viewing. Wildlife viewing does not include simply noticing wildlife while doing something else, such as gardening, exercising, hunting, or fishing, or intentionally scouting for game.*

(Please select all that apply.)

- ☐ Closely observing wildlife or trying to identify unfamiliar types of wildlife
- ☐ Photographing or taking pictures of wildlife
- ☐ Feeding wild birds
- ☐ Feeding other wildlife
- ☐ Maintaining plantings or natural areas for the benefit of wildlife
- ☐ Visiting parks and natural areas to observe, photograph, or feed wildlife
- ☐ Taking trips or outings to any other location to observe, photograph, or feed wildlife
- ☐ I did not participate in any of these forms of wildlife viewing in the past 5 years.

>>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



Before we continue with the rest of the survey, we have just a few quick questions about you.

In **what year** were you born?

(Please select your birth year from the drop-down list.)

<<

>>



Which state do you live in for most of the year?

(Please select a state from the drop-down list.)

What is your **gender**?

(Please select one.)

- ◯ Man
- ◯ Woman
- ◯ Non-binary
- ◯ Prefer to not disclose
- ◯ Prefer to self-describe

What is the **highest degree or level of school** you have completed?

(Please select one.)

- ◯ High school diploma, equivalent, or less
- ◯ Some college
- ◯ Associate's or technical degree
- ◯ Bachelor's degree
- ◯ Professional, master's or doctoral degree

<< >>



Now, we would like to ask you more about your wildlife viewing activities.

Which of the following **types of wildlife** are you interested in observing, photographing, or feeding?

(Please select all that apply.)

- ☐ **Birds**
  (such as songbirds, waterfowl, birds of prey, etc.)
- ☐ **Insects or spiders**
  (such as butterflies, dragonflies, beetles, etc.)
- ☐ **Amphibians**
  (such as frogs, salamanders, etc.)
- ☐ **Land mammals**
  (such as deer, bears, elk, etc.)

- ☐ **Freshwater or saltwater fish**
  (such as sunfishes, darters, trout, salmon, sea bass, etc.)
- ☐ **Marine mammals**
  (such as whales, seals, dolphins, etc.)
- ☐ **Reptiles**
  (such as turtles, snakes, etc.)
- ☐ ***None of the above**, I am not interested in observing, photographing, or feeding wildlife*
- ☐ **None of the above,** *I am interested in observing, photographing, or feeding other types of wildlife*

How would you **rate your skill level** in wildlife viewing?

(Please select one.)

- ○ Beginner
- ○ Novice
- ○ Intermediate
- ○ Advanced
- ○ Expert

Do you own any **specialized equipment** for wildlife viewing *(such as binoculars, cameras, mobile apps, spotting scopes, field guides, or specialized clothing)*, or have you rented or borrowed any specialized equipment for wildlife viewing in the past 5 years?

(Please select one.)

- ◯ Yes
- ◯ No

>>



Next, we would like to know about your expenditures related to wildlife viewing.

How much money do you spend on the following expenses related to wildlife viewing in a typical year?

Note: *Throughout this survey we will ask you about your activities during "a typical year." This is because we recognize that the last year has been unusual due to the COVID-19 pandemic, and this may have impacted your participation in wildlife viewing. By "a typical year," we mean a recent year (within the last ~5 years) that was not impacted by unusual circumstances like the COVID-19 pandemic. If you started viewing wildlife during the pandemic, please answer all questions about "a typical year" for the past year.*

(For each expense category below, please select the response that contains your best estimate of how much you typically spend.)

Trip-related costs for wildlife viewing *(such as transportation, lodging, guide fees, or access fees)*

All other wildlife viewing expenses and equipment *(such as binoculars, hiking or boating equipment for viewing, field guides, bird feeders or bird food, or membership dues for wildlife viewing organizations)*

<< >>



Now, we would like to know more about the role of wildlife viewing in your life.

To what extent do you **agree or disagree** with the following statements?

(Please select one response per statement.)

To what extent do you **agree or disagree** with the following statements?

(Please select one response per statement.)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I think of **myself** as a wildlife viewer.	○	○	○	○	○
Being a wildlife viewer is an important part of **who I am**.	○	○	○	○	○
Wildlife viewing has a **central role** in my life.	○	○	○	○	○
A lot of my life is **organized** around wildlife viewing.	○	○	○	○	○
Wildlife viewing is **not an important** part of my life.	○	○	○	○	○
People who **look like me** participate in wildlife viewing.	○	○	○	○	○
I feel **welcome** among other wildlife viewers.	○	○	○	○	○
Being a wildlife viewer is **not a key** part of who I am.	○	○	○	○	○
I **teach** or **mentor** others in wildlife viewing.	○	○	○	○	○
Wildlife viewing is one of the **most enjoyable** activities I do.	○	○	○	○	○

<< >>



We are also interested in your history with wildlife viewing.

How did the **COVID-19 pandemic** impact your overall participation in wildlife viewing?

(Please select one.)

- ○ **No impact;** I was wildlife viewing prior to the COVID-19 pandemic, and I continued wildlife viewing during the pandemic.
- ○ I was wildlife viewing prior to the COVID-19 pandemic, but **I stopped wildlife viewing** during the pandemic.
- ○ While I previously participated in wildlife viewing, I was not currently wildlife viewing when the COVID-19 pandemic started. During the pandemic, I **started wildlife viewing again**.
- ○ I **started wildlife viewing for the first time** during the COVID-19 pandemic.

>>



For about **how many years** have you participated in wildlife viewing?

(Please select the category that contains your best estimate.)

<<

>>

FISH AND WILDLIFE CONSERVATION
VIRGINIA TECH™



In this section of the survey, we will ask you about how much time you spend wildlife viewing in different locations. The first question asks about the number of days you spend wildlife viewing in *a typical year*. The next two questions ask you about how many days you spent wildlife viewing in the *past year* and how much time you think you will spend wildlife viewing in the *upcoming year*.

First, **how many days** do you spend wildlife viewing in each of the following locations **in a typical year**?

Note: By "a typical year," we mean a recent year (within the last ~5 years) that was not impacted by unusual circumstances like the COVID-19 pandemic.

(Please select the response that contains your best estimate for the number of days you spend wildlife viewing in each location. If you do not typically participate in wildlife viewing in these locations, please select 0 days.)

First, **how many days** do you spend wildlife viewing in each of the following locations **in a typical year**?

Note: By "a typical year," we mean a recent year (within the last ~5 years) that was not impacted by unusual circumstances like the COVID-19 pandemic.

(Please select the response that contains your best estimate for the number of days you spend wildlife viewing in each location. If you do not typically participate in wildlife viewing in these locations, please select 0 days.)

	0 days	1-30 days	31-60 days	61-90 days	91-120 days	121-150 days	151-180 days	181-210 days	211 or more days
Around or within 1 mile of your home	○	○	○	○	○	○	○	○	○
More than 1 mile away from your home, but within your state	○	○	○	○	○	○	○	○	○
Outside of your state or outside of the United States	○	○	○	○	○	○	○	○	○

How many days did you spend wildlife viewing in each of the following locations **during the first year of the COVID-19 pandemic** (March 2020 - February 2021)?

(Please select the response that contains your best estimate for the number of days you spent wildlife viewing in each location. If you did not participate in wildlife viewing in these locations during the first year of the COVID-19 pandemic, please select 0 days.)

	0 days	1-30 days	31-60 days	61-90 days	91-120 days	121-150 days	151-180 days	181-210 days	211 or more days
Around or within 1 mile of your home	○	○	○	○	○	○	○	○	○
More than 1 mile away from your home, but within your state	○	○	○	○	○	○	○	○	○
Outside of your state or outside of the United States	○	○	○	○	○	○	○	○	○

How many days do you think you will spend wildlife viewing in each of the following locations **in the next 12 months**?

(Please select the response that contains your best estimate for the number of days you expect to spend wildlife viewing in each location. If you do not expect to participate in wildlife viewing in these locations in the upcoming year, please select 0 days.)

