VALUE ORIENTATIONS AND ATTITUDES OF WILDLIFE CONSERVATION PROFESSIONALS

By

Rachel Menale

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ABSTRACT

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Large-scale sociological changes affect the way people interact with and value wildlife. Commensurate with these geographical, demographical, and sociological changes, the beliefs and attitudes of stakeholders toward wildlife management and uses of wildlife are also shifting. Changes in societal attitudes toward wildlife could create an alignment issue between wildlife professionals and society.

My objective was to assess and compare change-over-time from 1998 to 2020 in value orientations, beliefs, and attitudes toward uses of wildlife, and wildlife management practices of members of The Wildlife Society (TWS) as a proxy for practicing wildlife professionals toward wildlife. In addition, I explored factors influencing approval of legal hunting and trapping among professionals. I present results from a 2020 web-based survey (n= 3,247) that closely approximates TWS membership demographically and geographically. I compare these data to findings from a nearly identical 1998 mail-back survey of TWS members.

My results indicate wildlife conservation professionals currently express a broad spectrum of beliefs about consumptive uses of wildlife with modest change over 2 decades. Two factors, 1 and 2, were found to be most influential in predicting approval of legal hunting and trapping by TWS members and are consistent with beliefs associated with current mutualistic and utilitarian wildlife value orientations occurring within the public. Research from this study provides insights into potential areas of training or education to focus on within the profession.

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CHAPTER 1:

INTRODUCTION

"We need to broaden our concept of professionalism to include legitimate self-examination."
(Clark 1988)

Wildlife conservation in the United States and Canada has a long and intertwined history with consumptive uses of wildlife (Reiger 1975, Trefethen 1975). The roots of North American wildlife management were planted at the end of an era of domination and exploitation of natural resources. Events of that era and the domination of the Anglo-European population resulted in a utilitarian view of wildlife and how populations should be managed for human benefit. The earliest efforts of wildlife conservation as an institution are attributed to prominent individuals such as Theodore Roosevelt, George Bird Grinnell, Gifford Pinchot, and Aldo Leopold (Reiger 1975), yet were also influenced by lesser-known individuals (Kessler and Glasscock 2020). Early approaches to conservation centered on wise use of resources such as regulated consumptive use of wildlife commensurate with prevailing societal values. At the same time, restrictive measures were put into place that prevented the use of some species.

The social landscape in America has continued to change since those early days in ways characterized by modernization (Manfredo et al. 2020*a*), urbanization (Bell 1973), and increased, albeit uneven, societal affluence (Manfredo et al. 2009). Other sociological drivers include diversifying human populations and globalization (Learn 2019). Utilitarian values based on wildlife as a resource have coincidentally shifted through time toward more mutualistic views because humans interact less directly with wildlife and the environment (Teel and Manfredo 2010). One outcome has been broad declines in participation in regulated hunting and trapping (U. S. Department of Interior 2016).

If current trends in hunting and trapping continue to decline, cohorts of hunters and trappers age out of the population or participation (Winkler and Warnke 2013), approval of hunting and trapping from the perspective of society but also wildlife conservation professionals may change. State and federal wildlife agency professionals are considered trust managers under the Public Trust Doctrine (Smith 2011) and have the key role of achieving the day-to-day management of wildlife for the benefit of all beneficiaries. Understanding these changes in approval among conservation professionals should help bridge the gap between trust managers and the beneficiaries.

Problem Statement

Shifting societal values creates a potential incongruency with current wildlife uses under the rubric of sustainable wildlife management. This possible misalignment of what the public values is likely to continue and affect how conservation professionals' function in their roles as trust managers and maintain wildlife and wildlife management relevancy to society.

The objective of my study is to assess how attitudes, beliefs, and value orientations of wildlife professionals toward uses of wildlife have changed over the past 2 decades. To accomplish this objective, I administered an online survey based on a 1998 questionnaire administered to members of The Wildlife Society as a proxy for practicing wildlife conservation professionals (Muth et al. 1998). I focused on the approval of regulated uses of wildlife through legal hunting and legal trapping and the antecedents of those attitudes. Insights gained from my study will support the adaptation of hiring practices, professional development, and educational materials to maintain the alignment of wildlife professionals with the beneficiaries of wildlife as a public resource.

Thesis Organization

This thesis is organized into 4 chapters: Chapters 2 and 3 are separate manuscripts intended for submission to the Wildlife Society Bulletin, plus this introductory chapter and a concluding chapter. Throughout, this thesis follows the style of the *Wildlife Society Bulletin*. Chapter 1 consists of an introduction and a problem statement to the thesis. Chapter 2 is the focus of the thesis and presents an analysis of the change over time (1998–2020) of key beliefs and attitudes expressed by TWS members toward wildlife and the uses of wildlife. Chapter 3 explores factors influencing approval of legal hunting and legal trapping by members of TWS. Lastly, Chapter 4 offers my perspective on the implications of my research and recommendations for agencies and organizations. Appendices contain the data collection instrument, additional data tables, and summary statistics.

CHAPTER 2:

CHANGE IN CHARACTERISTICS AND ATTITUDES OF TWS MEMBERS OVER TIME

Urbanization-suburbanization, human population growth, and other large-scale sociological changes characterized as modernization are affecting the way people interact and value wildlife (Manfredo et al. 2009, Decker et al. 2012). Twenty-first-century values in the United States are trending away from utilitarian views of wildlife and wildlife management (Teel and Manfredo 2010). A utilitarian view of wildlife is the belief wildlife principally is for the benefit of humans (Manfredo et al. 2018). The belief of humans and wildlife co-existing together and wildlife deserving similar rights and care as humans are considered mutualistic beliefs, which are becoming a dominant belief, especially in urban-suburbanized environments. Traditional utilitarian views still exist among a significant enough portion of stakeholders, however, to create the potential for a divisive backlash in governance of public wildlife resources (Manfredo et al. 2017). Changes in values and beliefs expressed by society toward wildlife are creating potential shifts in the alignment of wildlife management and beneficiaries of those public resources.

Wildlife conservation emerged from protectionist roots in order to prevent overexploitation and extension of species. The wildlife profession developed from a concern that wildlife was still in decline and restorative measures were needed. Although, activities such as hunting, fishing and trapping and the profession were dominated by men, women groups played a vital role in early conservation measures. Wildlife management developed as an enterprise tailored toward these utilitarian views and uses of wildlife (Reiger 1975). Societal and

professional values are suspected to be shifting away from those described as utilitarian as demographic changes such as urbanization and decline of rural communities, as well as the growth of activities that compete for time and interest with hunting and trapping (Karns et al. 2015). In addition to the increasing diversity of academic backgrounds, the number of women working in the wildlife profession has increased. This gender shift contributed to or accelerated a shift in values (Muth et al. 2002). These values held by wildlife professionals are believed to largely reflect changes occurring in society. Calls for transformation within wildlife agencies (Jacobson and Decker 2008, Jacobson et al. 2010) recognize changes are required to maintain alignment with society, assessment of current beliefs and trends among wildlife professionals is needed to thoughtfully inform change efforts (Ford et al. 2021).

Background

Theodore Roosevelt and George Bird Grinnell founded The Boone and Crocket Club after witnessing the exploitation and destruction of natural resources and wildlife occurring in the West (Trefethen 1975). Club members led the efforts to preserve the American landscape and the wildlife found within. Conservation of wildlife and its habitat were possible, in part, through efforts of hunters and trappers throughout the country that valued wildlife. A transition toward stewardship of natural resources developed from a central life interest based on a connection to the land and its resources (Daigle et al. 1998, Mahoney and Jackson III 2013). American society was achievement-oriented, valuing accomplishment and hard work (Wuthnow 2008). Wildlife management reflected these values by focusing on maintaining wildlife populations for harvestable surplus, a primary concern at the time (Manfredo et al. 2009). This management style benefited hunters, trappers, and recreational fishing and resulted in revenue for wildlife agencies through license sales (Leopold 1930, Trefethen 1975). Accomplishments by

iconic men such as George Bird Grinnell, Theodore Roosevelt, Gifford Pinchot, and Aldo Leopold usually overshadow lesser recognized women who also contributed to the profession. Women such as Maria Martin, Amelia Laskey, and Harriet Hemenway, and many more through efforts as wildlife scientists, naturalists, and conservation activists contributed immensely to the foundations of the wildlife profession (Kessler and Glasscock 2020). The wildlife profession would not be what it is today without the efforts of these women and others who are not as glorified in history.

The numbers of participating hunters and trappers are decreasing in much of North America (U.S. Department of Interior 2016). The National Survey of Fishing, Hunting and Wildlife-Associated Recreation reported a decrease in the number of hunters from 13.7 million in 2011 to 11.5 million in 2016 (U.S. Department of Interior 2016). An estimated 176, 573 trappers existed in the US in 2015 (Response Management 2015). Trapping of wildlife throughout history provided income, clothing, food, and enabled a traditional lifestyle (White et al. 2015*a*). Nonetheless, unregulated exploitation of wildlife from trapping in the 19th Century contributed to declines in beaver, river otter, and other furbearer populations. Through regulated harvest programs, furbearer populations were restored, and the development of best management practices (BMPs) by the Association of Fish and Wildlife Agencies in collaboration with state and federal agencies, has improved the welfare of trapped animals (White et al. 2010, 2021).

Modernization, as an outcome coincidental with increased urbanization-suburbanization, is contributing to a society less dependent on utilitarian uses of wildlife such as hunting and trapping for food or revenue sources (Decker et al. 2012). One byproduct is an anthropomorphic way of thinking about human-animal relationships (Manfredo et al. 2020*b*). Urban-suburban lifestyles may contribute to, or at least be associated with, increasing wealth, decreasing the need

for subsistence use of animals and correspondingly increasing the need for social affiliation and belongingness (Manfredo et al. 2003). Human demographics are changing as well. For example, the number of Hispanic and Asian families in the US has increased, which provides more diverse values in society (Learn 2019). Hispanic, Asian and African American families reported less approval of activities such as trapping and having more mutualistic wildlife value orientations (NSSF 2019, Manfredo et al. 2020*a*). The mix of cultures and values provide opportunities but also pose a challenge with wildlife management and how to handle human-wildlife conflicts for the future. In addition to diversification of cultures, some states are experiencing a division of mutualistic and utilitarian beliefs toward wildlife (Teel et al. 2005, Teel and Manfredo 2010, Manfredo et al. 2018). This separation of values is likely to create continual differences of opinion about how wildlife should be managed and how publics respond to management decisions involving wildlife (Manfredo et al. 2017).

The animal rights movement and negative representation of trapping through media, coincidental to the broad social shift described as modernization, moved society toward a more protectionist view of animal welfare and wildlife. Attitudes associated with trapping are focused on ethical and humane treatment of the animal (White et al. 2015*b*). Wildlife agencies recognizing the public are highly uninformed on the subject would benefit by informing the public on ways trapping is ethical and humane. Approval of trapping is greatest among the public when the reason is for wildlife restoration, population control, food or to protect property (NSSF 2019). Similar results regarding reasons for the approval of trapping were reported in a study conducted with residents of Colorado (Manfredo et al. 1999). Colorado residents (61.1%) were not in favor of trapping and believed "the ban of trapping would eliminate a cruel form of animal capture and ensure the preservation of some types of wildlife." Armstrong and Rossi

(2000) investigated perspectives of state furbearer biologists on the status of avocational trapping and revealed 5 emergent issues that affect participation. Armstrong and Rossi describe avocational trapping as the group of trappers considered being recreational, fur, hobbyist or commercial. Avocational trapping was collectively considered a more appropriate descriptor than recreational according to wildlife biologists. That study of state furbearer biologists reported anti-trapping sentiment, recruitment, pelt values, image, and land access as barriers or factors affecting the participation of avocational trappers (Armstrong and Rossi 2000). Potential ways to change the public perception of an avocational trapper are to modify trapping education through evaluating its effectiveness and for biologists to better communicate the role of BMPs, and the values of trappers, to the public. A decrease in direct experience with hunting and trapping among conservation professionals was proposed as a factor creating a workforce less knowledgeable in the subject of trapping and its role in wildlife management (Muth et al. 2006).

Turnover of personnel within the wildlife profession is inevitable due to retirement, new fields of expertise, and changing staff dynamics in the workplace. To stay relevant and align with the values of beneficiaries of the wildlife trust, an updated assessment is needed to reveal underlying beliefs and attitudes of current professionals. New employees with different sociodemographic backgrounds entering wildlife agencies may be opposed to some historic approaches to wildlife in management or the pursuit of wildlife as recreation (Teel and Manfredo 2010). Much of the new generation of conservation professionals may not share similar experiences with wildlife as previous generations. By the early 20th century, state and federal agencies had been given responsibility for the management of wildlife. To continue to fulfill their duties to the public, state wildlife agency (SWA) professionals establish trust by being fair and transparent with the growing diversity of stakeholders (Riley et al. 2018). This outcome

may be more likely when stakeholders view SWA professionals as reflecting similar values and beliefs as their own (Teel and Manfredo 2010).

1998 Comparative Survey

Use of foot-hold traps to capture wildlife is one of the most controversial topics within public view and among conservation professionals (Muth et al. 2006). The 1998 questionnaire asked respondents whether they agreed with outlawing the use of leghold traps and their reasons for or against (the term leghold, as opposed to the current accepted term, foothold, was used in the 1998 survey; Muth et al. 1998). Nearly 58% of TWS members at that time expressed opposition to outlawing use of leghold traps while 27.8 % supported and 14.1% conveyed no opinion. Common reasons to support a included unnecessary pain or stress on furbearers that are trapped (96.6%), and trapping poses the possibility of harming or killing non-target species (82.8%). Reasons for opposition to outlawing the use of leghold traps included: it is an efficient method to harvest furbearers (87.4%) and it is an important tool for managing furbearer populations (83.9%). Responses to use of leghold traps as a wildlife management tool were divided between the groups of respondents. Personal experience, professional knowledge, and subcultural norms may account for the difference in responses by conservation professionals (Muth et al. 2006).

The wildlife profession is continuing to change in many ways, especially in the sociodemographic backgrounds of conservation professionals in the workforce (Urbanek et al. 2018). Differences in sociodemographic backgrounds, experiences, and education are contributing to a shift in the values and beliefs of professionals toward wildlife management. A difference in response by age groups (<38 years, 34–48 years, > 48 years) to the statement, "wildlife and fish species are resources to be harvested in a sustainable way and used for human

benefit" was evident in 1998 (Muth et al. 2002). The older age groups of respondents agreed with statements depicting wildlife as resources more frequently than the 2 younger age groups. More of the younger age group agreed than other age groups with statements such as, "I believe that wildlife animals have the same rights as human beings" and "it is morally wrong to kill wildlife for human sport." Differences were detected between youngest (52.2%) and oldest age groups (39.3%) in favor of outlawing the use of leghold traps (Muth et al. 2002).

Potential changes occurring within the profession appear consistent with those of the public. Assessment of trends in wildlife professionals' attitudes toward specific issues and ethics relating to wildlife management provides insights for both agencies and professional organizations in efforts to ensure relevancy. I expect to see a modest change similar to what is occurring in the public with wildlife value orientations leaning toward more support of mutualism and less utilitarian. This modest change I predict will occur more in younger generations than older. The information provided in this chapter and throughout this thesis will help inform leaders in the profession regarding trends in the degree of divergence between professionals and traditional stakeholders, as well as convergence toward broader societal attitudes and beliefs.

Research Objectives

The goal of my research was to determine change over time in attitudes and beliefs of TWS members. My primary objectives were to: (1) measure current attitudes and beliefs in 2020 of TWS members; (2) determine if beliefs and attitudes of TWS members' toward wildlife and uses of wildlife differed from those measured in 1998; and (3) identify generational differences between members on specific statements.

METHODS

Study Population

I assumed members of TWS served as a proxy for wildlife conservation professionals in North America, who were the population of interest. The Wildlife Society is an international professional scientific organization of 10,855 members (at time of survey) in wildlife science, management, and conservation (The Wildlife Society 2020). The organization's purpose is to enable wildlife professionals to sustain wildlife populations and habitats through science-based management and conservation. The Society was founded in 1937 to address the need of a central organization to establish professional and ethical standards and promote communication within the wildlife conservation and management profession. Members exist in every U.S. state, Canadian Province, and 164 members are from at least 15 other countries. The 1998 comparison survey used stratified sampling in which 500 questionnaires were sent to female TWS members and 500 were sent to male TWS members.

Survey Instrument

A survey instrument, updated from a 1998 version (Muth et al. 1998), was designed and conducted through a web based Qualtrics online survey software (Qualtrics International Inc., Provo, Utah, USA). Qualtrics survey software is a platform used to design, distribute, and analyze surveys through a more research user base experience. Online survey software enabled our survey to be more accessible, test and edit in real time, as well as gain insights into the survey results through time.

The 18-page mail-back questionnaire used in the 1998 study consisted of 119 questions aimed at identifying the attitudes and beliefs of conservation professionals related to management philosophy, ethical considerations, sociocultural factors, specific management

practices, selected wildlife and fish harvest activities and uses, and sociodemographic characteristics. Questions relating to hunting, fishing and trapping were asked throughout the 5 sections of the survey. The 1998 survey was administered to a sample frame comprised of a subset of members from 4 professional organizations, including The Wildlife Society. The 2020 questionnaire consisted of 6 sections that included questions about sources of information, outdoor activity frequency, views about management, level of appropriateness toward specific management activities, trapping and demographics. A total of 26 questions, comprised of 10 multi-item Likert scale questions, were included in the online questionnaire (Appendix B) with combined sections from the 1998 version.

Questionnaire Implementation

The survey instrument asked respondents to identify the level of importance of 21 sources of information they would use to inform themselves about wildlife conservation issues. Each item was measured on a 5-point scale ranging from 1= "not at all important" to 5= "extremely important." Section 2 of the questionnaire prompted the respondents to select how frequently they have participated in 18 outdoor activities in the last 5 years. Frequency of outdoor activity ranged from 0= "not at all" to 3= "more than 20 times." Section 3 of the questionnaire asked respondents to provide information on their personal views about management. It consisted of 6 sets of multi-item questions and measured beliefs on a 6-point scale on level of agreement where 1= "strongly disagree" to 5= "strongly agree" and 6= "don't know." Views about management included 4 statements of the acceptability of hunting and trapping, 14 statements about wildlife management in North America, 6 statements of ethical issues related to all management activities, 8 statements about ethical acceptability of harvest of wildlife, 8 statements associated with the opportunity to participate in hunting and an additional

8 associated with the opportunity to participate in trapping. Section 4 consisted of 26 statements about specific management activities and were measured on a 6-point scale ranging from 1= "extremely inappropriate" to 5= "extremely appropriate" and 6= "don't know."

A section devoted to trapping consisted of 3 subset questions about respondents' view on outlawing the use of foothold traps, the level of familiarity with Best Management Practices (BMPs) of trapping and the overall level of support for trapping BMPs. Skip-and-display logic were used in this section on trapping, which enabled participants to move forward in the survey if they had little knowledge or familiarity with trapping. The first question in the trapping section asked respondents whether the use of foothold traps to trap species classified as a furbearer should be outlawed and was comprised of 3 answer choices: 1= "strongly agree", 2= "strongly disagree" and 3= "no opinion." Depending on the level of agreement a respondent answered the previous question with a display logic presented a set of 8 reasons why the foothold trap should be outlawed or should not be outlawed. A text box labeled "other" was included in the list of reasons for each response choice to provide further explanation for their reasoning. A "no opinion" option was available for participants who chose not to answer the question about the use of foothold traps. Participants who chose this option were prompted with a follow up question to ask why they do not have a formulated opinion. Two response choices were provided as a follow up question: "I don't know enough about the topic" or "I have an opinion, but I don't care to express it."

The level of familiarity with BMPs for trapping was measured on a 4-point scale ranging from 1= "not at all familiar" to 4= "extremely familiar." If a respondent chose "not at all familiar" with BMPs the survey automatically skipped to the final section that contained questions about demographics. If participants indicated they were familiar with BMPs, they

were asked for their level of support of BMPs on a 6-point scale ranging from 1= “strongly oppose” to 5= “strongly support and 6= “don’t know.” Depending on the answer chosen, display logic displayed either 6 reasons to support or 6 reasons to oppose BMPs. Participants were provided with 6 reasons listed to choose from, 1 write in text box and a “don’t know” option was included.

The final section of the questionnaire was 14 questions regarding demographics. Questions included the highest level of education completed, what academic or professional field respondents earned a degree in, whether they were currently a student, participation in any professional development programs, current employment status, years of employment in the profession, what kind of organization employed in, responsibilities of your job, membership of professional organizations, description of current and childhood residence, current state residing in, year born, and gender. The questionnaire concluded with a text box for additional comments or views participants would like to share. The survey instrument was evaluated and approved by the Michigan State University Institutional Review Board (Study number: 00003262).

We identified key variables to measure in the 1998 questionnaire to make cross sectional comparisons of how attitudes and beliefs of the TWS membership population had changed from 1998 to 2020. Key variables included specific statements on views and ethical considerations about management, specific harvest activities, views about management activities, specific trapping activities, and demographics. In addition to focusing on key variables to make a comparison over time, we needed to include more trapping specific questions to understand familiarity and overall support of recent trapping initiatives as well as contemporary issues to both hunting and trapping. Fishing related questions asked in 1998 were omitted from the 2020 survey to accommodate new questions.

Pilot Survey

I conducted a pilot survey to gain feedback and insight into how the questionnaire read, determine if focus questions were understandable, detect any leading questions and elicit overall concerns with the survey. Constructive feedback gained from the pilot survey participants identified wording that was misleading and questions that needed clarification. The pilot was conducted 4 November - 01 December 2019. A reminder email was sent out on 14 November 2019 to those who had not responded. The sample population included participants from professional development workshops in 2019 from the Conservation Leaders for Tomorrow and Trapping Matters programs. Forty participants were randomly selected from the cumulative list of both programs (n= 131) and sent an anonymous survey link from Qualtrics software to their email addresses. Participant email addresses were provided by administrative support through both programs. A total of 22 respondents (55%) completed the pilot survey. Revisions to the final survey included changing the format of the online questionnaire software, reordering questions, and addressing minor grammatical errors.

Nonresponse

To obtain the email address list of members of TWS, all communication and access to the email address list was limited to only TWS staff. This did not permit me access to records to perform an examination of nonresponse bias using a different method based off known respondents. I examined responses of the last 100 respondents received and participants who submitted a survey during the final reminder compared to earlier respondents. The differences from the early respondents and the last 100 and final wave reminder respondents assumes they might reflect key differences among respondents and non-respondents. Respondents who submit

a survey later in the collection period may be similar to nonrespondents in cases where there are several points of contact (Choi et al. 1992, Coon et al. 2020).

Data Collection

My approach to administering the questionnaire was an attempted census of the entire TWS membership (N=10,588 at the time of survey) for whom email addresses were available. An anonymous survey link was generated through the Qualtrics survey software and included an invitation email sent out by administrative staff at TWS. The survey was implemented following a modified version of the Tailored Design Method (Dillman et al. 2014). Administration of the survey included 4 waves of emails sent to membership by systematic timing through the months of January and February. An email was sent out on 08 January 2020 to all members of TWS by the current president to announce a questionnaire was forthcoming the following week, describe the purpose, and who was conducting the research. The official email invitation with an active link to Qualtrics, was emailed 14 January 2020 with a first reminder email sent out on 22 January 2020. A second reminder email was sent out to membership on 4 February 2020. On 22 February a third reminder was sent out to membership and a last plea was sent on 28 February 2020. Each reminder contained a link to the survey instrument, but respondents were only able to complete the survey one time per computer. Settings in the Qualtrics program helped to safeguard against participants attempting to submit multiple survey responses.

Data Analysis

IBM SPSS Statistics version 26.0 was used for these analyses (IBM Corp, 2019). Descriptive statistics and frequency distributions were calculated for each variable for comparison with the 1998 data. I conducted an ordinal logistic regression to examine differences in statements toward wildlife and uses of wildlife within the context of wildlife management of

TWS members from 1998 and 2020. The reference group used throughout to distinguish change over time were TWS members from the 1998 questionnaire. Statements included in this analysis were treated as ordinal since they have an order to their levels. Social sciences commonly use scales as continuous variables (Vaske 2008). Time was treated as the independent or predictor variable coded as 0 for 1998 and 1 for 2020. Select statements were used as the dependent variable. Interpretation of results from the ordinal logistic regression were converted from ordered log odds (logits) to odds ratio. Odds express the likelihood of an event occurring relative to the likelihood of an event not occurring. To change log odds to odds-ratio requires exponentiating the log odds: Odds = exp [log odds]. To determine generational differences of mean attitudinal scores, I performed an ordinal logistic regression to assess if age was a predictor on specific statements. The predictor or independent variable was grouped into 6 age groups in increments of 10 ranging from 20 through 70. The item score from the selected statement was the dependent variable. In order to choose the reference category in SPSS, I recoded the age group for the 20–29 age group to be the reference group. Interpretation of results are similar to the change over time analysis and comparison of the reference group to the older age group (60–69 yrs).

For this chapter, I focus on statements with the greatest change during the past 22 years. These statements include topics such as ethical issues about management activities, views about management, and the ethical acceptability toward the harvest of wildlife. The first statement regarding ethical issues about management activities is minimizing the pain and suffering of individual animals should be important criteria in wildlife management. The second statement is humans can harvest surplus production of wildlife populations without harming their long-term

population viability if done properly. Lastly, the harvest of wildlife is more ethically acceptable if it involves fair chase and sportsmanship.

RESULTS

Response Rates

Of 10,588 emailed invitations, 4,844 (45.7%) recorded submissions were obtained. There were 1,276 submissions (26.3%) removed due to incomplete responses to key survey items or the entire survey. Identifiable survey responses of 3,568 (33.7%) members, of whom 3,247 (91.0%) self-identified as being a TWS member when asked in the survey. The other 223 (6.3%) responses identified as non-TWS membership and 98 (2.7%) responded to being a former member. Respondents who identified as non- and no longer members of TWS were excluded from the sample. After excluding all non-TWS members, 3,247 (30.7%) usable responses remained. No statistical differences were found between the last 100 respondents or respondents from the last reminder when compared to earlier respondents. Mean scores for specific statements were calculated between the 3 groups and little difference was detected. The proportion of respondents who identified as male (59.7%) or female (37.7%) closely matched the demographics of the society's membership (C. Kovach, The Wildlife Society, unpublished data).

Respondent Characteristics of 1998

Of respondents surveyed in 1998 (n= 842), 53.8% reported being male and 46.2% female, which reflects the equal sex ratio used in the stratified sampling. The average age was 39.2 years (SD: 11.9 Range: 19–88). Of the 91.1% of TWS members who responded to being employed in a Natural Resources-related field, 58.4% reported being employed by a state or federal agency. Members who reported being employed in a Natural Resources field had a relatively even distribution of years employed with 32.4% having 11–20 years. Members

reported a high level of education: 96.4% reported having earned ≥1 college degree, with 58.1% having gained a graduate level degree. Information on respondent's state of residence was not available on the survey at that time.

Respondent Characteristics of 2020

Table 1 shows respondent characteristics: 59.7% were male and 37.7% were female. The mean age was 46.9 years (SD= 16.0, range: 19–91). Female participants reported a mean age of 39.7 yrs. (SD= 12.9, range: 19–87 yrs.) and male participants had a mean age of 51.5 yrs. (SD= 16.2, range: 19–91 yrs.). A slight increase but similarly elevated levels of education were reported in comparison to 1998, with 96.9% of respondents indicating they completed a college degree and 69.4% having gained a graduate degree. Respondents ranged in the kind of organization they were employed: state agency (29.2%) and institution of higher education (22.9%) being most frequent. Participants reported 41.3% having been employed for > 20 years in their professional field. TWS respondents were almost evenly divided in current place of residence along a gradient from rural to large urban. Similar results were reported for place of childhood residence. Respondents were well-represented geographically within all 50 states, 6 Canadian provinces, and 15 other countries (Appendix B).

Respondents reported a diverse background of job responsibilities ranging from land acquisition to education and training to policy formulation. The question allowed participants to select all that apply to 17 different job responsibilities listed; the majority included research (53.1%), monitoring (42.6%), and non-game species management (40.2%). Popular outdoor activities reported by members included non-consumptive activities such as wildlife viewing (74.5%), hiking (72.1%), and citizen science (44.2%). Hunting opportunities included small (18.4%) and big game hunting (33.5%).

Membership in professional organizations, societies, and associations were reported with 56.8% of members being involved in an environmental or conservation-related organization. Respondents had the opportunity to write in other organizations with whom they held a membership, which ranged from specific disciplines to broader professional fields. Respondents reported 16% having attended professional development opportunities and trainings such as Trapping Matters, Conservation Leaders for Tomorrow and The National Conservation Leadership Institute. Two additional open-ended text boxes were available for write-in responses. Members reported a diverse set of workshops and trainings they attended during their years of employment. Members recounted a collection of sources of information they rely on as important conservation information. Professional associations (M= 4.76) and personal experiences (M= 4.56) were found most important. Scientific journals, professional colleagues, professional conferences, and professional workshops were among those listed as extremely important. Less important sources of information included television, animal protection organizations and sporting magazines.

Table 1: Self-reported demographic variables by members of The Wildlife Society (TWS). Shown are the sample sizes of respondents (*n*) and percent (%) of the sample. Data were derived from a self-administered, web-based questionnaire (Qualtrics) sent in 2020 to all known members of TWS (14 Jan–10 Mar).

Demographic variable	*n*	%
Highest level of education	3,244	
Graduate of Technical/trade school	24	0.7%
Completed some college courses but did not graduate	58	1.8%
Two-year community college degree (Associate's degree)	21	0.6%
College/University degree (Bachelor's)	891	27.5%
Master's degree	1,383	42.6%
Professional school degree (e.g., Veterinary Medicine)	38	1.2%
Doctorate (Ph.D. or equivalent)	829	25.6%
Current student status	3,235	
Yes	456	14.1%
No	2,779	85.9%
Best describes you currently	3,234	
Currently employed in a natural resource organization	2,100	64.9%
Currently employed not in a natural resource organization	265	8.2%
Previously employed in a natural resource field	296	9.2%
Never employed in the natural resource field	120	3.7%
Retired	453	14.0%
How long have you been or were employed in your professional field	3,212	
Less than 5 years	678	21.1%
5–10 years	575	17.9%
11–20 years	634	19.7%
More than 20 years	1,325	41.3%
Kind of organization are you employed	3,139	
Federal agency	626	19.9%
State agency	918	29.2%
Local government agency	106	3.4%
Private sector corporation or business	445	14.2%
Institution of higher education	720	22.9%
Non-profit/ non-governmental organization	324	10.3%
Describe the place you currently live	3,237	
Rural Area (<2,500 people)	687	21.2%
Town (2,500–10,000 people)	575	17.8%
Small City (10,001–50,000 people)	749	23.1%
Medium City (50,001–250,000 people)	713	22.0%
Large City (>250,000 people)	513	15.8%

Table 1 (cont'd)

Demographic variable	*n*	%
Describe the place where you lived most of your childhood	3,231	
Rural Area (<2,500 people)	855	26.5%
Town (2,500-10,000 people)	651	20.1%
Small City (10,001–50,000 people)	644	19.9%
Medium City (50,001–250,000 people)	585	18.1%
Large City (>250,000 people)	496	15.4%
What is your gender	3,229	
Male	1,928	59.7%
Female	1,218	37.7%
Non-binary	12	0.4%
Prefer not to answer	71	2.2%
Age	3,145	
19 and under	3	0.1%
20–29	504	16.0%
30–39	726	23.1%
40–49	606	19.3%
50–59	483	15.4%
60–69	516	16.4%
70 and beyond	306	9.7%

Change Over Time

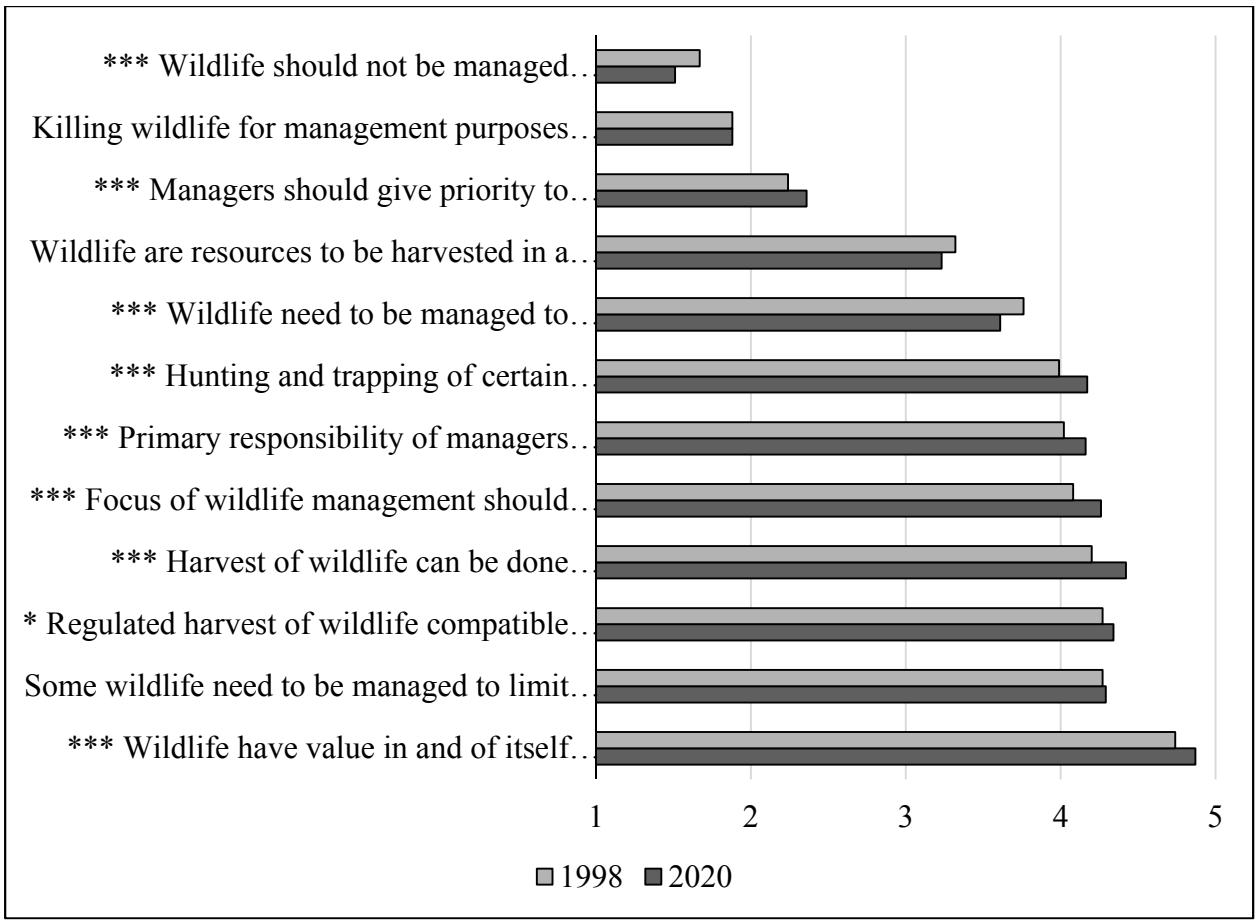


Figure 1: Survey responses on the level of agreement of statements toward beliefs about wildlife management. Statements were measured on a scale of 1 ("strongly disagree") to 5 ("strongly agree") by members of The Wildlife Society for surveys conducted in 1998 (Muth et al. 1998) and 2020. Statistically detectable differences are indicated by asterisks *p<.05, **p<.01, ***p<.001.