	0 days	1-30 days	31-60 days	61-90 days	91-120 days	121-150 days	151-180 days	181-210 days	211 or more days
Around or within 1 mile of your home	○	○	○	○	○	○	○	○	○
More than 1 mile away from your home, but within your state	○	○	○	○	○	○	○	○	○
Outside of your state or outside of the United States	○	○	○	○	○	○	○	○	○

<< >>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



Now, we would like to know more about where you participate in wildlife viewing in Arkansas.

In a typical year, in **which locations** do you participate in wildlife viewing in Arkansas?

Note: *By "a typical year," we mean a recent year (within the last ~5 years) that was not impacted by unusual circumstances like the COVID-19 pandemic.*

(Please select all that apply.)

- ☐ My own home or property
- ☐ Property of friends or family
- ☐ Other privately-owned areas *(such as lands owned by land trusts, non-profit organizations, private companies, or individuals)*
- ☐ Locally-managed areas *(such as town or county parks, trails, or open spaces)*
- ☐ State-managed areas *(such as state parks, forests, boat landings, fishing areas, conservation areas, or Wildlife Management Areas)*
- ☐ Federally-managed areas *(such as National Parks, National Wildlife Refuges, Bureau of Land Management Land, Waterfowl Production Areas, or National Forests)*
- ☐ Tribal lands
- ☐ I am unsure who owns or manages the areas where I participate in wildlife viewing.
- ☐ I do not participate in wildlife viewing in any of the above locations.

<< >>

FISH AND WILDLIFE CONSERVATION
VIRGINIA TECH



Next, we would like to understand the factors that support and limit your participation in wildlife viewing.

To what extent do people in each of the following groups **encourage your participation** in wildlife viewing?

(Please select one response per statement.)

	Not at all	Very little	Somewhat	Quite a bit	A great deal
Family member(s)	○	○	○	○	○
Friend(s)	○	○	○	○	○
Mentor(s)	○	○	○	○	○
Peer(s)	○	○	○	○	○

To what extent do you experience **accessibility challenges** related to wildlife viewing?

Note: *By* ***"Accessibility challenges"*** *we mean the difficulties someone experiences in interacting with or while using the physical or social environment while trying to engage in a meaningful activity (such as wildlife viewing). This may be a result of a mobility challenge, blindness or low vision, intellectual or developmental disabilities (including Autism), mental illness, being Deaf or Hard of Hearing, or other health concerns. (Definition from Birdability.org)*

(Please select one.)

- ◯ Not at all
- ◯ Very little
- ◯ Somewhat
- ◯ Quite a bit
- ◯ A great deal

To what extent do each of the following **limit the extent of your participation** in wildlife viewing in a typical year?

Note: *By* ***"a typical year,"*** *we mean a recent year (within the last ~5 years) that was not impacted by unusual circumstances like the COVID-19 pandemic.*

(Please select one response per statement.)

	Not at all	Very little	Somewhat	Quite a bit	A great deal
Lack of **free time** to participate in wildlife viewing	○	○	○	○	○
Few **people who support** your wildlife viewing activities	○	○	○	○	○
Few **people to participate in wildlife viewing with**	○	○	○	○	○
Lack of **organized viewing opportunities** within your community or social groups	○	○	○	○	○
Lack of wildlife viewing **skills**	○	○	○	○	○
Lack of access to **equipment or supplies** for wildlife viewing	○	○	○	○	○
Financial costs associated with wildlife viewing	○	○	○	○	○
Distance to high-quality locations for wildlife viewing	○	○	○	○	○

Not knowing **where to go wildlife viewing**	○	○	○	○	○
Lack of **transportation** to wildlife viewing locations	○	○	○	○	○
Accessibility challenges for yourself or the people you go wildlife viewing with	○	○	○	○	○
Lack of **facilities** at wildlife viewing locations	○	○	○	○	○
Safety concerns when wildlife viewing	○	○	○	○	○
Crowds in wildlife viewing locations	○	○	○	○	○

>>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



We are also interested in your participation in other kinds of outdoor recreation.

Which of the following **outdoor activities**, if any, do you participate in during a typical year?

Note: *By "a typical year," we mean a recent year (within the last ~5 years) that was not impacted by unusual circumstances like the COVID-19 pandemic.*

(Please select all that apply.)

- ☐ Camping
- ☐ Fishing
- ☐ Horseback riding

- ☐ Winter sports *(such as skiing, snowboarding, or snowshoeing)*
- ☐ Rock climbing or bouldering
- ☐ Foraging *(for wild foods such as mushrooms or berries)*
- ☐ Hunting
- ☐ Swimming
- ☐ Recreational shooting sports or archery
- ☐ Geocaching
- ☐ Hiking or backpacking
- ☐ Off-roading or use of Off Highway Vehicles *(such as ATVs or snowmobiles)*

- ☐ Motorized boating
- ☐ Non-motorized boating *(such as kayaking or canoeing)*
- ☐ Road or mountain biking
- ☐ Running, jogging, or walking
- ☐ I do not participate in any of these activities.
- ☐ Botanizing or viewing wildflowers, other plants, or fungi

<< >>

FISH AND WILDLIFE CONSERVATION
VIRGINIA TECH



Now we would like to know more about your interest in participating in wildlife or habitat conservation activities in the future.

How likely would you be to participate in each of the following **conservation activities** in the next 5 years, if you had the opportunity to do so?

(Please select one response per conservation activity.)

	Not at all likely	Slightly likely	Moderately likely	Very likely	Extremely likely
Informing or **teaching** others about wildlife conservation	○	○	○	○	○
Enhancing wildlife habitat *(the place or environment where wildlife live and grow)*	○	○	○	○	○
Participating in **civic engagement** *(such as voting or advocating)* related to wildlife conservation	○	○	○	○	○
Collecting data on wildlife or habitat to contribute to science or management	○	○	○	○	○
Donating money to support wildlife conservation	○	○	○	○	○
Purchasing products that benefit wildlife or whose proceeds support conservation	○	○	○	○	○
Cleaning up trash or litter	○	○	○	○	○

<< >>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



In this section of the survey, we would like to know more about your experiences with and thoughts about Arkansas Game and Fish Commission, the state agency responsible for conserving fish and wildlife and their habitats and managing wildlife-related recreation in Arkansas, among other things.

How **familiar** are you with Arkansas Game and Fish Commission?

(Please select one.)

- ○ Not at all familiar
- ○ Slightly familiar
- ○ Moderately familiar
- ○ Very familiar
- ○ Extremely familiar

Now, we would like to know more about your **familiarity** with different aspects of Arkansas Game and Fish Commission.

(Please select one response per statement.)

	Not at all familiar	Slightly familiar	Moderately familiar	Very familiar	Extremely familiar
Arkansas Game and Fish Commission staff	○	○	○	○	○
Arkansas Game and Fish Commission programs	○	○	○	○	○
Arkansas Game and Fish Commission lands	○	○	○	○	○
Arkansas Game and Fish Commission mission	○	○	○	○	○

Have you seen this logo before?

(Please select one.)



- ○ **Yes**, I have seen this logo before
- ○ **No**, I have not seen this logo before

<< >>



Regardless of your level of familiarity with Arkansas Game and Fish Commission, we are interested in your thoughts about **how the agency currently prioritizes** programs and services that support wildlife viewing. Please complete the following statement:

The level at which Arkansas Game and Fish Commission prioritizes programs and services that support wildlife viewing is...

(Please select one.)

- ○ Far too low
- ○ Too low
- ○ About right
- ○ Too high
- ○ Far too high
- ○ I don't have an opinion.

<< >>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



We are also interested in any experiences you may have with the programs and services offered by Arkansas Game and Fish Commission.

Arkansas Game and Fish Commission offers a variety of **programs and services** that connect people with wildlife and support wildlife viewing. Which of the following Arkansas Game and Fish Commission programs and services, if any, have you **participated in or used** in the past 5 years?

(Please select all that apply.)