There was little detectable change in beliefs about management 1998–2020 (Figure 1). An increased frequency of agreement, however, was detected with statements related to active management such as "humans can harvest surplus production of wildlife populations without harming their long-term population viability if done properly." The odds of participants in 2020 responding more favorably to this statement (item statement score) was 1.69 (95% CI, 1.46 to 1.95) times that of participants in 1998 (Wald χ^2 (1)= 49.08, *P*= <0.001). Members in 2020

scored greater on the level of agreement of this item than in 1998. Coincidentally, the mean belief scores related to intrinsic values retained by wildlife increased 1998–2020. Belief about intrinsic values did not, however, lead directly to an animal rights orientation.

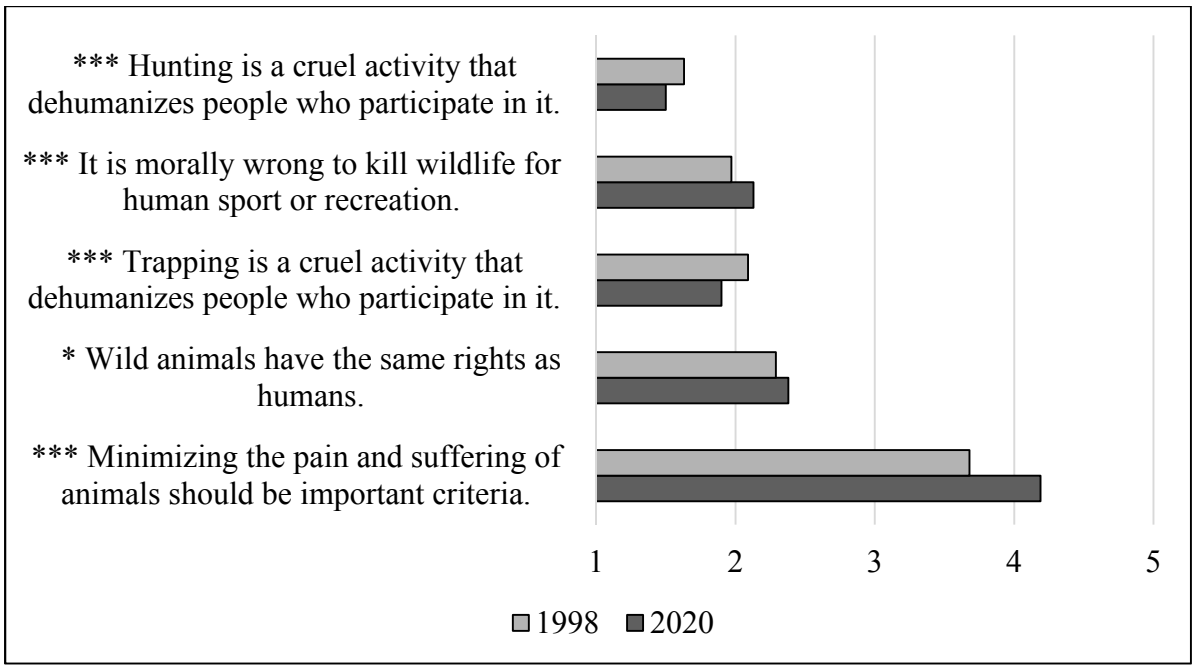


Figure 2: Survey responses on the level of agreement of statements toward ethical considerations of wildlife management activities. Statements were measured on a scale of 1 ("strongly disagree") to 5 ("strongly agree") by members of The Wildlife Society for surveys conducted in 1998 (Muth et al. 1998) and 2020. Statistically detectable differences are indicated by asterisks *p<.05, **p<.01, ***p<.001.

Of 5 replicated statements (1998 vs 2020) toward the ethical considerations of wildlife management activities, minimizing the pain and suffering of animals had the most reported change over time (Figure 2). Time was a predictor (P= 0.001) in the statement "minimizing the pain and suffering of individual animals should be important criteria in wildlife management" indicating a difference between responses in 1998 and 2020. A greater proportion of respondents in 2020 agreed with the statement than in 1998. The odds of participants in 2020

responding more favorably toward this statement was 2.66 (95% CI, 2.30 to 3.07) times that of participants in 1998 (Wald χ^2 (1)= 179.12, *P*=<0.001).

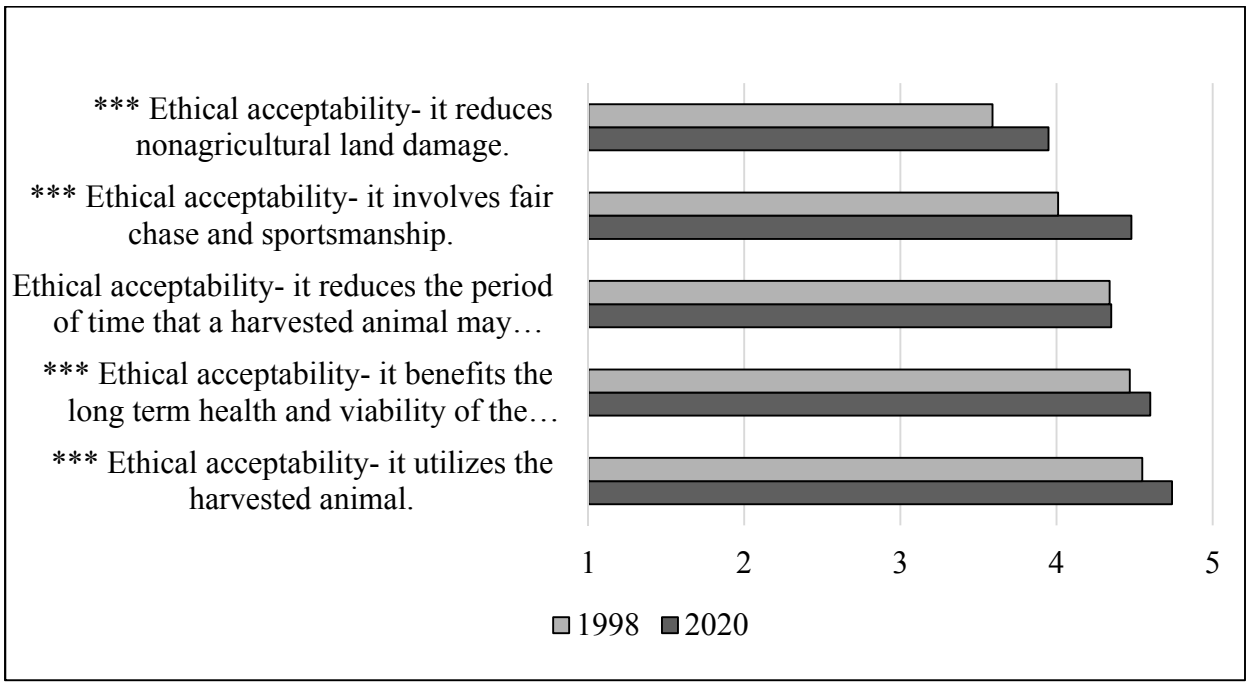


Figure 3: Survey responses on level of agreement of statements toward ethical acceptability toward the harvest of wildlife. Statements were measured on a scale of 1 ("strongly disagree") to 5 ("strongly agree") by members of The Wildlife Society for surveys conducted in 1998 (Muth et al. 1998) and 2020. Statistically detectable differences are indicated by asterisks *p<.05, **p<.01, ***p<.001.

The greatest level of change was associated with the statement, "the ethical acceptability toward the harvest of wildlife if it involves fair chase and sportsmanship" (Figure 3). The odds of 2020 participants responding more favorably toward this statement was 2.83 (95% CI, 2.44 to 3.28) times that of 1998 participants (Wald χ^2 (1)= 191.99, *P*=<0.001). A slight increase in what would be considered utilitarian orientation was observed in consideration of the ethical acceptability toward the harvest of wildlife. However, it is recognized that ethics are standards of behavior rather than beliefs. This increase included considerations of use of animals, if practices increased health, or reduced damages.

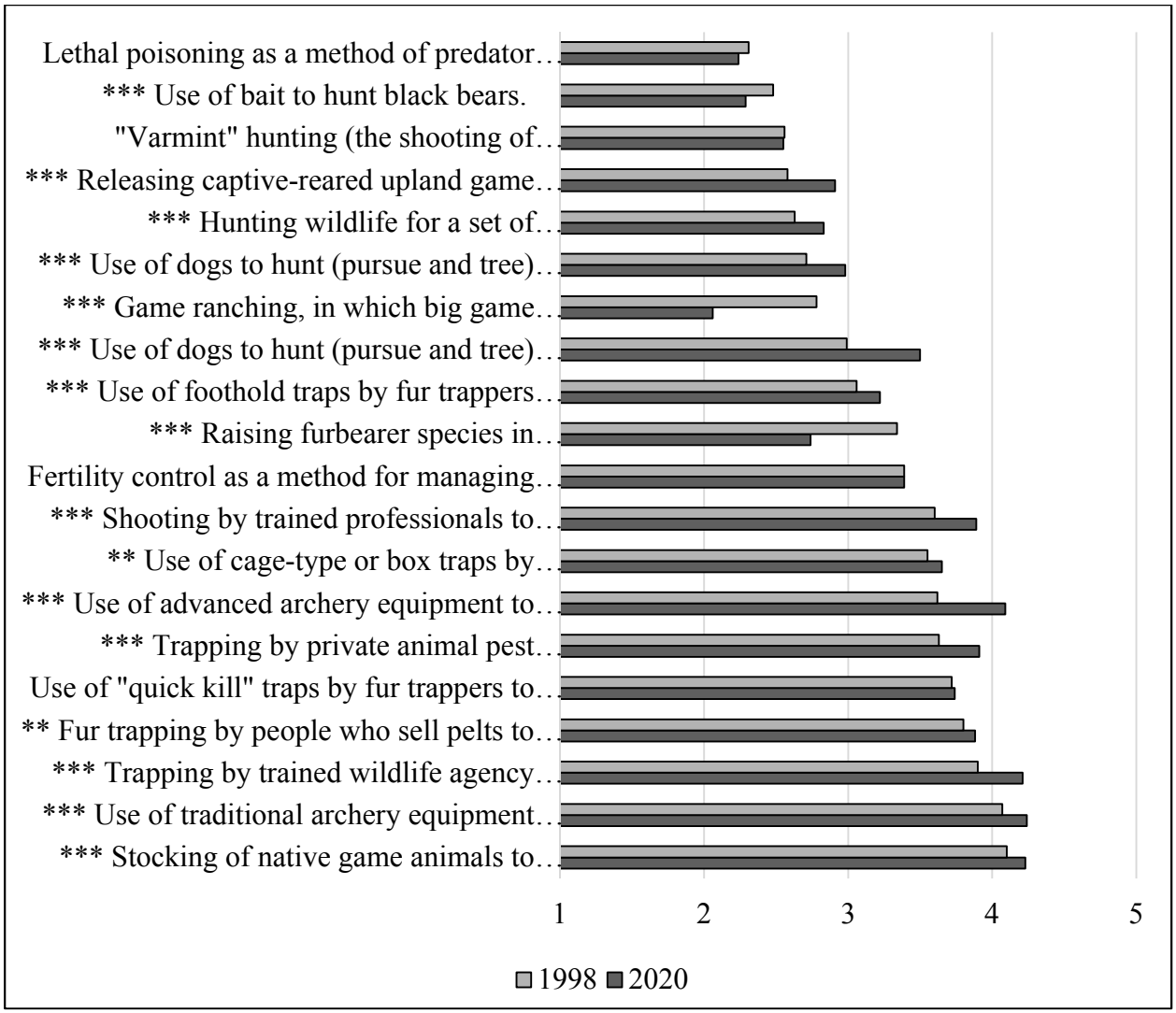


Figure 4: Survey responses to level of agreement of statements toward beliefs about specific management activities. Statements were measured on a scale of 1 ("extremely inappropriate") to 5 ("extremely appropriate") by members of The Wildlife Society for surveys conducted in 1998 (Muth et al. 1998) and 2020. Statistically detectable differences are indicated by asterisks *p<.05, **p<.01, ***p<.001.

Attitudes toward appropriateness of hunting and trapping activities 1998–2020 indicated stable to slightly more positive attitudes about active or intrusive types of wildlife management (Figure 4). Notable increases in acceptability include the use of dogs, trapping by pest control firms or trained professionals, and archery hunting. Exceptions included activities such as game ranching and raising of furbearer species in commercial facilities for eventual sale. Mean

attitude scores about shooting by trained professionals to manage wildlife populations, however, increased 1998–2020.

Generational Differences in 2020

Age structures of 1998 and 2020 respondents are shown in figure 5 and figure 6. Participants of all 6 age groups responded in strong agreement to wildlife species having value in and of themselves above and beyond use by humans. Similar results were observed among other statements including "minimizing the pain and suffering of individual species should be an important criteria of wildlife management," "hunting on property where wildlife are confined by high fences is unethical" and "the harvest of wildlife is ethically acceptable if it utilizes the harvested animal." Several differences, however, were detected between age groups. The older the respondent age group, the greater the frequency of that group to indicate agreement with the statement "wildlife are resources to be harvested in a sustainable way and used for human benefit." Compared with the youngest group (20–29 yrs.), the odds for respondents in the older group (60–70 yrs.) to respond more favorably to the statement (indicating more agreement) is 2.85 times (CI 95% 2.20 to 3.69) more likely (Wald χ^2 (1)= 63.36, P= <0.001).

An inverse trend was revealed in response to the statement "I believe wild animals have the same rights as humans." Compared with the youngest group, the odds for the respondents in the older group to respond favorably to the statement indicating more agreement is 0.33 times (CI 95% 0.27 to 0.42) less likely (Wald χ^2 (1)= 91.58, P= <0.001). In other words, the older the respondents, the more likely they disagree with the statement. Management activities that further elicited generational differences included "raising furbearer species in commercial facilities for eventual sale of the pelts on the commercial fur market" and "hunting for a large set of antlers/horns, or to have the animal mounted by a taxidermist." Compared with the youngest

group, odds for respondents in the older group to respond more favorably to the statement (indicating more agreement) was 4.23 times (CI 95% 3.36 to 5.32) more likely (Wald χ^2 (1)= 150.13, *P*= <0.001). The older the respondents, the most likely they were to agree with the statement "raising furbearer species in commercial facilities for eventual sale of pelts on the commercial fur market."

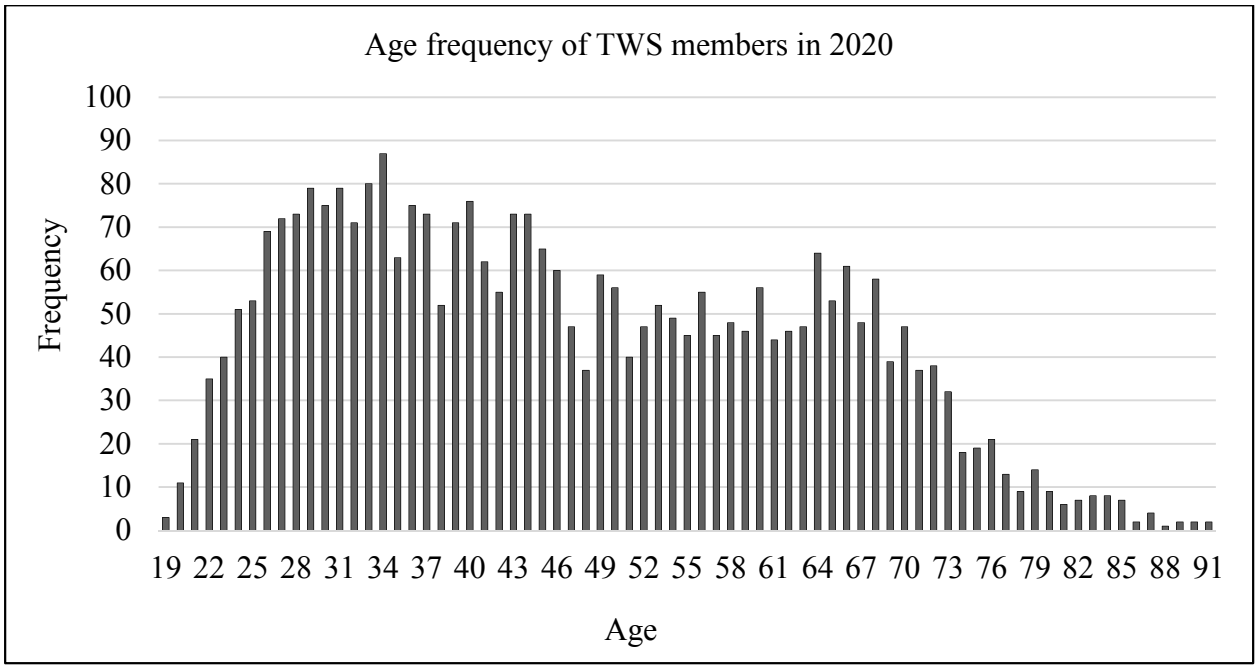


Figure 5: Age frequency distribution of the survey population of members in The Wildlife Society (TWS) in 2020. Data were derived from a web-based questionnaire (Qualtrics) sent in 2020 to all known members of TWS (14 Jan–10 Mar).

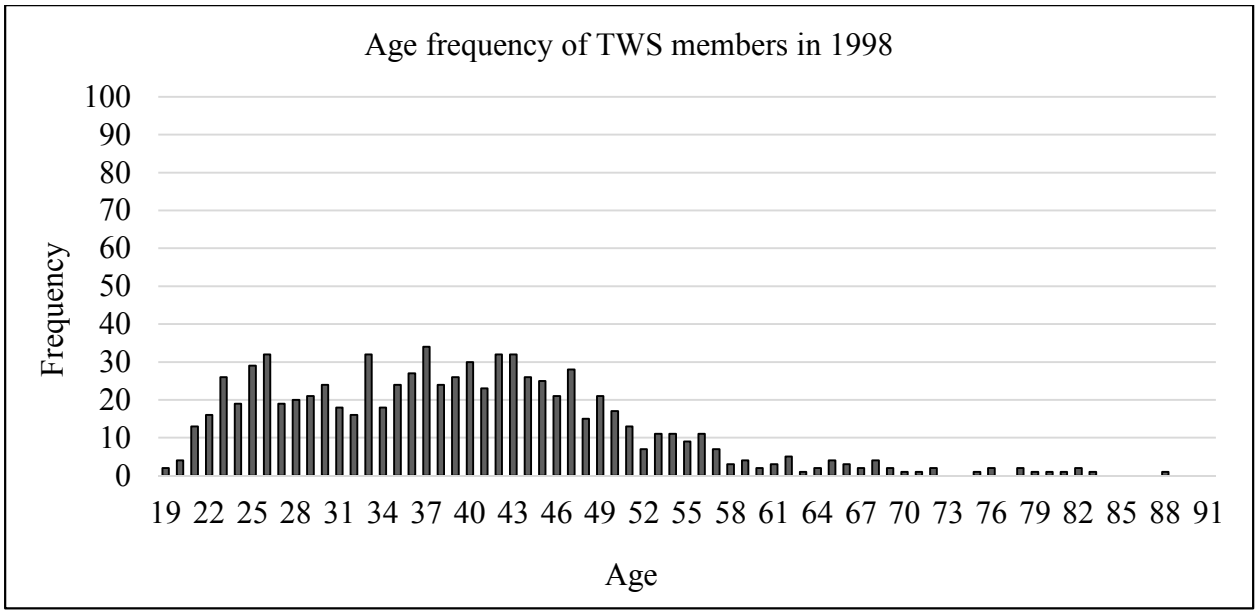


Figure 6: Age frequency distribution of the survey population of members in The Wildlife Society (TWS) in 1998. Data were derived from a self-administered, mail-back questionnaire in 1998 to a sample of 1,000 members of each organization.

Geographical Representation on Key Statements

Attitudinal scores for the statement "wildlife are resources to be harvested in a sustainable way and used for human benefit" were reported higher in states such as Mississippi (M= 3.83), Missouri (M= 3.96), and West Virginia (M= 3.86). Measured on a scale of 1 (strongly disagree) to 5 (strongly agree). Table 2 shows the geographical representation of each state and TWS section on key statements and categories.

Similar results were reported for mutualistic statements such as "wildlife have the same rights as humans" and "it is morally wrong to kill wildlife for human sport or recreation." States with greater scores but still less than full agreement on the statement "wildlife have the same rights as humans" included those in the east (e.g., Connecticut (M= 2.88), and Washington D.C (M= 2.86)) or west (e.g., California (M= 2.95), and Hawaii (M= 2.90)).

Table 2: Survey responses to the level of approval of others participating in legal hunting and legal trapping regardless of their opinion. Statements measured on a scale of 1 ("strongly disapprove") to 5 ("strongly approve") by members of The Wildlife Society for the survey conducted in 2020 displayed by the state of residence. Wildlife are resources and animals have the same rights were measured on a 5-point scale 1 ("strongly disagree") to 5 ("strongly agree"). Factor 1 represents 7 statements about the care of animals and ecosystem within wildlife management. Factor 2 represents 7 statements about utilitarian approaches to wildlife management. Ethical acceptability category is a combined 8 statements of the ethical acceptability toward the harvest of wildlife. Shown are the sample sizes of respondents (*n*) and mean scores ($\bar{x}$) of the sample. Data were derived from a web-based questionnaire (Qualtrics) sent in 2020 sent to all known members of TWS (14 Jan–10 Mar).

Section and State	*n*	Hunting approval	Trapping approval	Wildlife are resources	Animals have the same rights	Factor 1	Factor 2	Ethical acceptability
Canadian	95	4.30	3.83	2.77	2.78	2.87	3.43	3.91
Western	312	4.14	3.16	2.69	2.90	2.95	3.47	4.02
California	253	4.11	3.13	2.66	2.95	2.98	3.46	4.01
Hawaii	11	4.00	3.00	2.55	2.90	2.91	3.50	4.03
Nevada	48	4.33	3.31	2.94	2.69	2.82	3.52	4.05
Southwest	297*	4.67	3.91	3.36	2.33	2.59	3.83	4.22
Arizona	70	4.49	3.45	3.13	2.72	2.80	3.65	4.04
Mexico	2	5.00	4.00	5.00	1.00	2.00	4.43	4.25
New Mexico	49	4.76	3.61	3.37	2.29	2.66	3.86	4.29
Texas	176	4.73	4.18	3.45	2.18	2.49	3.89	4.27
Northwest	513	4.66	3.67	3.11	2.37	2.65	3.72	4.18
Alaska	89	4.71	3.88	3.37	2.18	2.58	3.83	4.17
Idaho	94	4.70	3.78	3.32	2.56	2.68	3.74	4.21
Montana	110	4.83	3.34	3.11	2.28	2.61	3.74	4.29
Oregon	108	4.49	3.55	2.99	2.48	2.74	3.65	4.13
Washington	112	4.59	3.83	2.84	2.34	2.63	3.66	4.10
Central Mountains and Plains	414	4.70	3.90	3.29	2.32	2.55	3.83	4.22
Colorado	145	4.68	3.66	3.14	2.42	2.63	3.80	4.20
Kansas	40	4.75	4.40	3.42	2.10	2.42	3.95	4.30

Table 2 (cont'd)

Section and State	*n*	Hunting approval	Trapping approval	Wildlife are resources	Animals have the same rights	Factor 1	Factor 2	Ethical acceptability
Nebraska	46	4.76	4.26	3.37	2.27	2.43	3.85	4.18
North Dakota	40	4.90	4.55	3.56	2.11	2.38	3.81	4.23
South Dakota	25	4.92	4.44	3.68	2.12	2.45	3.98	4.17
Utah	49	4.49	3.69	3.33	2.51	2.69	3.77	4.22
Wyoming	69	4.75	3.54	3.20	2.28	2.54	3.82	4.23
North Central	477	4.74	4.28	3.39	2.24	2.49	3.89	4.25
Illinois	50	4.59	4.24	3.14	2.58	2.58	3.84	4.29
Indiana	36	4.78	4.39	3.22	2.23	2.45	3.85	4.25
Iowa	29	4.83	4.24	3.52	2.46	2.61	3.95	4.13
Michigan	73	4.70	4.24	3.44	2.18	2.47	3.83	4.23
Minnesota	75	4.73	4.16	3.24	2.32	2.52	3.83	4.16
Missouri	51	4.90	4.78	3.96	1.80	2.23	4.07	4.35
Ohio	44	4.70	4.07	3.36	2.24	2.61	3.89	4.23
Wisconsin	119	4.75	4.23	3.35	2.21	2.48	3.91	4.28
Northeast	368	4.67	4.11	3.23	2.39	2.54	3.77	4.24
Maine	40	4.48	3.85	3.22	2.62	2.73	3.72	4.27
Connecticut	10	3.90	3.40	2.50	2.88	2.97	3.45	3.90
Massachusetts	31	4.87	4.03	3.13	2.30	2.48	3.77	4.32
New Hampshire	21	4.62	3.71	3.19	2.30	2.61	3.76	4.16
Rhode Island	9	4.56	4.33	2.89	2.67	2.60	3.40	4.17
Vermont	27	4.70	4.11	2.96	2.15	2.51	3.74	4.18
New Jersey	25	4.48	3.96	3.08	2.36	2.66	3.68	4.05
Delaware	11	4.91	4.27	3.82	2.36	2.52	4.06	4.28
New York	90	4.70	4.09	3.23	2.36	2.48	3.72	4.26
Pennsylvania	74	4.72	4.27	3.25	2.49	2.53	3.84	4.34
West Virginia	30	4.87	4.67	3.86	2.17	2.33	4.02	4.20

Table 2 (cont'd)

Section and State	*n*	Hunting approval	Trapping approval	Wildlife are resources	Animals have the same rights	Factor 1	Factor 2	Ethical acceptability
Southeast	660	4.72	4.22	3.43	2.18	2.49	3.88	4.27
Alabama	34	4.85	4.50	3.68	1.88	2.34	4.01	4.40
Arkansas	53	4.77	4.57	3.72	1.77	2.40	4.01	4.30
Washington D.C.	8	4.00	3.13	2.63	2.86	2.97	3.09	3.88
Florida	86	4.58	4.06	3.17	2.26	2.55	3.72	4.17
Georgia	58	4.90	4.40	3.34	2.07	2.38	3.94	4.41
Kentucky	33	4.79	4.21	3.39	2.41	2.56	4.00	4.40
Louisiana	27	4.78	4.41	3.59	2.23	2.47	3.95	4.26
Maryland	40	4.73	4.23	3.40	2.15	2.49	3.94	4.33
Mississippi	47	4.91	4.41	3.83	1.85	2.27	4.10	4.41
North Carolina	67	4.69	4.24	3.56	2.11	2.38	3.81	4.23
Oklahoma	25	4.72	3.88	3.48	2.28	2.57	3.97	4.26
South Carolina	47	4.68	4.04	3.32	2.62	2.65	3.81	4.26
Tennessee	56	4.71	4.25	3.57	2.07	2.46	3.88	4.25
Virginia	79	4.57	3.97	3.29	2.37	2.60	3.81	4.18

Acceptability of Trapping and Foothold Traps

Members of TWS reported a strong level of approval for others participating in legal hunting and legal trapping regardless of their opinion. Respondents in 2020 approved legal hunting (M= 4.62) more than legal trapping (M= 3.93). Members living in West Virginia, North Dakota, Missouri, Arkansas and Alabama had a higher attitudinal approval score than other states (Table 2). A greater percentage of TWS members in 2020 strongly disagreed (45.0%) with the statement "foothold traps should be outlawed to trap species classified as a furbearer." More respondents in 2020 reported (21.6%) not having an opinion on the topic than in 1998 (14.7%) (Table 3).

Table 3: A comparison of self-reported responses by members of The Wildlife Society (TWS) 1998 vs. 2020, about whether foothold traps should be outlawed to trap species classified as a furbearer. Shown are the sample sizes of respondents (*n*) and percent (%) of the sample. Data were derived from a self-administered, mail-back questionnaire in 1998 and a web-based questionnaire (Qualtrics) sent in 2020 sent to all known members of TWS (14 Jan–10 Mar).

	TWS 1998 *n*= 865	TWS 2020 *n*= 3,232
Strongly disagree	46.1%	45.0%
Strongly agree	38.4%	33.0%
No opinion	14.7%	21.6%
- I don't know enough about the topic		75.5%
- I have an opinion, but I don't care to express it		24.5%

DISCUSSION

Attitudes and beliefs toward wildlife and about uses of wildlife remained relatively stable among TWS members since 1998. Responses from my 2020 survey, however, reveal a modest increasing trend toward mutualistic value orientations. In addition to acceptance of various uses of wildlife, even regulated trapping, TWS members reported a strong desire for humane

treatment and fair chase of wildlife. My research findings are consistent with previous work completed at a national level in the United States (Manfredo et al. 2003, Teel et al. 2005). Mutualistic value orientations toward wildlife are becoming more prevalent throughout the US (Manfredo et al. 2018). The trend revealed by my data depicts a gradual change in dominance away from utilitarian roots of the membership toward more mutualistic value orientations; the trend is most apparent in the youngest age classes, especially in Generation Z (those born in 1995 to 2012).

The proportion of wildlife professionals that express value orientations characterized as utilitarian, however, appears greater than what might be expected from estimates of society as a whole, where 28% of the U.S. population is considered traditionalist or utilitarian (Manfredo et al. 2018). Mutualists throughout the US make up an estimated 35% of the population, with the remaining population considered pluralist or distanced. A comparative study in 2004 (Teel et al. 2005) of Western states in the US show an increase in mutualists of 4.7% and a commensurate decrease in utilitarian value orientations (Manfredo et al. 2018). States such as Alaska, Montana, North and South Dakota and West Virginia show high percentages of traditionalists while more mutualist states include California, Hawaii and Connecticut. Similar results to the national study were found in our results with the western states having more mutualistic than utilitarian wildlife value orientations toward wildlife and uses of wildlife. Positive attitudes associated with wildlife species such as coyotes and wolves have increased from 1978 to 2014 throughout the US (George et al. 2016). These results show an increase in the belief and concern for wildlife species outside of domestic animals. This trend in the US could be from the sociological driver of modernization and its effects on the population.