- ☐ Volunteer research or wildlife data collection opportunities
- ☐ Volunteer opportunities, not related to research or data collection
- ☐ Technical assistance or information about improving wildlife habitat
- ☐ Information about wildlife viewing opportunities in the state
- ☐ Information about wildlife in the state
- ☐ Programs or presentations for groups or clubs
- ☐ Arkansas Game and Fish Commission lands
- ☐ Arkansas Game and Fish Commission nature, education, or visitor centers
- ☐ Conservation law enforcement
- ☐ I have not used or engaged in any of these agency programs or services in the last 5 years.

Have any members of your household engaged in programming for children or youth provided by Arkansas Game and Fish Commission *(such as school-based programs, camps, or youth and family events)*?

(Please select one.)

- ◯ **Yes**; children or youth in my household have engaged in some of these programs.
- ◯ **No**; children or youth in my household have not engaged in any of these programs.
- ◯ **Not applicable**; I do not have children or youth in my household.

<< >>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



We would also like to understand how Arkansas Game and Fish Commission can best meet the needs of wildlife viewers.

Which of the following potential programs or services from Arkansas Game and Fish Commission would better **support your wildlife viewing activities** in Arkansas?

(Please select all that apply.)

Arkansas Game and Fish Commission can better support my wildlife viewing activities by providing...

- ☐ More opportunities for **youth** to learn how to participate in wildlife viewing
- ☐ More agency **staff** to support wildlife viewing
- ☐ More opportunities to be involved in volunteer **research** or wildlife data collection activities

- ☐ More **virtual programs** for wildlife viewing *(such as video classes, online presentations, or wildlife cameras)*
- ☐ More information about **how** to view various types of wildlife
- ☐ More information about **wildlife in Arkansas**
- ☐ More information about **where** to go to see wildlife
- ☐ More programs to **interact** with other wildlife viewers
- ☐ More **accessible features** in wildlife viewing locations *(such as paved trails, accessible parking, or tactile signage)*
- ☐ More wildlife viewing **events** *(such as wildlife viewing festivals or competitions)*
- ☐ Access to more **places** to go wildlife viewing
- ☐ More programs to improve wildlife viewing **skills**
- ☐ More **amenities** for wildlife viewing *(such as viewing platforms, blinds, or signs)*
- ☐ More information about where and when to view wildlife where there is **no hunting**
- ☐ More **training** opportunities for wildlife viewing guides or mentors
- ☐ I am **not interested** in any of these options to support my wildlife viewing activities.
- ☐ More opportunities to be involved in other **volunteer** activities, not related to research or data collection

>>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



Now, we would like to know about your past financial support of Arkansas Game and Fish Commission.

Below are a variety of ways that wildlife conservation and recreation opportunities provided by Arkansas Game and Fish Commission are *financially* supported by the public in Arkansas. Which of the following **purchases or contributions**, if any, have you made in the past 5 years?

Note: *Please also select options for which you have ever made a one-time, permanent purchase, such as a lifetime hunting or fishing license.*

(Please select all that apply.)

- ☐ Any Arkansas hunting license
- ☐ Any Arkansas fishing license
- ☐ Arkansas conservation or habitat stamp *voluntarily purchased independent of a hunting license*
- ☐ Fees for a program or event hosted by Arkansas Game and Fish Commission
- ☐ Donation of land to Arkansas Game and Fish Commission through a conservation easement
- ☐ Direct donation of money to Arkansas Game and Fish Commission
- ☐ Tangible products from Arkansas Game and Fish Commission *(such as books, maps, and other merchandise)*
- ☐ I have not made any of these purchases or contributions.

<< >>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



Now, we would like to know about future purchases or contributions you may make to Arkansas Game and Fish Commission.

How likely are you to make the following **purchases or contributions** in the next 5 years, assuming these options are available in Arkansas?

(Please select one response for each type of contribution, regardless of whether or not the option is currently available in Arkansas.)

	Not at all likely	Slightly likely	Moderately likely	Very likely	Extremely likely
Any Arkansas hunting license	○	○	○	○	○
Any Arkansas fishing license	○	○	○	○	○
Arkansas conservation or habitat stamp *required with purchase of a hunting license*	○	○	○	○	○
Arkansas conservation or habitat stamp *voluntarily purchased independent of a hunting license*	○	○	○	○	○
Conservation or wildlife license plate	○	○	○	○	○
Arkansas Game and Fish Commission lands access pass, permit, or entrance fee	○	○	○	○	○
Fees for a program or event hosted by Arkansas Game and Fish Commission	○	○	○	○	○
Voluntary donation of a portion of state income tax return to Arkansas Game and Fish Commission	○	○	○	○	○
Donation of land to Arkansas Game and Fish Commission through a conservation easement	○	○	○	○	○
Direct donation to Arkansas Game and Fish Commission	○	○	○	○	○
Lottery ticket for which the proceeds go to habitat conservation	○	○	○	○	○

Virtual products from Arkansas Game and Fish Commission *(such as podcasts, e-books, and other online materials)*	○	○	○	○	○
Physical products from Arkansas Game and Fish Commission *(such as books, maps, and other merchandise)*	○	○	○	○	○

<< >>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



We would like to understand what might encourage you to provide additional financial support to wildlife conservation through Arkansas Game and Fish Commission.

How likely would you be to provide **more financial support** than you currently do to Arkansas Game and Fish Commission, if your contributions were used in the following ways?

(Please select one response per statement.)

	Not at all likely	Slightly likely	Moderately likely	Very likely	Extremely likely
Supported **habitat** conservation	○	○	○	○	○
Supported conservation of **rare** or **vulnerable** species	○	○	○	○	○
Supported conservation of the types of **wildlife** you like to view	○	○	○	○	○

Supported more **opportunities** or **resources** for wildlife viewing	○	○	○	○	○
Supported more **education** or **outreach** related to wildlife conservation	○	○	○	○	○
Supported wildlife **research** or **monitoring**	○	○	○	○	○
Were **matched** with funding from a different source	○	○	○	○	○

<< >>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



We would also like to know more about your interest in supporting Arkansas Game and Fish Commission by participating in wildlife or habitat conservation activities in the future.

How likely would you be to participate in each of the following **conservation activities *with or in support of Arkansas Game and Fish Commission*** in the next 5 years, if you had the opportunity to do so?

(Please select one response per conservation activity.)

	Not at all likely	Slightly likely	Moderately likely	Very likely	Extremely likely
Informing or teaching others about wildlife conservation	○	○	○	○	○
Enhancing wildlife habitat *(the place or environment where wildlife live and grow)*	○	○	○	○	○

Participating in **civic engagement** *(such as voting or advocating)* related to wildlife conservation	○	○	○	○	○
Collecting data on wildlife or habitat to contribute to science or management	○	○	○	○	○
Donating money to support wildlife conservation	○	○	○	○	○
Purchasing products that benefit wildlife or whose proceeds support conservation	○	○	○	○	○
Cleaning up trash or litter	○	○	○	○	○

<< >>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



Next, we would like to know more about how you feel about Arkansas Game and Fish Commission.

To what extent do you agree or disagree with each of the **following statements about Arkansas Game and Fish Commission**?

(Please select one response per statement.)

	Strongly Disagree	Somewhat Disagree	Neither Disagree nor Agree	Somewhat Agree	Strongly Agree
I **trust** Arkansas Game and Fish Commission.	○	○	○	○	○
I **trust** the **staff** at Arkansas Game and Fish Commission.	○	○	○	○	○

I **doubt** the **honesty** of Arkansas Game and Fish Commission.	○	○	○	○	○
Promises made by Arkansas Game and Fish Commission are likely to be **reliable**.	○	○	○	○	○
I expect that Arkansas Game and Fish Commission will **keep promises** they make.	○	○	○	○	○
I **do <u>not</u> doubt** the honesty of Arkansas Game and Fish Commission.	○	○	○	○	○
I expect that Arkansas Game and Fish Commission is **well-meaning**.	○	○	○	○	○
I expect that Arkansas Game and Fish Commission has **good intentions** toward wildlife viewers.	○	○	○	○	○
I expect that Arkansas Game and Fish Commission's intentions are **benevolent**.	○	○	○	○	○

I **doubt** that Arkansas Game and Fish Commission is **well-meaning**.	○	○	○	○	○
Arkansas Game and Fish Commission **knows about** wildlife viewing.	○	○	○	○	○
Arkansas Game and Fish Commission **understands** the environment they work in.	○	○	○	○	○
Arkansas Game and Fish Commission knows how to **support** to wildlife viewers.	○	○	○	○	○
Arkansas Game and Fish Commission **does not know** about wildlife viewing.	○	○	○	○	○

>>



Finally, we would like to learn how Arkansas Game and Fish Commission can best communicate with wildlife viewers in Arkansas about recreation opportunities and conservation issues.