The support wildlife professionals express for trapping, differing from more general societal beliefs (Responsive Management 2016) may be because they judge trapping based on an understanding of the role in providing goods and services such as population and damage control. Professionals may have a greater direct knowledge of the activity, as opposed to members of the public at large who are swayed by anti-trapping misinformation (White et al. 2015*b*). Both agency professionals and the public were supportive of lethal wildlife management under certain circumstances such as controlling wildlife diseases, survival of species, preservation of habitats, wildlife damage, human safety, population management and food (Koval and Mertig 2004). Agency professionals were more supportive than the public in all situations. Acceptability of lethal management increases with the public the more severe a wildlife interaction is (Bruskotter and Way 2012). Members of society in the US may view trapping species such as beaver, that cause damage to land or human safety, negatively (Jonker et al. 2006). These experiences may lead to less support for trapping initiatives and result in nuisance problems associated with the species. A study conducted in 2016 of residents in Indiana, Wisconsin and Connecticut found that residents were supportive of trapping for reasons that include ecological, damage control and subsistence reasons (Responsive Management 2016). In addition to negative attitudes toward specific furbearer species, a lower acceptance capacity for beavers was found to be associated with higher acceptability of lethal beaver management actions (Siemer et al. 2013). Wildlife managers and professionals may have a different understanding of how to handle human-wildlife conflicts that include providing beneficiaries with services such as beaver population management, beaver dam removal permits and damage prevention education. A critical component of understanding management involving trapping is to understand the motivations a trapper might have toward participating. A study of trappers in

the Northeast found 5 factors that contribute to participation of a trapper including lifestyle orientation, animal control, nature appreciation, self-sufficiency, and affiliation (Daigle et al. 1998).

In addition to the support of trapping, consistent beliefs toward specific active management practices suggested continued utilitarian orientations (Muth et al. 2006). Professionals working for agencies deal with ethical dilemmas during their roles as trust managers and managing wildlife (Lunney 2012). Conservation professionals reported the act of lethal control for large carnivores is justified if the humans are in immediate risk (Lute et al. 2018). Management actions such as lethal control were favorable to professionals who had more experience in the profession than those of younger professionals. This finding may account for the generational differences I detected. Research and monitoring are among the fundamental job responsibilities members of TWS handle in their professional roles. Education and understanding their roles as trust managers may contribute to them having a more insightful understanding of activities such as hunting and trapping.

Value orientations toward wildlife and uses of wildlife have changed more slowly than I expected over the last 22 years by TWS members as proxy for practicing wildlife conservation professionals. Educational institutions are expanding, and wildlife science is becoming more specialized with diverse sub-disciplines. Programs involving conservation biology, wildlife ecology and social sciences are becoming more prominent in the profession along with a concurrent decrease in traditional wildlife management content. These new academic disciplines could be contributing to a new set of values and beliefs from younger professionals (Muth et al. 2002). With urbanization, families may not have the same opportunities to provide for traditional lifestyles involving outdoor activities such as hunting, fishing or trapping. Land access, time and

money could also contribute to a lack of experiences involving traditional activities (Karns et al. 2015). Value shifts within society take time to change and usually occur within generations. More than 2 decades of time may not be enough to detect complete changes of value orientations, but it is enough to see the shift within a professional society. Members of general society may be shifting toward a more protectionist view of the world and of wildlife (Manfredo et al. 2003) and my data suggest those in TWS may be changing with a slight lag in time, or conversely, immersion in the wildlife profession may result in adherence to and appreciation of more traditional attitudes and beliefs.

The acceptability of sustainable uses such as legal hunting and legal trapping was evaluated for TWS members in 2020. Although both activities had high levels of approval, legal hunting was found to have more approval than legal trapping. Members of TWS were asked if they believed if leg hold (1998) and foothold (2020) traps should be outlawed in both 1998 and 2020. Participants in both time periods strongly disagreed with the statement which provided consistent results over time. More members in 2020 responded with having no opinion on the topic of foothold traps. Of the members who reported not having an opinion on the outlawing of foothold traps, more than half responded with not knowing enough about the topic and the remaining had an opinion but did not care to express it. The increase in not having an opinion could indicate some members may simply not have enough knowledge on the subject to make a definitive choice on their level of agreement, or it could mean they are conflicted because of empathy toward animals combined with an understanding and appreciation of the activity. Lack of knowledge could be the result of not having experiences with traditional outdoor activities such as trapping, or not being exposed to it in their job responsibilities (Muth et al. 2002). Those who responded to having an opinion about outlawing foothold traps but did not care to share it

may believe the topic is too sensitive or controversial to discuss and may lack trust in the survey's confidentiality. The public is found to be accepting of trapping in certain circumstances, but they may not be knowledgeable of the benefits trapping brings to habitats, humans and wildlife management (White et al. 2015*a*). A decline in the participation of trapping and relevancy may be creating a gap in knowledge between the public and wildlife professionals toward the activity. This allows for improvement in agency professionals communication of the benefits of continued trapping, as well as knowledge gain in the subject as trust managers.

Although the sample sizes of respondents in both time periods is different, the professional profile of TWS members is consistent. Employment of TWS members in 1998 and 2020 were highest with state agencies, and a greater proportion had a graduate level degree. Tenure in the profession differed between samples, with 1998 respondents had a higher percentage of professionals being employed 10–20 years whereas 2020 respondents had a higher percentage employed more than 20 years. The current and childhood residences were almost evenly divided between all 5 categories in both 1998 and 2020. Professionals in 2020 did however have more diverse academic degree programs. Lastly, job responsibilities of those in natural resource organizations in 1998 were similar to 2020 and included non-game species management, research and monitoring.

A generation can be thought of as a collection of people born in each time period or as an inter-related social group that evolves as history unfolds over time (Lyons and Kuron 2014). A common trend found across generations is individualization where people are finding personal satisfaction and are more self-focused – what sociologists refer to as differentiation of the value structure of American society, of the "cult of the individual" (Muth 1991). Importance of material rewards, leisure time and career mobility are increasing in younger generations.

However, authority within a workplace organization still lies with age or older generations (Rasch 2018). Understanding workplace dynamics and attributes that may arise from different generations could help management integrate all generations in the workplace better. Adding to the trend of individualization, younger generations are spending more time near technology and less time outdoors and in nature (Louv 2008). This detachment to nature could result in a decline in nature relatedness in younger generations (Rasch 2018). Relatedly, my results indicate older participants have more agreement with statements involving utilitarian uses of wildlife such as believing wildlife are resources to be harvested in a sustainable way and used for human benefit than those in younger generations, while younger respondents agreed more with mutualistic statements including believing animals have the same rights as humans. The generational results from my study provide further confirmation of expectations I had regarding the difference between younger and older generations. With younger generations perhaps not having the same traditional experiences as older generations, results from my study show slight differences in responses from younger generations than mid-career or older adults in the profession.

Professionals in the wildlife field are bringing in new perspectives from life experiences and sociodemographic backgrounds to the work force and to their profession. The alignment of professional values and beliefs with those of society will continue to make wildlife management relevant for the future as value orientations continue to shift. Wildlife professionals have responsibility to beneficiaries to conserve wildlife for present and future generations. Trust in departments of natural resources by stakeholders is reported to be critical to creating a relationship between beneficiaries and trust managers of wildlife (Gigliotti et al. 2020)

Limitations

Although the 2020 survey instrument attempted to be as similar to the 1998 instrument as possible, some sampling differences occurred. The 1998 sampling scheme attempted to attain an equal sex ratio. Our 2020 sample, however, attempted to closely mirror the current demographics of TWS membership. This difference in sampling schemes may have some effect on estimates.

My data are exclusively from a portion of TWS members whose total membership exceeds 10,500 members employed at various levels in all types of jobs within diverse organizations and are distributed widely throughout North America. My respondents geographically represent 50 states and 15 other countries, yet this population likely does not represent the full spectrum of people who consider themselves wildlife conservation professionals.

Implications

If support among wildlife professionals for various uses of wildlife such as trapping and hunting is desirable to sustain, an investment in continual education about their roles in wildlife management are likely to be helpful. Emphasis on techniques that explicitly address concerns about humane treatment of animals are predicted to sustain support among professionals. In addition to techniques that address concerns about humane treatment, further investigation and description into what constitutes fair chase could facilitate deliberation and awareness among professionals. Programs such as Trapping Matters, Conservation Leaders for Tomorrow and many others could be helpful for wildlife conservation professionals gaining experience and

knowledge in the areas of expertise they are not knowledgeable about, but are important for their role as trust managers in wildlife management.

Age structure of the TWS membership suggests there may be considerable turnover in personnel during the next 10 years. The younger age classes of professionals have greater mutualistic value orientations that are likely to only increase the importance of these discussions and deliberations within the society.

CHAPTER 3:

FACTORS INFLUENCING WILDLIFE CONSERVATION PROFESSIONALS' APPROVAL OF SUSTAINABLE USES OF WILDLIFE

Demographics, educational and professional development, and career paths of wildlife conservation professionals have changed meaningfully in the last 22 years (Organ and Fritzell 2000, Muth et al. 2002, Lauber et al. 2009, Millenbah et al. 2009, Urbanek et al. 2018). Those changes, along with myriad long- and short-term societal changes (Inglehart 1997, Mertig et al. 2002) are suspected to have created a workforce with fewer people steeped in sustainable, utilitarian uses of wildlife and more who hold protection-oriented beliefs about wildlife (Teel et al. 2005). If society's value orientations become more mutualistic and protectionist toward wildlife (Manfredo et al. 2018), the public and professionals may become less accepting of previously considered sustainable uses of wildlife such as hunting solely for recreational purposes or trapping. Insights are needed about factors affecting value orientations expressed by wildlife conservation professionals to better understand changes in the conservation workforce as well as informing needs to consider in hiring and training of personnel. It is expected that these practitioners will be more accepting of harvest practices that center around explicitly humane treatment of wildlife such as those that promote fair chase in hunting and best management practices of trapping.

In Chapter 2, I reported that beliefs expressed by members of The Wildlife Society (TWS) about wildlife and the uses of wildlife changed modestly during 1998–2020. Although a greater percentage of members in 2020 express agreement with statements that focus on animal welfare and fair chase opportunities for wildlife, members in 2020 also expressed high levels of

approval for legal hunting and trapping. Approval of hunting was greater among TWS members than was approval of trapping. From the level of disagreement with a comparative question asking participants whether foothold traps should be outlawed was relatively consistent among respondents in the 1998 and 2020 surveys. An increased number of respondents in 2020, however, identified not having an opinion on the topic of whether foothold traps should be outlawed. The 21.6% members who responded as not having an opinion reported the reason as they did not care to share their opinion (5.1%) or did not have enough knowledge on the topic (16.5%). The levels of appropriateness reported for specific active management activities (i.e., "varmint" hunting or fertility control) remained relatively consistent through time with the exception of the appropriateness of activities such as game ranching and raising furbearer species in commercial facilities declining.

Except for the Southeast Section, TWS members broadly expressed similar patterns in value orientations of publics occurring throughout most of the US but at a reduced level. Those values are trending toward mutualistic orientations about wildlife, uses of wildlife, and common practices in wildlife management (Teel and Manfredo 2010, Manfredo et al. 2018). Mutualistic value orientations are beliefs of human and wildlife co-existing together and wildlife deserving the same rights as humans (Manfredo et al. 2018). A utilitarian value orientation describes the belief that wildlife principally is for the benefit of humans.

Sustainable uses of wildlife are implicit in the North American model of wildlife conservation and fundamental to how wildlife is managed to produce benefits while reducing costs incurred by society (Decker et al. 2017). Sustainable use in the wildlife context is defined as "utilization of the wildlife resource in a manner that maintains its potential to meet current and future human needs and aspirations and prevent its long-term decline" (Decker et al. 2017).

Principles necessary to maintain public support of sustainable use include: uses serve a practical purpose; species or population used is not threatened or endangered; and when necessary, the method of take is considered socially acceptable (Hamilton et al. 1998, Decker et al. 2017). Mechanisms in place for sustainability throughout wildlife management include policy and regulation as well as the development of best management practices pertaining to trapping of wildlife. As such, an important objective of wildlife management, consistent with public trust responsibilities, is to conserve wildlife populations for future generations, and to do so, concepts and principles such as sustainable use and best management practices will be most effective if continually evaluated and amended to meet societal needs (Decker et al. 2017). A value shift from utilitarian toward mutualistic within some publics could result in pressures on the social license – the public consent to exist and operate – of wildlife agencies and wildlife professionals who serve those agencies (Hampton and Teh-white 2019).

Not all wildlife conservation professionals find uses considered sustainable as acceptable or appropriate practices (Muth et al. 2002, Batavia et al. 2018, Batavia et al. 2019). It is important to address differences among wildlife conservation professionals including the development of an animal rights orientation (Hutchins and Wemmer 1986, Muth et al. 2000) because those professionals may be in leadership roles within an agency and need to manage a workforce with differing beliefs and values (Muth et al. 2002). For example, conservation professionals disagreed over whether the use of leghold traps should be outlawed (Muth et al. 2006). Factors including personal experiences, professional knowledge and subcultural norms influence a person's support or approval of a type of management or harvest practice. Some members of the wildlife conservation profession, however, are expressing a desire for alternative approaches that reflect different value orientations from traditional ones. There are different

perspectives on acceptability of uses traditionally considered sustainable. For example, a concept termed "compassionate conservation" (Wallach et al. 2018) implies conservation and management of animals should be focused on well-being or rights of wildlife and non-anthropocentric valuations to sustain biological diversity (Bruskotter et al. 2017, Vucetich et al. 2021). This approach to wildlife conservation and similar ones proposed through time (Callicot 1990), however, are not widely accepted among many conservation professionals because the approaches posit animal rights philosophy and seldom take into consideration perspectives of humans who live near and are affected by wildlife (Oommen et al. 2019). As society becomes more disconnected to wildlife and nature (Manfredo et al. 2020), it is also important to monitor where wildlife professionals stand on topics such as the approval of sustainable uses of wildlife. If participation in hunting and trapping continue to decline (U.S. Department 2016), determining the level of approval by the public in such sustainable use activities may be critical for the future of wildlife conservation, policy formation, and funding (Jacobson et al. 2010, Manfredo et al. 2017).

Sociological drivers such as modernization are contributing to society becoming less supportive of utilitarian uses of wildlife such as hunting and trapping for food or revenue sources (Manfredo et al. 2009*a*). As society becomes more disconnected to wildlife and nature (Manfredo et al. 2020), it is also important to monitor where wildlife professionals stand on topics such as the approval of sustainable uses of wildlife. Reasons proposed to explain public approval of hunting include to protect humans from harm, wild harvested meat, protect property and population control objectives of wildlife management (Byrd et al. 2017, NSSF 2019). Similar reasons for approval of trapping reported are habitat restoration, population control, food, or to protect property (White et al. 2015, NSSF 2019). Decline in approval may center

around hunting or trapping being motivated by recreational, sport, or trophy desires (Batavia et al. 2018) and perceptions of cruelty and empathy toward individual animals. To maintain relevancy of wildlife professionals and understand the comparison between attitudes and beliefs of stakeholders and practitioners, it's important to examine beliefs internal to the wildlife profession because it will help practitioners function in their role as public trust managers (Smith 2011).

Background

I am focusing on how beliefs and attitudes of wildlife conservation professionals influence approval and the level of stated appropriateness of activities involving hunting and trapping. A cognitive hierarchical approach was introduced to understand how humans process information and develop behaviors in the order of values, beliefs, attitudes, social norms, behavioral intention, and behavior (Fulton et al. 1996, Decker et al. 2012). Rokeach (1973) defined values as enduring beliefs that indicate preferred modes of conduct or end-states of existence. Values are few in number and are central to one's mental construct as they transcend situations (Rokeach 1973). Beliefs, in turn, are what one person holds true or factual within their thoughts (Decker et al. 2012). Wildlife value orientations are the direction and pattern of beliefs about wildlife (Fulton et al. 1996). Attitudes are an evaluation of an object, person or place whether they be good or bad (Heberlein 2012). Two wildlife value orientations emerged from studies conducted on the public's basic wildlife beliefs and value orientations toward wildlife (Teel et al. 2005, Manfredo et al. 2009*b*). Those with a domination or utilitarian value orientation reflect agreement toward appropriate uses of wildlife and hunting beliefs (Manfredo et al. 2009*b*, Manfredo et al. 2018). On the opposite of the spectrum is mutualistic, reflecting people who hold an egalitarian ideology toward to wildlife (Manfredo et al. 2009*b*). Mutualistic

value orientations reflect agreement with more social affiliation and caring beliefs. A utilitarian wildlife value orientation regards as wildlife as a resource for humans to benefit from while a mutualistic orientation regards wildlife as a part of the community and care more about the well-being of the animals (Manfredo et al. 2018).

Two wildlife value orientations have stood out in previous studies over the last decade, but they have stayed consistent with the beliefs associated to each one. An original study in 1996 described 2 value orientations within 8 basic wildlife belief dimensions and referred to them as wildlife benefits/existence and wildlife rights/use (Fulton et al. 1996). Wildlife benefits/existence clustered together with beliefs such as wildlife education, recreational wildlife experience and existence while wildlife rights/use clustered together with hunting, fishing and wildlife use. Further research in 2003 led to terms such as protection use orientation and wildlife appreciation orientation (Manfredo et al. 2003). Protection use orientation associates with a belief that wildlife should be managed and is positive toward hunting and fishing. Wildlife appreciation orientation associates with beliefs such as wildlife should have same rights as humans and wildlife should be protected for the future (Manfredo et al. 2003).