Which, if any, of the following ways are you interested in **receiving information** from Arkansas Game and Fish Commission?

Note: *Your responses are for data collection only. Arkansas Game and Fish Commission will not receive your specific response nor contact you as a result of this survey.*

(Please select all that apply.)

- ☐ Printed materials *(such as brochures and maps)*
- ☐ Mailed newsletter or other subscription
- ☐ Email update or e-newsletter
- ☐ Online magazine

- [ ] Arkansas Game and Fish Commission website
- [ ] Local news *(such as television or online or print newspapers)*
- [ ] Blogs
- [ ] Facebook
- [ ] Twitter
- [ ] Tik-Tok
- [ ] Instagram
- [ ] YouTube
- [ ] Podcast
- [ ] Text alert
- [ ] One-on-one interaction with agency staff
- [ ] I would prefer not to receive information from Arkansas Game and Fish Commission.

>>

FISH AND WILDLIFE CONSERVATION VIRGINIA TECH



This is the final section of the survey. We have just a few more quick questions about you.

For about how many years total have you lived in Arkansas?

(Please select the number that's your best estimate of total years you've lived in Arkansas.)

What is your race and/or ethnicity?

(Please select all that apply.)

- [ ] American Indian or Alaska Native
- [ ] Asian
- [ ] Black or African American
- [ ] Hispanic, Latino, or Spanish
- [ ] Middle Eastern or North African
- [ ] Native Hawaiian or other Pacific Islander
- [ ] Some other race or ethnicity
- [ ] White

What was your total household income during the past 12 months?

(Please select one.)

- ◯ Less than $24,999
- ◯ $25,000 - $49,999
- ◯ $50,000 – $74,999
- ◯ $75,000 – $99,999
- ◯ $100,000 – $124,999
- ◯ $125,000 or more
- ◯ I prefer not to answer.

What is your five-digit zip code?

Which of the following best describes where you currently live?

(Please select one per statement.)

- ◯ Rural area (Less than 2,500 people)
- ◯ Small town (2,500 - 9,999 people)
- ◯ Small city (10,000 - 49,999 people)
- ◯ Urban area (50,000 or more people)

<< >>

APPENDIX B. Reverse coded items and attention checks

1. Attention checks for the question, "In which, if any, of the following forms of wildlife viewing have you participated in the past 5 years?"

    a. Respondent selected ["Closely observing wildlife or trying to identify unfamiliar types of wildlife"] AND ["None of the above, I am not interested in observing, photographing, or feeding wildlife"]
    OR
    b. Respondent selected ["Photographing or taking pictures of wildlife"] AND ["None of the above, I am not interested in observing, photographing, or feeding wildlife"]
    OR
    c. Respondent selected ["Feeding wild birds"] AND ["None of the above, I am not interested in observing, photographing, or feeding wildlife"]
    OR
    d. Respondent selected ["Feeding other wildlife"] AND ["None of the above, I am not interested in observing, photographing, or feeding wildlife"]
    OR
    e. Respondent selected ["Visiting parks and natural areas to observe, photograph, or feed wildlife"] AND ["None of the above, I am not interested in observing, photographing, or feeding wildlife"]
    OR
    f. Respondent selected ["Taking trips or outings to any other location to observe, photograph, or feed wildlife"] AND ["None of the above, I am not interested in observing, photographing, or feeding wildlife"]

2. Attention checks for "Now, we would like to know more about the role of wildlife viewing in your life. To what extent do you agree or disagree with the following statements?"

    a. Respondent selected ["Strongly Agree"] FOR ["Being a wildlife viewer is an important part of who I am" AND "Being a wildlife viewer is not a key part of who I am"]
    OR
    b. Respondent selected ["Strongly Disagree"] FOR ["Being a wildlife viewer is an important part of who I am"] AND ["Being a wildlife viewer is not a key part of who I am"]

OR

c. Respondent selected [“Strongly Agree”] FOR [“Wildlife viewing is not an important part of my life”] AND [“Wildlife viewing has a central role in my life”] OR
d. Respondent selected [“Strongly Disagree”] FOR [“Wildlife viewing is not an important part of my life” AND “Wildlife viewing has a central role in my life”]

3. Attention checks for “How many days do you spend wildlife viewing in each of the following locations in a typical year?”

    a. Respondent selected [211 or more days] IS SELECTED FOR [“Outside of your state or the United States”] AND [“More than 1 mile away from your home, but within your state”] OR [“Around or within 1 mile of your home”]

4. Attention checks for “How many days did you spend wildlife viewing in each of the following locations during the first year of the COVID-19 pandemic (March 2020 - February 2021)?”

    a. Respondent selected [211 or more days] IS SELECTED FOR [“Outside of your state or the United States”] AND [“More than 1 mile away from your home, but within your state”] OR [“Around or within 1 mile of your home”]

5. Attention checks for “How many days do you think you will spend wildlife viewing in each of the following locations in the next 12 months?”
    a. Respondent selected [211 or more days] IS SELECTED FOR [“Outside of your state or the United States”] AND [“More than 1 mile away from your home, but within your state”] OR [“Around or within 1 mile of your home”]

6. Attention checks for “Next, we would like to know more about how you feel about the Arkansas Game and Fish Commission. To what extent do you agree or disagree with each of the following statements about the Arkansas Game and Fish Commission?”

    a. Respondent selected [“Strongly Agree”] FOR [“I doubt the honesty of the Arkansas Game and Fish Commission”] AND [“I can count on the Arkansas Game and Fish Commission to be truthful”] OR [“Strongly Disagree”] IS SELECTED FOR [“I doubt the honesty of Arkansas Game and Fish Commission”] AND [“I can count on Arkansas Game and Fish Commission to be truthful”]

b. Respondent selected [“Strongly Agree”] FOR [“I expect thatArkansas Game and Fish Commission’s intentions are benevolent”] AND [“I doubt that Arkansas Game and Fish Commission is well meaning”] OR [“Strongly Disagree”] FOR [“I expect that Arkansas Game and Fish Commission’s intentions are benevolent”] AND [“I doubt that Arkansas Game and Fish Commission is well meaning”]

c. Respondent selected [“Strongly Agree”] FOR [“Arkansas Game and Fish Commission knows very little about wildlife viewing”] AND [“Arkansas Game and Fish Commission knows how to support wildlife viewers”] OR [“Strongly Disagree”] FOR [“Arkansas Game and Fish Commission knows very little about wildlife viewing”] AND [“Arkansas Game and Fish Commission knows how to support wildlife viewers”]

APPENDIX C. Tables Appendix

Table 1. Age (survey quota)

	Statewide (mean)	Consumptive (mean)	Nonconsumptive (mean)	Significance (t)
Age	47.60	45.48	50.84	**4.84*** **

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 770

Table 2. Gender (survey quota)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Man	47.8	47.5	48.4	0.12
Woman	51.8	52.3	50.9	
Non-binary	0.1	0.0	0.3	
Not Disclose	0.2	0.0	0.5	
Self-Describe	0.1	0.2	0.0	

Note that statistical tests are between consumptive and nonconsumptive groups, with only "man" and "woman" due to low sample size. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 3. Education (survey quota)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Professional, master's or doctoral degree	10.9	9.5	13.2	
Bachelor's degree	19.8	16.9	24.3	
Associate's or technical degree	13.8	13.5	14.2	**15.83****
Some college	27.7	29.3	25.1	
High school diploma, equivalent, or less	27.8	30.8	23.3	

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 4. Race and ethnicity (for descriptive analysis)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)
White	86.3	85.1	88.3
Black or African American	8.9	9.9	7.1
Multiracial	6.3	5.7	5.2
American Indian or Alaska Native	4.9	6.1	3.0
Hispanic, Latino, or Spanish	4.2	4.1	4.3
Some other race or ethnicity	1.3	1.3	1.3
Asian	1.2	0.5	2.3
Native Hawaiian or other Pacific Islander	0.3	0.3	0.3
Middle Eastern or North African	0.1	0.0	0.3

Table 5. Race and ethnicity (for statistical analysis)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
BIPOC	19.4	21.0	17.0	2.42
White	80.6	79.0	83.0	

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 6. Household income

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Less than $24,999	24.7	25.0	24.4	7.55
$25,000 - $49,999	29.1	31.7	24.9	
$50,000 – $74,999	17.6	17.3	18.0	
$75,000 – $99,999	12.1	10.6	14.5	
$100,000 – $124,999	7.0	6.5	7.8	
$125,000 or more	9.5	8.9	10.5	

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 5

Table 7. Residential location

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Rural area (Less than 2,500 people)	32.3	35.6	27.2	**14.18****
Small town (2,500 - 9,999 people)	17.6	18.8	16.0	
Small city (10,000 - 49,999 people)	24.4	21.1	29.7	
Urban area (50,000 or more people)	25.6	24.5	27.2	

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 3

Table 8. Forms of wildlife viewing

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Visiting parks and natural areas to observe, photograph, or feed wildlife	58.7	62.7	52.4	**10.39****
Feeding wild birds	56.9	56.7	57.5	0.05
Photographing or taking pictures of wildlife	56.0	60.4	49.6	**11.22*****
Taking trips or outings to any other location to observe, photograph, or feed wildlife	43.7	50.8	32.7	**32.12*****
Feeding other wildlife	40.7	49.2	27.8	**45.11*****
Closely observing wildlife or trying to identify unfamiliar types of wildlife	40.1	44.9	32.9	**14.32*****
Maintaining plantings or natural areas for the benefit of wildlife	31.6	36.2	24.8	**14.31*****

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 9. Types of wildlife

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Land Mammals	79.5	84.8	71.4	**26.61*** **
Birds	77.9	77.4	79.0	0.34
Reptiles	38.0	44.2	28.9	**23.72*** **
Fish	36.5	44.6	23.3	**47.23*** **
Marine Mammals	35.7	37.4	32.9	2.10
Insects	32.7	36.4	27.1	**9.44** **
Amphibians	30.1	35.4	22.0	**20.39*** **
Other Wildlife	1.4	1.2	1.8	0.67

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 10. Affective specialization: Centrality scale

Specialization	Statewide (Mean)	Consumptive (Mean)	Nonconsumptive (Mean)	Significance (t)
Centrality	3.09	3.25	2.84	**-6.59*** **

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 990

Table 11. Behavioral specialization: specialized equipment

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Yes, I have owned, rented, or borrowed specialized equipment.	59.9	65.9	51.0	**22.06*** **
No, I have not owned, rented, or borrowed specialized equipment.	40.1	34.1	49.0	

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 12. Behavioral specialization: years viewing

# of years spent viewing	Statewide (%)	Consumptive (%)	Nonconsumptive (%)
1-5 years	26.4	24.1	29.5
6-10 years	17.6	17.0	18.6
11-15 years	11.3	12.9	8.8
16-20 years	10.5	11.9	8.5
21-25 years	7.1	7.5	6.4
26-30 years	6.6	6.1	7.4
31-35 years	3.5	3.5	3.5
36-40 years	4.3	4.2	4.5
41-45 years	2.5	2.6	2.4
46-50 years	3.5	3.3	3.7
51-55 years	3.1	3.0	3.2
56-60 years	1.8	1.7	1.9
61-65 years	1.6	1.7	1.3
66 or more years	0.3	0.4	0.3

Table 13. Behavioral specialization: experience as percentage of life spent viewing

% of life spent viewing	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
0-20%	41.0	37.4	46.1	
21-40%	24.0	25.5	22.0	
41-60%	13.1	13.5	12.4	7.52
61-80%	10.3	10.9	9.3	
81-100%	11.6	12.6	10.1	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 14. Cognitive specialization: self-rated level of expertise

Self-rated skill level	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Beginner	30.1	26.5	35.4	
Novice	30.4	29.5	32.1	
Intermediate	29.5	32.1	25.6	**16.49****
Advanced	8.5	10.3	5.6	
Expert	1.5	1.7	1.3	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 15. COVID-19 impacts on wildlife viewing participation and the R3 Framework

R3 Category	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Retained	63.9	63.2	65.4	3.62
Churned	18.0	16.9	19.2	
Reactivated	12.9	14.3	10.8	
Recruited	5.2	5.6	4.6	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 3

Table 16. Time spent wildlife viewing (Statewide)

Statewide				
Year	**Location**	**0 days (%)**	**1 - 30 days (%)**	**> 30 days (%)**
Typical Year	**Around home**	4.6	34.3	61.1
	Away from home	9.7	43.3	47.1
	Outside of state or country	41.1	41.8	17.1
First year of COVID-19 pandemic	**Around home**	10.4	35.1	54.5
	Away from home	19.8	42.9	37.3
	Outside of state or country	56.4	29.7	14.0
Upcoming year	**Around home**	6.2	33.7	60.1
	Away from home	11.2	41.6	47.2
	Outside of state or country	42.6	37.7	19.7

Table 17. Time spent wildlife viewing: Consumptive and nonconsumptive

		C (%)	N (%)	C (%)	N (%)	C (%)	N (%)	
Year	**Location**	**0 days (%)**		**1 - 30 days (%)**		**> 30 days (%)**		**Significance (χ^2)**
Typical year	**Around home**	3.5	6.4	34.0	34.5	62.5	59.2	4.53
	Away from home	4.9	17.0	40.8	46.9	54.2	36.1	**51.17*** **
	Outside of state or country	35.5	49.3	45.6	36.3	19.0	14.4	**17.79*** **
First year of COVID-19 pandemic	**Around home**	9.7	11.2	33.1	38.2	57.2	50.6	4.10
	Away from home	16.2	25.2	41.6	44.9	42.2	29.9	**19.84*** **
	Outside of state or country	51.8	63.2	32.2	25.8	15.9	11.0	**12.63** **
Upcoming year	**Around home**	5.3	7.6	32.2	35.9	62.5	56.5	4.55
	Away from home	7.0	17.7	39.7	44.6	53.3	37.7	**37.75*** **
	Outside of state or country	37.7	49.9	40.6	33.5	21.7	16.6	**14.29*** **

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 2

Table 18. Wildlife viewing location

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
My own home or property	80.5	80.3	80.8	0.04
State-managed areas	60.5	67.1	50.6	**27.22*** **
Locally-managed areas	55.1	58.6	50.1	**6.88** **
Property of friends or family	46.2	53.5	34.9	**33.04*** **
Federally-managed areas	42.8	48.7	33.9	**21.30*** **
Other private property	21.5	24.8	16.5	**9.95** **
Tribal lands	5.0	6.3	3.0	**5.22***
I am unsure	4.3	5.4	2.5	**4.89***

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 19. Wildlife viewing trip-related expenditures

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
$0	18.8	12.2	29.2	**62.05*** **
$1-$50	20.0	19.6	20.2	
$51-$100	16.7	16.2	17.6	
$101-$150	8.0	9.6	5.6	
$151-$200	6.6	7.3	5.6	
$201-$250	6.3	8.4	3.1	
$251-$300	4.9	5.8	3.6	
$301-$350	3.8	4.3	3.1	
$351-$400	3.0	2.8	3.3	
$401-$450	1.7	2.0	1.3	
$451-$500	2.9	3.6	1.8	
$501 or more	7.2	8.3	5.6	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 11