Earlier work on typology of basic attitudes and values toward animals (Kellert 1976) and nature (Kellert 1996) have helped to describe present day patterns of beliefs toward wildlife. The typologies included naturalistic, ecologistic, humanistic, moralistic, scientistic, aesthetic, utilitarian, dominionistic, negativistic and neutralistic (Kellert 1976). Terms such as domination and mutualistic value orientations that emerged in 2009 draw upon Kellert's previous value typology studies and have similar association of beliefs with the wildlife value orientations discussed earlier (Manfredo et al. 2009*b*, Teel and Manfredo 2010). Domination value orientation beliefs include: wildlife should be managed for human benefit, and human well-being

should be prioritized over wildlife. Actions that result in death or harm to wildlife are acceptable. Mutualistic value orientation beliefs reflect an egalitarian ideology that fostered perceptions of social inclusion and equality that extend to human-animal relationships (Teel and Manfredo 2010). A mutualistic value orientation is more likely to view wildlife in human terms and more likely to engage in welfare-enhancing behaviors for individual animals. Domination orientation is found to be associated with hunting and use of wildlife while mutualistic orientation is associated with caring and social affiliation. Four types of wildlife value orientations emerged in 2010 building off beliefs associated with previous studies and included traditionalist, mutualist, pluralists and distanced (Teel and Manfredo 2010). A comparative study from 2004 to 2018 of Western states in addition to all 50 states surveyed in 2018 estimated the 4 value orientations throughout the US as traditionalist (28%), mutualist (35%), pluralists (21%) and distanced (15%) (Manfredo et al. 2018).

Wildlife value orientations of residents in 19 western states, normally considered conservative leaning, appear to be shifting from utilitarian and traditional toward a mutualistic value orientation in the way they view and interact with wildlife (Teel et al. 2005). This same phenomenon is reported to be happening throughout the US (Manfredo et al. 2018). Recently, a greater proportion of society is reported as expressing more mutualistic value orientations (35%) compared to the 28% considered as utilitarian or traditionalists (Manfredo et al. 2018).

Values in society began shifting from materialist toward post-materialist or expressing a need for belonginess and self-esteem after World War II (Inglehart 1997). This shift in values is attributed to the growth of attributes associated with the concept of modernization, a societal driver in which urbanization and anthropomorphic thinking creates a distance between humans and direct interaction with the environment and wildlife (Manfredo et al. 2020). Causal factors

of modernization, including income, education and urbanization, were positively associated with mutualistic value orientations at an individual-level and negatively associated with domination (Manfredo et al. 2009*a*). In addition to modernization characteristics, the diversity of cultures throughout the US carries different values toward wildlife and nature (Lopez et al. 2005). These dynamics may cause a difference or shift in values within each state. Family and cultural dynamics, as well as having the same attributes, have helped to shape values and beliefs of minorities throughout the US.

Social license, a concept used in public policy and the human dimensions field, is used to understand how the public responds to situations in wildlife use activities such as hunting and trapping (Kendal and Ford 2017, Hampton et al. 2019). Wide-spread opposition to practices such as trophy hunting may pose a threat to the long-term social license of hunting as an activity in wildlife conservation (Nelson et al. 2016, Darimont et al. 2017, Wanger et al. 2017). Darimont et al. (2020) suspected the social license of hunting for specific species that are not commonly used for meat or trophies will continue to be of concern. The relevancy of activities such as hunting or trapping in present day society are brought to the forefront of discussion in wildlife conservation and management due to the decline in these activities and the potential impact on future generations. Determining how the public views management actions or situations may be important in the long-term social license and relevancy of hunting and trapping. Members of TWS may be involved in situations where they interact or engage the public and being aware of how the public interprets certain management actions can help them function in their roles as trust managers.

Wildlife value orientations (WVOs) are patterns of beliefs a people express toward wildlife and are beneficial for wildlife agencies to understand when making management

decisions involving wildlife and stakeholders (Bright et al. 2000). The belief statements that shape the factors addressed in this chapter may help to give insight into what TWS members believe and whether they influence approval of sustainable uses such as hunting and trapping. Demographic variables will be used in addition to explanatory factors to better understand what other information is influential. Although the predictive value of WVOs may be limited when it comes to predicting specific behaviors, value orientations are important in their influence on other cognitions such as attitudes and behavioral intentions (Fulton et al. 1996). It may be important to know the domination and mutualism wildlife value orientations a person may hold are not mutually exclusive, meaning an individual can hold multiple orientations at the same time toward wildlife, or just one, and even none at all (Teel and Manfredo 2010). The mutualistic value orientation is associated with support of habitat and wildlife protection (Teel and Manfredo 2010, Dietsch et al. 2016). Vucetich et al. (2021) found individuals prioritizing 5 conservation perspectives and competing values are often decided by case-specific context. A qualitative approach to understanding the determinants of wildlife value orientations revealed 4 major dimensions that influence WVOs, including socialization, experience, personal characteristics, and place, as in influences on pattern of beliefs (Deruiter and Donnelly 2002).

Most research studies focus on broader segments of society or on narrow user groups such as hunters. My data are unique in that they reflect practicing wildlife conservationists to the extent that members of TWS are a proxy for the wildlife profession.

Research Objectives, Assumptions, and Hypothesis

My goal was to determine how beliefs about wildlife and wildlife management, as well as control variables such as demographics and occupations, influence approval of legal hunting and trapping by practicing wildlife professionals. A second objective was to reveal the extent to

which TWS members believe specific management activities are appropriate. A key assumption is that members of TWS (n~10,500) serve as a proxy for wildlife conservation professionals, and my large sample of that population is reflective of the membership as a whole. My hypothesis is that TWS members who express mutualistic wildlife value orientations will express lower approval of legal hunting and legal trapping.

METHODS

Study Population

I assumed members of TWS served as a proxy for wildlife conservation professionals in North America, who were the population of interest. The Wildlife Society is an international professional scientific organization of 10,855 members (at time of survey) in wildlife science, management, and conservation (The Wildlife Society 2020). The organization's stated purpose is to enable wildlife professionals to sustain wildlife populations and habitats through science-based management and conservation. The Society was founded in 1937 to address the need of a central organization to establish professional and ethical standards and promote communication within the wildlife conservation and management profession. Members exist in every U.S. state, Canadian Province, and 164 members are from at least 15 other countries.

Survey Instrument

A survey instrument, updated from a 1998 version (Muth et al. 1998), was designed and conducted through web based Qualtrics survey software (Qualtrics International Inc., Provo, Utah, USA). Qualtrics survey software is a platform used to design, distribute, and analyze surveys through a research user base experience. Online survey software enabled my survey to be more accessible, tested and edited in real time, as well as gain insights into the survey results through time.

Questionnaire Implementation

The survey instrument asked respondents to identify the level of importance of 21 sources of information they would use to inform themselves about wildlife issues. Each item was measured on a 5-point scale ranging from 1= "not at all important" to 5= "extremely important." Section 2 of the questionnaire prompted the respondents to select how frequently they have participated in 18 outdoor activities in the last 5 years. Frequency of outdoor activity ranged from 0= "not at all" to 3= "more than 20 times." Section 3 of the questionnaire asked respondents to provide information on their personal views about management. It consisted of 6 sets of multi-item questions and measured beliefs on a 6-point scale on level of agreement where 1= "strongly disagree" to 5= "strongly agree" and 6= "don't know." Views about management included 4 statements of the acceptability of hunting and trapping, 14 statements about wildlife management in North America, 6 statements of ethical issues related to all management activities, 8 statements about ethical acceptability of harvest of wildlife, 8 statements associated with the opportunity to participate in hunting and an additional 8 associated with the opportunity to participate in trapping. Section 4 consisted of 26 statements about specific management activities and were measured on a 6-point scale ranging from 1= "extremely inappropriate" to 5= "extremely appropriate" and 6= "don't know."

A section devoted to trapping consisted of 3 subset questions about respondents' view on outlawing the use of foothold traps, the level of familiarity with Best Management Practices (BMPs) of trapping, and the overall level of support for trapping BMPs. Skip-and-display logic were used in this section on trapping, which enabled participants to move forward in the survey if they had little knowledge or familiarity with trapping. The first question in the trapping section asked respondents whether the use of foothold traps to trap species classified as a

furbearer should be outlawed and was comprised of 3 answer choices: 1= "strongly agree", 2= "strongly disagree" and 3= "no opinion." Depending on the level of agreement a respondent answered the previous question with a display logic presented a set of 8 reasons why the foothold trap should be outlawed or should not be outlawed. A text box labeled "other" was included in the list of reasons for each response choice to provide further explanation for their reasoning. A "no opinion" option was available for participants who chose not to answer the question about the use of foothold traps. Participants who chose this option were prompted with a follow up question to ask why they do not have a formulated opinion. Two response choices were provided as a follow up question: "I don't know enough about the topic" or "I have an opinion, but I don't care to express it".

The level of familiarity with BMPs for trapping was measured by a 4-point scale ranging from 1= "not at all familiar" to 4= "extremely familiar." If a respondent chose "not at all familiar" with BMPs the survey automatically skipped to the final section that contained questions about demographics. If participants indicated they were familiar with BMPs, they were asked for their level of support of BMPs on a 6-point scale ranging from 1= "strongly oppose" to 5= "strongly support" and 6= "don't know." Depending on the answer chosen, display logic displayed either 6 reasons to support or 6 reasons to oppose BMPs. Participants were provided with 6 listed reasons to choose from, 1 write in text box and a "don't know" option was included.

The final section of the questionnaire comprised 14 questions regarding demographics. Questions included the highest level of education completed, what academic or professional field respondents had earned a degree in, whether they were currently a student, participation in any professional development programs, current employment status, years of employment in the

profession, what kind of organization employed in, responsibilities of your job, membership of professional organizations, description of current and childhood residence, current state residing in, year born, and gender. The questionnaire concluded with a text box for additional comments or views participants would like to share. The survey instrument was evaluated and approved by the Michigan State University Institutional Review Board (Study number: 00003262).

Pilot Survey

I conducted a pilot survey to gain feedback and insight into how the questionnaire read, determine if focus questions were understandable, detect any leading questions and elicit overall concerns with the survey. Constructive feedback gained from pilot survey participants identified wording that was misleading and questions that needed clarification. The pilot was conducted 4 November - 01 December 2019. A reminder email was sent out on 14 November 2019 to those who had not responded. The sample population included participants from professional development workshops in 2019 from the Conservation Leaders for Tomorrow and Trapping Matters programs. Forty participants were randomly selected from the cumulative list of both programs (n= 131) and sent an anonymous survey link from Qualtrics software to their email addresses. Participant email addresses were provided by administrative support through both programs. A total of 22 respondents (55%) completed the pilot survey. Revisions to the final survey included changing the format of the online questionnaire software, reordering questions, and addressing minor grammatical errors.

Nonresponse

To obtain the email address list of members of TWS, all communication and access to the email address list was limited to only TWS staff. This did not permit me access records to perform an examination of nonresponse bias using a different method based off known

respondents. I examined responses of the last 100 respondents received and participants who submitted a survey during the final reminder compared to earlier respondents. The differences from the early respondents and the last 100 and final wave reminder respondents assumes they might reflect key differences among respondents and non-respondents. Respondents who submit a survey later in the collection period were assumed to be similar to nonrespondents in cases where there are several points of contact (Choi et al. 1992, Coon et al. 2020).

Data Collection

My approach to administering the questionnaire was an attempted census of the entire TWS membership (N=10,588 at time of survey) for whom email addresses were available. An anonymous survey link was generated through the Qualtrics survey software and included an invitation email sent out by administrative staff at TWS. The survey was implemented following a modified version of the Tailored Design Method (Dillman et al. 2014). Administration of the survey included 4 waves of emails sent to membership by systematic timing through the months of January and February. An email was sent out on 08 January 2020 to all members of TWS by the current president to announce a questionnaire was forthcoming the following week, describe the purpose, and who was conducting the research. The official email invitation with an active link to Qualtrics was emailed 14 January 2020 and a first reminder email sent on 22 January 2020. A second reminder email was sent to membership on 4 February 2020. On 22 February a third reminder was sent to membership and a last plea was sent on 28 February 2020. Each reminder contained a link to the survey instrument, but respondents were only able to complete the survey one time per computer. Settings in the Qualtrics program helped to safeguard against participants attempting to submit multiple survey responses.

Measurement

Responses regarding approval of legal hunting and legal trapping were measured with a 5-point scale (1= strongly disapprove to 5= strongly approve). The 17 statements used in the confirmatory factor analysis (CFA) were measured by a 5-point scale of level of agreement or disagreement ranging from 1 (strongly disagree) to 5 (strongly agree). The internal consistency of the 2 factors result from the CFA was assessed by using composite reliability of the items representing beliefs about wildlife management and uses of wildlife in each factor. Appropriateness of management activities was measured on a 5-point scale of 1 (extremely inappropriate) to 5 (extremely appropriate).

In addition, I examined current views about appropriateness of 26 specific wildlife management activities toward certain species. Management activities included stocking of native game animals to reestablish a viable population, use of traditional archery equipment (e.g., longbow, recurve) to hunt wildlife, trapping by trained wildlife agency personnel to manage wildlife, fur trapping by people who intend to use money from selling pelts and products to support their family, use of "quick kill" traps (e.g., body gripping, or conibear) by fur trappers to harvest pelts and products, trapping by private animal pest control firms to control nuisance wildlife, use of advanced archery equipment (e.g., compound bows, sights, crossbows, etc.) to hunt wildlife, use of cage-type or box traps by trappers to harvest pelts and products, shooting by trained professionals (e.g., sharpshooters) to manage wildlife, fertility control as a method for managing wildlife populations, raising furbearer species in commercial facilities (e.g., mink ranches, fox farms) for eventual sale of the pelts on the commercial fur market, use of foothold traps by fur trappers to harvest pelts and products, use of dogs to hunt (pursue and tree) raccoons, game ranching, in which big game species are raised behind a fence, use of dogs to hunt (pursue

and tree) mountain lions, hunting wildlife for a large set of antlers/horns, or to have the animal mounted by a taxidermist, releasing captive-reared upland game birds to provide hunting opportunities, "varmint" hunting (the shooting of woodchucks, crows, prairie dogs, or other animals not commonly used by humans), and use of bait to hunt black bears.

Data Analysis

IBM SPSS Statistics version 26.0 was used for descriptive and ordinal regression analyses (IBM Corp, 2019). JASP and R software were used to fit the 2 separate factor models in the CFA, Cronbach's alpha for the reliability analysis of each scale and extraction of factor scores to be used in the ordinal regression analysis (Nunnally and Bernstein 1994). I performed multiple imputation to handle missing data values in the dataset before performing 2 separate ordinal regressions (McKnight et al. 2007). Multiple imputation is a process to replace missing data by taking random draws from their distribution; replacements are then used to fill in missing data creating multiple data sets then pooling the results into a final dataset (Lang and Little 2018). The procedure of multiple imputation compared to list-wise deletion enabled my results to be more representative of and generalizable to the intended population.

Confirmatory factor analysis included 17 belief statements about wildlife management and uses of wildlife that would be used to determine the factors that influence the approval of legal hunting and trapping. Confirmatory factor analysis is a hypothesis-driven type of structural equation modeling used to determine the relationships between observed measures or indicators and latent variables of factors (Brown 2015). Several indices generated by R software provided quantitative assessment of how well the hypothesized model fit the observed covariance data. These indices included chi-square, chi-square/degrees of freedom, Goodness of Fit Index (GFI), Normed Fit Index (NFI), Normed Noncentrality Fit Index (CFI), and Root-Mean-Square-

Residual (RMR)[2] (Schreiber et al. 2006). Items for each factor were tested for reliability using composite reliability.

To address the research question, which asked what the factors are influencing the approval of legal hunting and trapping, I fitted an ordinal regression model for each factor for a total of two factors. Outcome variables of the 2 separate ordinal regression models were the approval of legal hunting and legal trapping. The predictors were factor scores of each factor and the 9 demographic variables on the approval of legal hunting and legal trapping. I estimated factor scores by means of regression. Lastly, means were calculated for the responses reported on the statements regarding the level of appropriateness toward specific management actions as a descriptive analysis.

RESULTS

Response Rates

From 10,588 emailed invitations, 4,844 (45.7%) submissions were obtained. There were 1,276 submissions (26.3%) removed due to incomplete responses to key survey items or the entire survey. Identifiable survey responses of 3,568 (33.7%) members, of whom 3,247 (91.0%) self-identified as being a TWS member when asked in the survey. The other 223 (6.3%) responses identified as non-TWS membership and 98 (2.7%) responded to being a former member. Respondents who identified as non- or no longer members of TWS were excluded from the sample. After excluding all non-TWS members, 3,247 (30.7%) usable responses remained. No statistical differences were detected between the last 100 respondents or respondents from the last reminder when compared to earlier respondents. Mean scores for specific statements were calculated between the 3 groups and little statistical difference was detected.

Respondent Characteristics of 2020

The proportion of respondents who identified as male (59.7%) or female (37.7%) closely matched the demographics of the society's membership (C. Kovach, The Wildlife Society, unpublished data). Mean age was 46.9 yrs. (SD= 16.0, range: 19–91 yrs.). Female participants reported a mean age of 39.7 yrs. (SD= 12.9, range: 19–87 yrs.) and male participants had a mean age of 51.5 yrs. (SD= 16.2, range: 19–91 yrs.). Respondents (96.9%) indicated they completed a college degree and 69.4% had earned a graduate degree. The type of organization in which respondents were employed varied, with state agencies (29.2%) the most frequently reported organization type, followed in frequency by institutions of higher education (22.9%). Participants, who reported having been TWS members employed for > 20 years in their professional field comprised 41.3% of respondents. Respondents were almost evenly divided in their current place of residence along a gradient from rural to large urban. Similar results were reported for place of childhood residence. Respondents were well-represented geographically within all 50 states, 6 Canadian provinces, and 15 other countries (Appendix B).

Assessment of Factor Model Fit and Reliability of Factor Scales

Factor 1 encompassed statements that focused on diversity (M= 4.26) and restoration (M= 4.16) of ecosystems (Table 4). In addition to an ecosystem focus, the ethics behind the harvest and management of wildlife included belief statements that wildlife have the same rights as humans and the act of killing wildlife is acceptable or moral. However, participants who strongly disagreed with activities such as hunting (M= 1.50) and trapping (M= 1.90) were more likely to believe those activities dehumanize the people who participate in them. Factor 2 included belief statements toward wildlife needing to be managed to limit adverse effects on other species (M= 4.29) and minimizing conflicts with humans (M= 3.61). Members reported

humans can harvest surplus production of wildlife populations (M= 4.42) and agree with the belief that hunting and trapping of certain species if necessary (M= 4.17).

Confirmatory factor analysis revealed the hypothesized model of basic wildlife beliefs for factor 1 provided a moderate fit to the data as indicated by GFI (0.99) and relative fit indices in the upper 0.80s and 0.90s (NFI= 0.99, CFI= 0.99), an RMR near 0.05 (0.05). The model had a statistically significant chi-square (χ^2 =95.60, df= 12, $P < .001$), but the large sample size (n= 3,247) likely was responsible for the large χ^2 value. Standardized factor loadings, standard errors, and t-values indicated that each item loaded on the factors that were predicted. The reliability score for factor 1 scale was 0.76.

Confirmatory factor analysis similarly demonstrated that the hypothesized model of basic wildlife beliefs for factor 2 provided a moderate fit to the data as indicated by a GFI (0.99) and relative fit indices in the upper 0.80s and 0.90s (NFI= 0.97, CFI= 0.98), and an RMR near 0.05 (0.07). The model had a significant chi-square (χ^2 =158.30, df= 11, $P< .001$), but again the large sample size (n= 3,247) was primarily responsible for the large χ^2 value. The standardized factor loadings, standard errors, and t-values indicated that each item loaded the factor predicted (Table 1). The reliability score for factor 2 scale was 0.77.

Influence of Factors and Demographics on the Approval of Legal Hunting

Results from the ordinal regression supported the relationships between the legal hunting outcome variable and demographic and factor score predictors [Model χ^2 (df= 38) = 1827.17–2022.15; Nagelkerke Pseudo R^2 range from 0.57 to 0.58]. Factor 1 was a statistically significant predictor in model 1 (β = -1.43, $p < .001$). In particular, for every 1 unit increase on the factor 1 score, there was a predicted decrease of 0.24 (CI 95% 0.21 to 0.28) odds of being in a higher

category on the dependent variable (legal hunting approval). The more a respondent indicated care for animals, the less approval they expressed for legal hunting. Factor 2 was a statistically significant predictor in model 1 ($\beta = 0.86$, $p < .001$). Specifically, for every 1 unit increase on the factor 2 score, there was a predicted increase of 2.34 (CI 95% 2.12 to 2.65) odds of being in a higher level of the dependent variable (legal hunting approval). The more a respondent indicated support for utilitarian management, the more approval they expressed for legal hunting.

Education level, type of employment and TWS regions were statistically significant predictors in model 1. Compared with members who earned a professional degree, the odds of respondents having a college education to respond more favorably to legal hunting is 1.92 (CI 95% 1.42 to 2.60) times more likely. For example, an individual with a college degree was more likely to indicate greater approval of hunting than a member having graduate and professional degrees (reference group). Members of TWS working in a higher education institution were 0.51 times (CI 95% 0.35 to 0.73) less likely to be in a higher category on approval of legal hunting (the dependent variable) than members working in non-governmental organizations (reference group). Participants working in an institution of higher education were less likely to approve of legal hunting than those working in a non-governmental organization.

Geographical differences were apparent in certain regions of the US. The odds of the Western Section members to respond more favorably to the legal hunting was 0.49 (CI 95% 0.35 to 0.70) times less likely compared to the Southeast Section (reference group). Participants residing in the Western Section were less likely to express a higher approval of legal hunting than that of participants from the Southeast Section.

Influence of Factors and Demographics on the Approval of Legal Trapping

Results from the ordinal regression supported the relationships between the legal trapping outcome variable and demographic and factor score predictors [Model χ^2 (df= 38) = 1978.62–2207.10; Nagelkerke Pseudo R^2 range from 0.52 to 0.53]. As with the approval of legal hunting, factor 1 was a statistically significant predictor (inverse influence) in model 2 (β= -1.42, $P<$ .001). The more a respondent agreed with statements toward the animal welfare factor, the less they approved of legal trapping. For every unit increase on the factor 1 score, the odds of being in a higher level of approval of legal trapping was 0.24 (CI 95% 0.21 to 0.27) times less likely. Factor 2 beliefs were a statistically significant predictor in the model (β= 0.49, $P < .001$). The more a respondent agreed with statements comprising factor 2**,** the more likely they were to have higher approval of legal trapping. For every unit increase on the factor 2 score, the odds of being in a higher level of legal trapping approval was 1.63 (CI 95% 1.49 to 1.77) times more likely.

Education level, employment status, gender and TWS sections were statistically significant predictors in model 2 to determine approval of legal trapping. Compared with members who earned a professional degree, the odds of respondents having earned no college education responding more favorably to the approval of legal trapping is 2.48 (CI 95% 1.56 to 3.97) times more likely. Members who identified having no college degree were more likely to approve of legal trapping than participants with a professional degree (reference group). A generational difference in attitudes, as well as a difference in attitude depending on source of employment, was detected in terms of respondents expressing approval of trapping. Odds of expressing greater approval of legal trapping was 2.00 (CI 95% 1.38 to 2.89) times more likely for members not currently employed in a natural resource organization compared to retired members (reference group).

As with members' approval of legal hunting, a geographical difference was detected in terms of approval level toward legal trapping. The Southeast Section exhibited the greatest level of approval of trapping compared to participants from the Western, Northeast and Central Mountains and Plains Sections. Compared to the Southeast Section, the odds of participants from the Western Section were 0.57 (CI 95% 0.44 to 0.73) times less likely to have a higher approval level compared to participants located in the southeastern region (reference group).

Appropriateness of Management Activities

The magnitude of difference in how members believed different activities to be appropriate was apparent, ranging from activities such as archery, stocking of native game animals to reestablish a viable population, and use of dogs to hunt upland birds, to more intrusive activities such as use of poison for predator control or use of bait to hunt (Figure 7). Use of traditional archery equipment (M= 4.24) and trapping by trained wildlife agency personnel (M=3.91) were among the activities deemed most appropriate. Activities, including high fence-game ranching (M=2.06), use of bait to hunt deer (M=2.09) and lethal poisoning (M=2.24) were viewed as least appropriate among TWS members.

The valence of attitudes expressed as appropriateness of specific management activities depended on criteria such as the method of take, whether wild animals had fair chase opportunities and the species involved. Activities with the greatest level of appropriateness involved a control of nuisance or nonnative animals. Methods of take that require a high level of skill including archery and trained professionals are found to be more appropriate management activities among members of TWS. Therefore, the method of take is the referent of the attitude appropriateness. Another element participants reported as appropriate is if animals were to be removed, that the type of trap kill them quickly or contain them in a box type structure.

Activities reported as least appropriate involved baiting, lethal poisoning, wildlife behind high fences, or captive in a commercial facility.

Table 4: Results of the Confirmatory Factor Analysis containing 14 statements reflecting beliefs of members of The Wildlife Society, 14 Jan–10 Mar 2020, toward uses of wildlife and wildlife management. Means and SD of each belief statement are displayed based on a scale of 1 ("Strongly disagree") to 5 ("Strongly agree"). Factor loadings, standard error and t-value are displayed for each factor. Reliability analysis of each factor was calculated by Cronbach's alpha. Data were derived from a web-based questionnaire (Qualtrics) sent in 2020 to all known members of The Wildlife Society.

	M	SD	Factor loadings	Std. error	t-value	Composite reliability
Factor 1						0.76
The focus of wildlife management should be on the biodiversity of the entire ecosystem rather than on individual species.	4.26	0.81	0.13	0.017	7.62	
A primary responsibility of managers should be to restore ecosystems that have been damaged.	4.16	0.80	0.18	0.015	12.21	
Killing wildlife for management purposes is seldom acceptable	1.88	0.94	0.58	0.021	27.75	
I believe wild animals have the same rights as humans.	2.38	1.21	0.79	0.021	37.63	
It is morally wrong to kill wildlife for human sport or recreation.	2.13	1.19	0.95	0.020	47.77	
Hunting is a cruel activity that dehumanizes the people who participate in it.	1.50	0.75	0.54	0.020	27.49	
Trapping is a cruel activity that dehumanizes the people who participate in it.	1.90	1.08	0.77	0.022	34.70	

Table 4 (cont'd)

	M	SD	Factor loadings	Std. error	t-value	Composite reliability
Factor 2						0.77
Some wildlife need to be managed to limit their adverse effects on other species and habitats.	4.29	0.70	0.35	0.02	19.91	
The regulated harvest of wild animals by humans is compatible with natural resource conservation.	4.34	0.80	0.57	0.02	28.57	
Humans can harvest surplus production of wildlife populations without harming their long-term population viability if done properly.	4.42	0.85	0.50	0.02	23.21	
Hunting and trapping of certain species are sometimes necessary to prevent other species from becoming endangered.	4.17	0.79	0.41	0.02	19.92	
Wildlife need to be managed to minimize conflicts with humans.	3.61	1.00	0.52	0.02	24.58	
Wildlife are resources to be harvested in a sustainable way and used for human benefit.	3.23	1.22	0.80	0.02	36.10	
Although biodiversity is important, managers should give priority to harvestable species.	2.36	1.07	0.51	0.02	25.12	

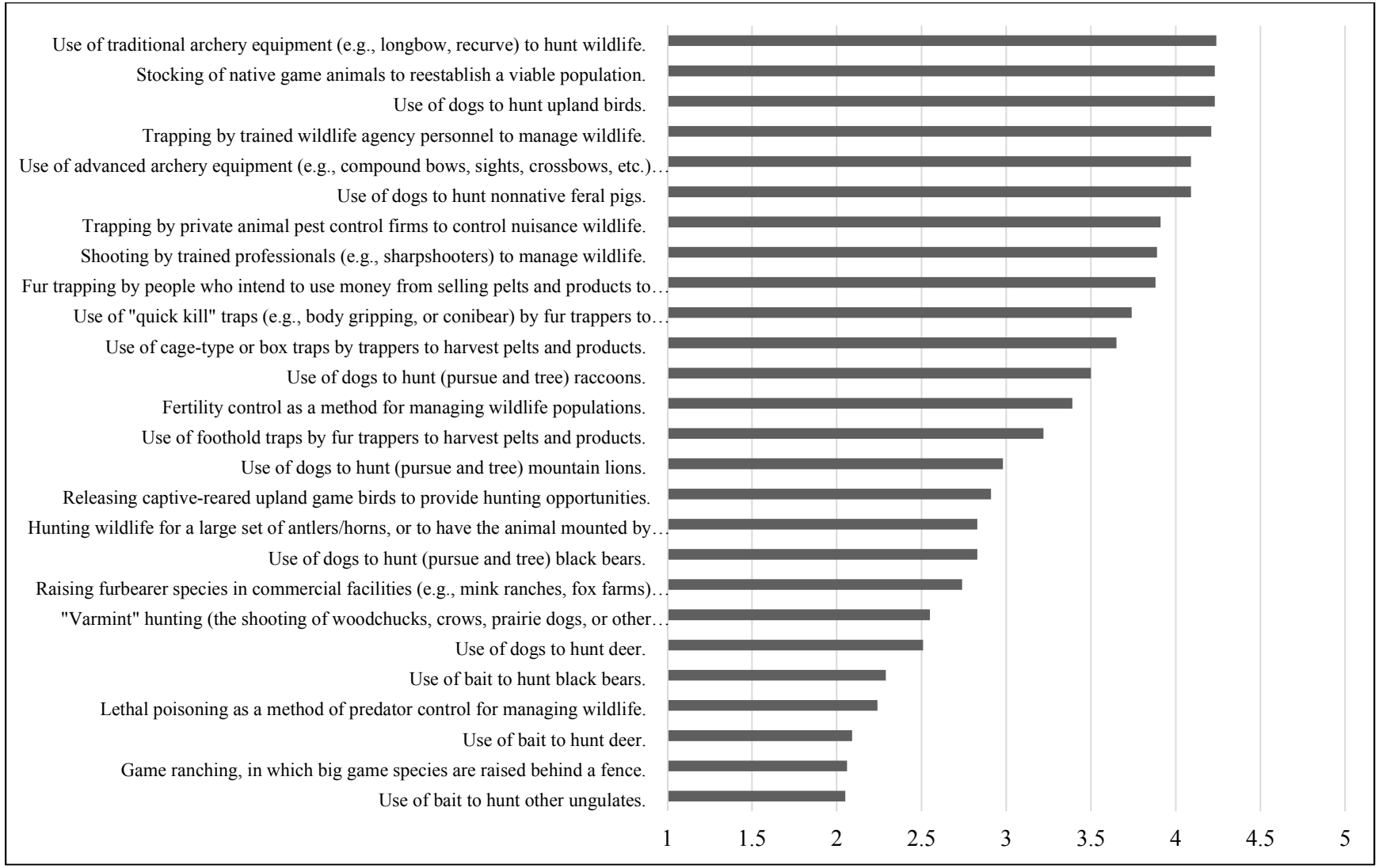


Figure 7: Survey responses on the level of appropriateness of statements toward beliefs of specific wildlife activities. Statements were measured on a scale of 1 (“Extremely inappropriate”) to 5 (“ Extremely appropriate”) by members of The Wildlife Society for surveys conducted in 2020.

DISCUSSION

This study set out to determine factors influencing TWS members' approval of legal hunting and legal trapping, and their stated level of appropriateness for specific wildlife management activities. Results from ordinal regression models failed to reject my hypothesis that participants associated with beliefs expressed as mutualistic wildlife value orientations would express a lower approval of legal hunting and legal trapping. These findings suggest participants with beliefs similar to those found in mutualistic value orientations expressed lower approval for legal hunting and legal trapping. Both models on the approval of legal hunting and trapping were similar to one another in regard to the influence of factors and demographics on the approval of each activity.

Beliefs and attitudes toward wildlife within both factor 1 and factor 2 are consistent with previously reported wildlife value orientations for the public (Manfredo et al. 2009*b*). These findings are also similar in pattern to value orientations occurring in the lay public throughout the US (Manfredo et al. 2018). Wildlife value orientations are important because they are useful in predicting patterns of attitudes and behaviors across a set of wildlife issues and they may influence other cognitions (Fulton et al. 1996). The beliefs held by TWS members in factor 1 are emblematic and consistent with beliefs of mutualistic value orientations (Manfredo et al. 2018). Mutualism has reported being associated with the support of habitat and wildlife protection as well as with decreased support for lethal management of wildlife (Teel and Manfredo 2010, Dietsch et al. 2011). A 2016 study found actions that restrict human interests to promote biodiversity were negatively associated with domination and positively associated with mutualism (Dietsch et al. 2016). Attitudes and beliefs toward wildlife comprising factor 2 indicate wildlife conservation professionals' express beliefs that wildlife need to be managed and

harvested. Factor 2 beliefs and attitudes convey consistencies with those of utilitarian or traditional value orientations toward wildlife and wildlife management (Manfredo et al. 2018).