Table 20. Other wildlife viewing-related expenditures

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
$0	17.4	11.5	26.7	
$1-$50	23.1	21.3	25.4	
$51-$100	13.9	16.3	10.3	
$101-$150	9.4	9.6	9.0	
$151-$200	8.8	10.1	6.7	
$201-$250	5.4	5.6	5.1	
$251-$300	4.3	4.8	3.6	**59.77*** **
$301-$350	3.9	3.7	4.4	
$351-$400	2.4	3.2	1.3	
$401-$450	2.4	2.3	2.6	
$451-$500	3.4	4.7	1.5	
$501 or more	5.5	7.0	3.3	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 11

Table 21. Other outdoor recreation

Other Outdoor Recreation	Statewide (% selecting item)	Consumptive (% selecting item)	Nonconsumptive (% selecting item)	Significance (χ^2)
Running, Walking, or Jogging	57.3	56.9	58.0	0.11
Fishing	56.6	NA	NA	NA
Camping	52.3	67.6	28.9	**144.04*** **
Hiking or Backpacking	47.8	52.8	40.0	**15.71*** **
Swimming	44.8	53.6	31.1	**48.93*** **
Hunting	30.0	NA	NA	NA
Recreational Shooting	22.7	31.1	9.9	**61.34*** **
Off Highway Vehicles	22.2	30.8	9.1	**64.87*** **
Motorized Boating	17.5	24.5	6.8	**51.68*** **
Biking	16.4	17.4	14.7	1.33
Horseback Riding	15.8	19.4	10.1	**15.54*** **
Foraging	15.4	21.1	6.6	**38.58*** **

Non-Motorized Boating	14.3	19.6	6.1	**35.68*** **
Botanizing	13.2	14.5	11.1	2.32
Climbing	10.5	12.5	7.3	**6.80** **
Geocaching	9.3	10.2	7.8	1.57
Winter Sports	8.0	9.7	5.3	**6.28***
None	5.3	0.0	13.4	NA

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 22. Conservation behaviors (general; statewide)

Statewide					
	Not at all likely (%)	**Slightly likely (%)**	**Moderately likely (%)**	**Very likely (%)**	**Extremely likely (%)**
Teaching Others	31.8	23.4	23.9	13.2	7.7
Enhancing Habitat	15.4	23.3	30.3	20.5	10.5
Civic engagement	20.5	19.3	26.1	22.1	12.1
Collecting Data	29.6	23.1	25.2	14.7	7.5
Donating	19.1	26.3	27.2	19.1	8.3
Purchasing products	11.5	24.4	30.0	22.8	11.2
Cleaning up trash	6.7	11.4	23.3	28.7	29.8

Table 23. Conservation behaviors (General; consumptive-nonconsumptive)

	Not at all likely (%)		Slightly likely (%)		Moderately likely (%)		Very likely (%)		Extremely likely (%)		Significance (χ^2)
	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	
Teaching Others	24.2	43.0	24.2	22.3	27.0	19.2	15.3	10.1	9.2	5.3	**42.84*** **
Enhancing Habitat	10.4	22.8	21.6	25.9	31.5	28.7	22.7	17.3	13.8	5.3	**46.77*** **
Civic engagement	15.7	27.3	19.9	18.5	26.2	26.1	24.2	19.0	14.1	9.1	**23.84*** **
Collecting Data	23.1	39.3	22.1	24.4	27.8	21.3	17.4	10.7	9.6	4.3	**41.75*** **
Donating	16.6	23.2	24.7	28.8	27.2	26.8	21.9	15.1	9.8	6.1	**16.60** **
Purchasing products	9.1	15.3	21.8	28.3	30.2	29.6	26.3	17.6	12.6	9.2	**22.37*** **
Cleaning up trash	3.8	11.2	9.7	14.0	21.8	25.7	30.0	26.7	34.8	22.4	**37.70*** **

Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 24. Conservation behaviors (With agency support; statewide)

Statewide					
	Not at all likely (%)	**Slightly likely (%)**	**Moderately likely (%)**	**Very likely (%)**	**Extremely likely (%)**
Teaching Others	34.3	21.7	21.7	13.4	8.9
Enhancing Habitat	16.9	24.0	27.2	20.4	11.5
Civic engagement	21.7	20.5	22.6	21.4	13.7
Collecting Data	28.6	23.9	22.9	15.1	9.6
Donating	21.8	26.3	24.8	17.1	9.9
Purchasing products	14.9	23.3	28.1	21.0	12.8
Cleaning up trash	8.3	14.6	18.9	25.2	33.1

Table 25. Conservation behaviors (With agency support; consumptive-nonconsumptive)

	Not at all likely (%)		Slightly likely (%)		Moderately likely (%)		Very likely (%)		Extremely likely (%)		Significance (χ^2)
	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	
Teaching Others	26.9	45.3	21.7	21.8	25.0	16.7	15.5	10.4	10.9	5.8	**43.04*** **
Enhancing Habitat	12.0	24.3	20.9	28.6	30.1	22.8	22.5	17.2	14.5	7.1	**46.76*** **
Civic engagement	16.6	29.7	19.9	21.1	24.4	20.1	22.7	19.5	16.3	9.6	**29.72*** **
Collecting Data	22.6	37.9	21.3	27.5	26.2	17.8	18.8	9.4	11.1	7.4	**48.03*** **
Donating	18.1	27.7	24.2	29.4	26.4	22.3	19.6	13.5	11.7	7.1	**24.34*** **
Purchasing products	11.4	20.3	19.3	29.2	29.2	26.4	24.6	15.5	15.5	8.6	**41.73*** **
Cleaning up trash	4.7	13.9	11.3	19.5	18.6	19.3	24.8	25.7	40.6	21.6	**61.11*** **

Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 26. Barriers to wildlife viewing (Statewide)

Statewide					
	Not at all (%)	**Very little (%)**	**Somewhat (%)**	**Quite a bit (%)**	**A great deal (%)**
Lack of free time	20.9	23.3	33.8	16.5	5.5
Few people who support viewing	34.2	31.1	23.5	8.0	3.2
Few people to view with	32.1	25.6	26.8	11.4	4.0
Lack of organized viewing opportunities	34.5	23.4	25.7	12.2	4.2
Lack of viewing skills	32.3	29.5	25.3	9.0	3.9
Lack of access to equipment	32.0	28.2	25.7	10.5	3.7
Financial cost	27.9	23.7	26.4	14.3	7.7
Distance to viewing locations	24.5	21.8	30.9	15.1	7.7
Not knowing where to go viewing	33.6	24.6	27.4	9.4	4.9
Lack of transportation to viewing locations	46.1	21.5	19.4	7.2	5.8
Accessibility challenges	43.8	23.0	21.6	7.0	4.5
Lack of facilities at viewing locations	38.6	25.5	23.4	8.9	3.6
Safety concerns when viewing	38.0	25.6	21.8	9.1	5.6
Crowds in viewing locations	38.2	24.4	22.2	10.2	5.1

Table 27. Barriers to wildlife viewing (Consumptive-nonconsumptive)

	Not at all (%)		Very little (%)		Somewhat (%)		Quite a bit (%)		A great deal (%)		Significance (χ^2)
	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	
Lack of free time	18.6	24.6	21.7	25.3	36.8	29.4	16.8	16.2	6.1	4.6	**10.44***
Few people who support viewing	31.7	38.2	31.7	29.8	25.0	21.4	8.0	8.1	3.6	2.5	5.48
Few people to view with	31.3	33.6	24.8	26.5	28.6	24.2	11.5	11.5	3.8	4.3	2.55
Lack of organized viewing opportunities	33.9	35.5	22.8	24.0	27.2	23.5	10.6	14.6	5.5	2.3	**10.25***
Lack of viewing skills	34.0	29.8	30.2	28.3	23.5	28.1	8.1	10.2	4.1	3.6	4.80
Lack of access to equipment	31.9	32.3	27.4	29.3	26.7	24.2	10.5	10.2	3.5	4.1	1.14
Financial cost	26.2	30.6	23.6	23.7	28.1	24.0	13.0	16.1	9.1	5.6	8.55
Distance to viewing locations	24.9	24.0	20.6	23.5	32.2	29.1	15.3	14.5	7.0	8.9	3.00
Not knowing where to go viewing	33.3	34.4	25.1	23.7	29.0	24.9	8.5	10.9	4.2	6.1	5.03
Lack of transportation to viewing locations	45.6	47.2	20.4	23.0	21.2	16.8	7.0	7.1	5.8	5.9	3.20
Accessibility challenges	40.7	48.7	23.2	22.7	23.5	18.9	8.7	4.3	4.0	5.4	**13.22***
Lack of facilities at	36.6	41.8	24.9	26.3	25.4	20.4	9.1	8.4	4.0	3.1	5.06

viewing locations											
Safety concerns when viewing	37.1	39.3	24.3	27.6	23.2	19.9	9.1	9.2	6.4	4.1	4.69
Crowds in viewing locations	38.6	37.4	23.9	24.9	22.6	21.8	10.1	10.3	4.7	5.6	0.63

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 28. Groups that encourage participation in wildlife viewing (Family)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all	15.4	11.5	21.3	
Very little	13.9	11.5	17.3	
Somewhat	27.3	29.2	24.4	**29.50*** **
Quite a bit	26.8	28.8	23.9	
A great deal	16.7	18.9	13.2	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 29. Groups that encourage participation in wildlife viewing (Friends)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all	20.2	15.0	28.4	
Very little	20.0	18.5	22.3	
Somewhat	32.9	35.0	29.4	**37.39*** **
Quite a bit	17.6	20.0	14.1	
A great deal	9.2	11.4	5.9	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 30. Groups that encourage participation in wildlife viewing (Mentors)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all	40.4	35.3	47.9	
Very little	17.1	15.2	20.0	
Somewhat	23.1	27.2	16.9	**29.75*** **
Quite a bit	12.2	13.9	9.7	
A great deal	7.2	8.4	5.4	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 31. Groups that encourage participation in wildlife viewing (Peers)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all	29.6	24.5	37.1	
Very little	23.0	21.9	24.8	
Somewhat	29.9	34.9	22.3	**28.38*** **
Quite a bit	12.2	12.6	11.8	
A great deal	5.3	6.1	4.1	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 32. Accessibility and wildlife viewing

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all	44.3	41.5	48.6	5.82
Very little	21.4	22.0	20.6	
Somewhat	22.5	24.5	19.6	
Quite a bit	8.3	8.3	8.1	
A great deal	3.5	3.8	3.1	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 33. Basic agency familiarity

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all familiar	8.0	4.9	12.7	
Slightly familiar	26.3	20.2	35.2	
Moderately familiar	28.5	27.1	30.6	**87.16*** **
Very familiar	23.3	28.3	15.7	
Extremely familiar	14.0	19.4	5.8	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 34. Familiarity with specific state agency characteristics (AGFC staff)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all familiar	37.0	29.8	48.0	
Slightly familiar	26.3	28.2	23.4	
Moderately familiar	20.1	22.7	16.2	**35.78*** **
Very familiar	10.0	11.2	8.1	
Extremely familiar	6.6	8.1	4.3	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 35. Familiarity with specific state agency characteristics (AGFC programs)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all familiar	21.6	15.7	30.8	
Slightly familiar	31.3	27.2	37.4	
Moderately familiar	25.1	29.5	18.6	**67.20*** **
Very familiar	13.5	17.0	8.1	
Extremely familiar	8.5	10.7	5.1	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 36. Familiarity with specific state agency characteristics (AGFC lands)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all familiar	23.2	14.6	36.3	
Slightly familiar	25.4	24.0	27.4	
Moderately familiar	25.0	29.1	18.7	**79.88*** **
Very familiar	19.8	23.5	14.1	
Extremely familiar	6.7	8.7	3.6	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 37. Familiarity with specific state agency characteristics (AGFC mission)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Not at all familiar	23.5	17.2	33.1	
Slightly familiar	28.3	26.7	30.8	
Moderately familiar	24.2	27.5	19.3	**47.46*** **
Very familiar	16.6	20.0	11.5	
Extremely familiar	7.3	8.6	5.3	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 38. Logo familiarity

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Yes, I have seen this logo before	92.3	94.4	89.1	**9.46****
No, I have not seen this logo before	7.7	5.6	10.9	

Note that statistical tests are between consumptive and nonconsumptive groups.
Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 39. Perception of state agency prioritization of programs and services for wildlife viewing

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Far too low	4.1	3.8	4.8	
Too low	18.1	17.4	19.2	
About right	71.8	72.0	71.2	2.12
Too high	4.6	5.1	3.8	
Far too high	1.4	1.7	1.0	

Note that statistical tests are between consumptive and nonconsumptive groups. Due to low sample sizes in the *far too high* category, these responses were combined with *too high* responses for analysis. Statistically significant test values in bold. Respondents that indicated 'no opinion' (n = 158) for this question were excluded in analysis.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 3

Table 40. Experiences with state agency programs

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Viewing festivals	NA	NA	NA	NA
Livestream wildlife cameras	NA	NA	NA	NA
No agency programs or services	38.1	30.3	49.7	**38.31*** **
Wildlife information	38.0	44.2	28.7	**24.26*** **
Visitor or education centers	30.1	36.7	20.1	**31.58*** **
Wildlife viewing opportunities	25.2	28.2	20.8	**6.85** **
Agency lands	24.9	32.0	14.2	**40.16*** **
Volunteer data collection	11.5	13.7	8.1	**7.24** **
Programs for groups or clubs	11.4	13.8	7.6	**9.17** **
Technical assistance or information about habitat	11.3	13.7	7.6	**8.76** **
Other volunteer opportunities	10.1	11.4	8.1	2.77
Conservation law enforcement	8.7	11.7	4.1	**17.55*** **

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 41. Programs and services for children and youth

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Yes, youth have engaged in programming	46.6	50.0	40.0	**4.67***
No, youth have not engaged in programming	53.4	50.0	60.0	

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold. Responses indicating no youth or children (statewide *n* = 478) in their household were excluded from analysis.
* *p* = .01 - .05
** *p* = .001 - .01
*** *p* < .001
df = 1

Table 42. Measures of trust in AGFC

	Statewide (Mean)	Consumptive (Mean)	Nonconsumptive (Mean)	Significance (t)
"I trust AGFC"	4.01	4.11	3.86	**-4.02*** **
"I trust AGFC staff"	3.92	4.00	3.79	**-3.52*** **
Gefen capability score	4.07	4.14	3.97	**-3.21*** **
Gefen benevolence score	3.94	3.97	3.91	-1.07
Gefen integrity score	3.29	3.33	3.24	**-2.72** **

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
"I trust AGFC" df = 998
"I trust AGFC staff" df = 998
Gefen capability score df = 998
Gefen benevolence score df = 785
Gefen integrity score df = 1,000

Table 43. Past purchases and contributions (nonvoluntary and voluntary)

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Habitat Stamp (Required)	NA	NA	NA	NA
License Plate	NA	NA	NA	NA
Land Access Fee	NA	NA	NA	NA
Income Tax Donation	NA	NA	NA	NA
Lottery Ticket	NA	NA	NA	NA
Virtual Product	NA	NA	NA	NA
Fishing License	57.5	77.3	27.3	**244.17*** **
Hunting License	31.6	45.3	10.6	**133.00*** **
None	28.0	13.5	50.1	**159.34*** **
Tangible Product	19.5	23.6	13.4	**15.64*** **
Program Fee	14.1	16.5	10.6	**6.71***
Direct Donation	12.8	14.3	10.4	3.36
Habitat Stamp (Voluntary)	12.4	15.8	7.1	**16.81*** **
Land Donation (Easement)	9.4	11.0	6.8	**4.97***

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05

** p = .001 - .01
*** p < .001
df = 1

Table 44. Lifetime fishing or hunting license purchases

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Yes, I have a lifetime fishing or hunting license	31.0	31.8	28.2	0.57
No, I do not have a lifetime fishing or hunting license	69.0	68.2	71.8	

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold. This question was only presented to respondents (*n* = 609) who had indicated they had purchased a fishing or hunting license in the past five years.
* *p* = .01 - .05
** *p* = .001 - .01
*** *p* < .001
df = 1

Table 45. Future purchases and contributions (Statewide)

Statewide					
	Not at all likely (%)	**Slightly likely (%)**	**Moderately likely (%)**	**Very likely (%)**	**Extremely likely (%)**
Habitat Stamp (Required)	43.8	14.7	18.4	11.5	11.5
Hunting License	40.7	12.5	14.2	13.8	18.7
Fishing License	20.4	11.4	16.9	18.5	32.9
Habitat Stamp (Voluntary)	43.0	17.5	21.7	9.3	8.5
License Plate	38.9	18.5	22.8	11.5	8.3
Land Access Fee	25.4	20.3	26.5	17.5	10.3
Program Fee	28.9	24.0	26.1	12.8	8.2
Income Tax Donation	38.7	23.6	21.3	10.0	6.4
Land Donation (Easement)	58.7	13.9	14.6	7.6	5.2
Direct Donation	37.5	23.5	21.6	10.3	7.2
Lottery Ticket	27.7	19.3	23.1	16.2	13.7
Virtual Product	35.3	23.5	22.3	12.3	6.6
Tangible Product	21.2	24.8	26.2	17.9	9.9

Table 46. Future purchases and contributions (Consumptive-nonconsumptive)

	Not at all likely (%)		Slightly likely (%)		Moderately likely (%)		Very likely (%)		Extremely likely (%)		Significance (χ^2)
	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	
Habitat Stamp (Required)	31.7	62.7	15.5	13.4	22.7	11.6	14.0	7.7	16.0	4.6	**103.03*** **
Hunting License	26.7	62.7	12.2	12.9	16.0	11.3	18.3	6.9	26.7	6.2	**154.68*** **
Fishing License	9.0	38.0	5.7	20.1	15.3	19.0	22.7	12.1	47.3	10.8	**252.38*** **
Habitat Stamp (Voluntary)	33.0	58.5	18.8	15.5	26.3	14.4	11.2	6.4	10.7	5.2	**66.61*** **
License Plate	30.3	52.3	18.6	18.4	26.8	16.3	13.8	7.9	10.5	5.1	**56.39*** **
Land Access Fee	18.2	36.7	17.1	25.4	30.7	19.7	20.7	12.6	13.3	5.6	**72.74*** **
Program Fee	22.5	39.1	25.0	22.6	27.0	24.4	15.3	9.0	10.3	4.9	**39.45*** **
Income Tax Donation	33.0	47.6	24.3	22.5	23.2	18.2	11.5	7.7	8.0	4.1	**25.18*** **
Land Donation (Easement)	54.3	65.5	15.3	11.9	14.5	14.7	9.0	5.4	6.8	2.6	**19.28*** **
Direct Donation	32.1	46.0	23.8	23.1	23.1	18.8	12.1	7.5	8.8	4.6	**25.12*** **
Lottery Ticket	21.4	37.5	19.6	18.8	24.7	20.6	17.9	13.6	16.4	9.5	**34.96*** **
Virtual Product	29.3	44.7	24.0	22.5	25.5	17.3	13.2	11.1	8.0	4.4	**28.48*** **
Tangible Product	15.9	29.6	23.0	27.8	29.2	21.1	19.0	16.2	12.9	5.4	**43.23** **

Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 47. Encouraging additional financial support (Statewide)

Statewide					
	Not at all likely (%)	**Slightly likely (%)**	**Moderately likely (%)**	**Very likely (%)**	**Extremely likely (%)**
Habitat conservation	15.9	27.4	28.5	16.6	11.7
Conservation of rare and vulnerable species	14.5	23.1	27.2	22.4	12.7
Conservation of preferred viewing species	13.4	22.8	31.0	20.6	12.1
Opportunities and resources for wildlife viewing	16.0	24.0	30.8	19.1	10.2
More education or outreach related to conservation	17.6	23.7	27.8	19.4	11.6
Wildlife research or monitoring	17.3	24.3	29.1	18.8	10.5
Funds matched by different source	20.5	23.9	28.4	16.9	10.3

Table 48. Encouraging additional financial support (Consumptive-nonconsumptive)

	Not at all likely (%)		Slightly likely (%)		Moderately likely (%)		Very likely (%)		Extremely likely (%)		Significance (χ^2)
	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	C (%)	NC (%)	
Habitat conservation	11.7	22.3	26.2	28.9	31.8	23.6	17.0	16.0	13.3	9.1	**27.05*** **
Conservation of rare and vulnerable species	11.1	19.8	21.5	25.7	29.8	23.2	23.6	20.6	14.0	10.7	**21.35*** **
Conservation of preferred viewing species	9.8	19.2	20.7	26.1	32.7	28.1	22.5	17.9	14.4	8.7	**29.11*** **
Opportunities and resources for wildlife viewing	12.4	21.5	21.2	27.9	32.5	28.2	21.9	14.9	11.9	7.4	**28.98*** **
More education or outreach related to conservation	14.4	22.5	20.7	28.1	30.0	24.6	20.7	17.1	14.2	7.7	**27.25*** **
Wildlife research or monitoring	13.1	23.9	21.1	29.3	31.5	25.4	21.6	14.4	12.8	6.9	**39.65*** **
Funds matched by different source	16.7	26.2	22.9	25.7	30.3	25.5	18.1	14.8	11.9	7.8	**18.51*** **

Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 4

Table 49. State agency support for wildlife viewing

	Statewide (%)	Consumptive (%)	Nonconsumptive (%)	Significance (χ^2)
Info - about wildlife in the state	46.9	49.0	43.5	2.89
Info - where to view wildlife	45.8	48.5	41.7	**4.42***
More wildlife viewing locations	41.1	46.0	33.3	**15.91*****
Info - how to view	35.5	37.8	31.8	3.73
Info - where to view where there is no hunting	33.8	36.0	30.3	3.46
More accessible features	32.3	36.1	26.5	**10.20****
More wildlife viewing amenities	30.3	34.7	23.4	**14.29*****
More opportunities for youth	30.2	34.2	24.2	**11.27*****
Programs to improve my viewing skills	28.7	32.0	23.7	**8.12****
Virtual programs	27.5	29.4	24.4	2.93
More wildlife viewing events	26.9	30.7	21.1	**11.10*****
Programs to interact with other viewers	22.3	26.6	15.8	**16.01*****
More training for guides	21.5	24.3	17.0	**7.36****
Volunteer data collection opportunities	20.2	25.6	12.0	**27.41*****
More wildlife viewing staff	15.4	17.3	12.5	**4.32***

Other volunteer opportunities	9.4	11.4	6.4	**7.06****
I am not interested in any of these options.	8.8	6.1	13.0	**14.01*****

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1

Table 50. Preferred AGFC communication methods

	Statewide (% selecting item)	Consumptive (% selecting item)	Nonconsumptive (% selecting item)	Significance (χ^2)
Website	58.7	65.5	48.0	**30.29*** **
Printed Materials	54.2	57.6	49.0	**7.12****
Email Update	49.4	53.3	43.4	**9.36****
Facebook	44.6	48.8	38.1	**11.22*** **
Mailed Newsletter, Subscription	36.7	41.3	29.7	**13.73*** **
Local News	34.5	36.6	31.5	2.81
Online Magazine	33.7	38.0	26.9	**13.07*** **
YouTube	28.6	33.2	21.8	**15.01*** **
Instagram	17.9	19.8	15.0	3.79
Twitter	13.3	14.4	11.7	1.49
TikTok	12.7	15.2	8.9	**8.54****

Text	12.3	15.2	7.9	**11.84*** **
Staff	11.8	15.5	6.1	**20.36*** **
Blogs	10.7	12.9	7.4	**7.59** **
Podcast	9.2	11.1	6.3	**6.34***
None	8.1	4.8	13.2	**22.70*** **

Note that statistical tests are between consumptive and nonconsumptive groups. Statistically significant test values in bold.
* p = .01 - .05
** p = .001 - .01
*** p < .001
df = 1