The terms domination and mutualistic value orientations emerged in 2009 with similar association of beliefs as the wildlife value orientations discussed earlier (Manfredo et al. 2009*b*, Teel and Manfredo 2010). My results failed to reject my hypothesis indicating participants who agreed more with the belief statements in factor 1 that are emblematic with mutualistic value orientations had a lower approval of hunting and trapping. The two factors I found influencing the approval of hunting and trapping by members of TWS are consistent with those two wildlife value orientations that are prominent within the public throughout the US (Manfredo et al. 2018). Geographic representation of TWS members based on the state of residence within my study is consistent with and representative of those of the public.

Models predicting approval by TWS members for both hunting and trapping had similar results to one another in addition to the factors having similar effects on the approval of each activity. Factor 2 had a stronger predictability of approval of both hunting and trapping, which is consistent with beliefs associated with utilitarian and traditional wildlife value orientations. I also found trapping to have a lower approval among TWS members compared to hunting (see Chapter 2). Results from my study indicate there was higher approval for hunting than for trapping, which is consistent with previous studies of professionals and stakeholders (Duda et al. 2010, NSSF 2019). Among wildlife conservation professionals, I believe people are more aware of the benefits that hunting brings to conservation including funding opportunities and the recreational experience. Trapping is an important management tool, as is hunting, but exposure to, awareness, and understanding of the activity may be much less. My findings in 2020 affirm

the same trend that occurred in 1998 among all 4 professional organizations sampled (Muth et al. 1998, 2006).

Respondents are likely more familiar and knowledgeable about hunting than they are for trapping with perceiving hunting to be more humane and have greater connotations related to fair chase (Geist et al. 2001, Nelson and Millenbah 2009, Boone and Crockett 2013). Trapping has been described as controversial and a conflicted topic within both the public and wildlife professionals (Siemer et al. 2013, Manfredo et al. 1999, Muth et al. 2006, Responsive Management 2016). Household dynamics may play an important part in the makeup of an individual's wildlife value orientation (Clark et al. 2017). Patterns of wildlife value orientations of hunting families in Pennsylvania and Colorado reported more support of wildlife use and hunting by males than those of females in the household (Zinn et al. 2002). Results suggested a family's pattern of beliefs toward wildlife are more likely to remain stable if the family is not influenced by education, urbanization, or residential stability. Whether a person comes from a household that has experience with activities such as hunting, and trapping may play a role in how they perceive sustainable uses of wildlife such as hunting and trapping.

Conservation professionals may have different experiences and direct knowledge of activities such as hunting and trapping that give them greater insight into and understanding of all aspects of the activity (White et al. 2015). For example, biologists from the Bureau of Land Management placed importance on moral and humane treatment of animals yet used justifications through their ecologistic and scientific orientations when reducing conflicts between human and moral issues (Peyton and Langenau 1985). Conservation professionals could have a better understanding of hunting as a management tool and how it contributes to the overall goal of conservation of wildlife (Mahoney and Jackson 2013). Understanding the

importance of sustainable uses will help aid conservation professionals by allowing them to make informed decisions and provide adequate information to the public, thus fulfilling their role as trust managers.

My results for the approval of legal hunting and trapping inform the social license of sustainable uses of wildlife by wildlife conservation professionals since social license is dependent on the approval and support of others (Decker et al. 2017). Teel and Manfredo (2010) found an association between wildlife related attitudes, wildlife value orientation, and behaviors which may indicate a shift from traditional views of resources such as wildlife and could result in continued declines in hunting and trapping which may reduce public and professional acceptance of different management actions. The role wildlife conservation professionals fulfill as trust managers has significant consequences in terms of providing opportunities for the public to participate in activities such as hunting and trapping as well as providing educational and training opportunities for professional colleagues. This, in essence, will improve the social license of sustainable uses of wildlife for the future.

Geography played a role in the approval of hunting and trapping among TWS members. Southeast Section members were more likely to have a higher approval of activities such as hunting and especially trapping, which is consistent with attitudes toward lethal removal of wildlife held within that region (Agee and Miller 2009, Manfredo et al. 2018). Southern states tend to have more conservative values, strong republican political party affiliations, and religious agrarian-orientated values (Applebome 1996, Layman and Carmines 1997). For example, legislation proposed in the southeast geographic region calls for a push for legalizing baiting opportunity for deer hunting, which may indicate their strong utilitarian value orientations toward wildlife (Adams and Ross 2013). It may also reflect the greater abundance of deer and

the difficulties experienced hunting in the dense swamps common to the region. Acceptance of different types of hunting and methods of take would be a manifestation of utilitarian value orientations within the Southern states. Decision makers within Southeast state wildlife agencies reported a decline in agency relevancy, wildlife disease, changing landscape and introduction of invasive species were important challenges they faced as agency leadership (Jewell et al. 2020). The challenges wildlife professionals face within Southeastern state agencies may result in tension of traditional agency decision making and changing values of the public. Professional background, life events, and educational focus of natural resource professionals in the southeastern states can help explain the shaping of their values and beliefs (Clark and Moreno 1998).

Educational background and employment type were found to have an influence on the approval of legal hunting and legal trapping. Educational institutions are expanding their curriculum (Muth et al. 2002, Millenbah and Wolter 2009) and wildlife degrees are becoming more specialized with more sub-disciplines to fulfill the growing wildlife and conservation concerns the profession is facing today and for the future (Matter and Steidl 2000, Kroll 2007). Programs involving conservation biology, wildlife ecology, and human dimensions or social sciences are becoming more prominent in the profession along with a concurrent decrease in traditional wildlife management content (Merkle et al. 2019). Sanborn and Schmidt (1995) reported differences among males and females on how TWS members viewed wildlife, wildlife management activities, and funding. Males held more traditional attitudes than females on topics related to wildlife management techniques and issues (Sanborn and Schmidt 1995). Although gender was not a predictor in this chapter, I found younger generations exhibited more mutualistic wildlife value orientations than compared to older generations (Chapter 2).

Participants in older age groups responded with similar belief statements as members in younger generations, while older members agreed more with belief statements supporting utilitarian uses and active management. Membership in TWS is shifting with more females than in the past and the age structure increasing (Urbanek et al. 2018). Shifting age structure, such as the loss of the baby boomer generation, will impact professional conservation organizations because of knowledge and experience losses and new values and beliefs entering the workforce (Chapter 2). Conflicts may occur as personal and professional values collide within an agency (Muth et al. 2002).

In addition to factors influencing approval, I noticed a pattern in the expressed appropriateness of management activities depending on type of species and the humane treatment in the method of take. Members believed activities involving the most amount of opportunity for wildlife to escape, sometimes referred to as fair chase, and management practices sensitive to welfare of wildlife, to be most appropriate management activities. Action severity, species hazard, and wildlife viewing opportunity may be reasons people find some management actions more appropriate than others. Other reasons may reflect differences based on the animal species involved (Zinn et al. 1998). People may view certain species as charismatic, majestic or symbolic (Sponarksi et al. 2015). Acceptability of lethal management actions toward coyotes, mountain lions, wolves and wild ungulates were found more acceptable if they prevent severe consequences to humans, personal property or the natural environment (Manfredo et al. 1998, Fulton et al. 2004, Vaske and Needham 2007, Bruskotter et al. 2009). Acceptability of harvesting or lethally removing wildlife has been found to be more value-based for certain management actions (Whittaker et al. 2006). Determinants influencing stakeholder acceptance were internal, psychological variables such as beliefs and value orientations, behavioral variables

and situational specifics including wildlife species and frequency of encounters (Zinn et al. 2009). An example of contrasting views may be opposing attitudes toward commercial aspects of harvest management (Chitwood et al. 2015). Agency professionals and the public have been supportive of lethal control of wildlife under certain circumstances such as controlling wildlife diseases, survival of species, preservation of habitats, wildlife damage, human safety, population management and food (Koval and Mertig 2004).

My findings suggest that a range of attitudes exists among professionals as well. Reasons found for approval of lethal management of carnivores by the public include threats to human safety, economic interests, or protection of preferred game species (Manfredo et al. 1998, Decker et al. 2006). Approval of lethal removal for protection of game species was positively correlated with a domination value orientation (Teel and Manfredo 2010, Jacobs et al. 2014, Dietsch et al. 2016). People who expressed domination value orientations represented a majority of the variance in acceptability of hunting deer when deer posed threats to humans, such as damage to property and transmission of disease (Jacobs et al. 2014). My data show similar trends in terms of why people think management of wildlife is needed. Similar trends can be found among the public as well (Teel et al. 2005). For example, Teel et al. (2005) found situational context of acceptability, where the acceptability of hunting depended upon the situation. Beliefs of TWS members are also situational in that they are supportive of maintaining wildlife as a natural resource and supportive of sustainable uses so long as those actions benefit conservation goals and healthy wildlife populations.

A study of TWS members in 1994 reported moderate to strong positive utilitarian attitudes toward wildlife, moderate concerns about pain and suffering of individual animals, and moderate to strong beliefs that management should emphasize wildlife populations and habitats

rather than the well-being of individual animals (Brown et al. 1994). Although there were differences among the 4 professional organizations, the patterns were the same in 1998 (Muth et al. 1998). Urbanek et al. (2018) reported results on mean age, gender proportions and professional affiliations consistent with findings from my study affirming demographic shift of TWS members. Decision-making by wildlife conservation professionals may or may not reflect traditional emphases depending on the geographic region they reside in, the educational institution they studied in, and the agency they work for (Sanborn and Schmidt 1995, Schmutz 2002). Organizational culture of agencies impacts attitudes and beliefs of wildlife professionals (Lauber et al. 2009). Ensuring professional societies reflect beliefs of their members is essential in maintaining their membership (Bal and Sharik 2019).

Results of my study will help wildlife agencies anticipate cultural changes forthcoming within their ranks. This can help identify and prioritize in-service training needs. As societal attitudes and beliefs shift, a concurrent, yet somewhat lagged shift will occur within the ranks of wildlife professionals. Current agency leaders cannot assume that new recruits will embrace traditional management paradigms. It is imperative that all professionals, ranging from baby boomers to millennials, understand and appreciate the diversity within our ranks. It is equally important to provide experiential and educational opportunities for young professionals to gain firsthand insights into traditional wildlife harvest methods – not for purposes of indoctrination, but so direct knowledge can be a basis for future decision-making that no doubt will be key to ensuring the future of the wildlife conservation enterprise.

Limitations

My data are exclusively from a portion of TWS members whose total membership exceeds 10,500 members employed at various levels in all types of jobs within diverse

organizations and are distributed widely throughout North America. My respondents geographically represent 50 states and 15 other countries, yet this population likely does not represent the full spectrum of people who consider themselves wildlife conservation professionals.

Implications

Programs such as Trapping Matters, Conservation Leaders for Tomorrow, and others could be helpful for wildlife conservation professionals gaining experience and knowledge on topics for which they are not informed yet are important for their role as wildlife trust managers. Providing wildlife agencies with feedback of what beliefs and factors influence wildlife conservation professionals will better prepare agency personnel to align their values with society. The results from this assessment can provide the missing information agencies are needing to supplement their educational programs for their employees. Educational programming will have better insight into what is missing in the information provided to professionals.

CHAPTER 4:

MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS

This project aimed to identify and understand the change in beliefs, value orientations, and attitudes of wildlife conservation professionals by comparing results of an updated questionnaire in 2020 to a similar questionnaire conducted in 1998 with members of The Wildlife Society (TWS). Results from the 2020 questionnaire revealed factors influencing the approval of legal hunting and legal trapping by members of the professional organization. I used members of TWS as a proxy for practicing wildlife professionals. Inferences about wildlife conservation professionals are based this study of TWS membership.

Potential conflict could arise from between traditional agency culture and stakeholders, creating tension between professionals and the public they serve as wildlife conservation professionals continue leaning toward mutualistic beliefs about wildlife and wildlife management. Results of my research support the idea that value changes in a professional society do not occur rapidly. Beliefs, value orientations, and attitudinal changes within TWS did not change dramatically between the 2 periods measured, but appear consistent with the gradual changes reported for the general public (Manfredo et al. 2009, Manfredo et al. 2018). My findings of the 2 factors influencing legal hunting and trapping approval by members were consistent with beliefs associated with current mutualistic and utilitarian wildlife value orientations occurring within the public.

Little research-based information regarding the attitudes, values, and preferences of conservation professionals has been explored. My findings contribute to understanding what is occurring in practicing professionals in comparison to the public. A few organizations with self-

examination include The Wildlife Society, US Forest Service, US Fish and Wildlife Service, to name a few (Peyton and Langenau 1985, Muth et al. 1998, Brown et al. 1994, Schumtz 2002, Urbanek 2018). Continued evaluation of practicing professionals in the conservation field will help the profession remain relevant to society, understand themselves better, and potentially provide leadership in future conservation issues (Muth et al. 2006).

Members from TWS in my study broadly approved of legal hunting and trapping, but wildlife management directed at hunting of captive wildlife, such as those within high fence facilities was not acceptable by the majority and can be expected to meet resistance among wildlife conservation professionals. Activities perceived to diminish fair chase or humane treatment of wildlife included game ranching, wildlife hunted behind high fences, furbearer species in a commercial facility for eventual sale, and lethal poisoning were reported among the least appropriate the outcome of meeting resistance. For example, states such as Alabama, Florida, Georgia, Mississippi, and Texas allow for high fence hunting opportunities, but overall, members do not find the activity appropriate for wildlife management (S. Demarais, The Wildlife Society, unpublished report). For agencies, staff, and professional societies to maintain support and relevancy of the public, acknowledgment, and understanding of the increased agreement toward the humane treatment of wildlife by practicing professionals is valuable. A consideration moving forward with training and education could be that agencies, administrations, or stakeholders who are aware that hunting programs may not be consistent with value orientations within professionals will be better able to make decisions about personnel management within their agencies.

Regardless of demographics and professional backgrounds, TWS members expressed that the humane treatment of animals is an essential consideration across wildlife management. The

reported mean level of stated appropriateness toward specific management activities indicated the method of management used was more acceptable if it involved practices considered to be described as the fair chase of wildlife. It should be noted, however, the expressed appropriateness of specific management activities, such as shooting or trapping by trained professionals to manage wildlife, is not necessarily the same as the level of support toward the activity. A continued focus on the humane treatment of animals will help sustain the support of professionals as the shift of wildlife value orientations continues from utilitarian to mutualistic.

More respondents in 2020 than 1998 indicated not having an opinion on whether or not foothold or leghold traps should be outlawed. One explanation of why this is could be fewer members enter the profession with experience in hunting or trapping, or their job does not pertain enough to trapping such that they would express an informed opinion. This may be related to their age, geography, and experiences from their upbringing (Muth et al. 2006). Of members who expressed an opinion, they reported high approval toward legal hunting and trapping but approval toward trapping was less. This is consistent with the general public's beliefs about trapping being among the most controversial of wildlife uses and gains less support than other uses of wildlife (White et al. 2015, NSSF 2019). Issues that arise include potential public confusion over trapping that may arise from the lack of consensus by professionals on the topic. Additionally, trust and credibility within agencies could be compromised when practicing professionals have different perspectives on topics such as trapping (Muth et al. 2006). For wildlife conservation professionals, who operate within diverse job types, an understanding of how trapping plays a role in wildlife conservation and research could be an important consideration for continued professional development training.

There are geographical differences apparent among professionals in their state, province or TWS Section of residence, which are reflected in the different positions held and responsibilities in meeting the needs of stakeholders and associated wildlife management activities. This finding warrants further investigation of how training, education, and services provided to TWS membership and other wildlife professionals can be tailored to the needs of personnel within those areas. For example, leadership in wildlife agencies in the Southeastern US has faced challenges associated with the introduction and spreading of invasive species, changing landscapes, and agency relevancy (Jewell et al. 2020). Professionals are working within different management activities and serving diverse stakeholders, so understanding the positions they hold and the duties they are tasked with will be important because different regions are working on specific challenges that are reflected in their populations.

If maintaining support for various wildlife management methods among wildlife professionals is a goal, then providing experiential and educational opportunities for young professionals to gain firsthand insights into traditional wildlife harvest methods seems important. The purpose is not aimed at indoctrination, but rather directed at increased knowledge and understanding that can be a basis for future decision-making. One of the issues revealed by my findings is that diversifying academic programs, fields of expertise, and a decrease in knowledge and experience in traditional wildlife activities will play a role in the changing dynamics within the work culture. For example, younger generations agreed more with beliefs associated with a mutualistic value orientation. More older generations of TWS members agreed with statements of active management and "wildlife are resources to be used for human benefit." My results will help wildlife agencies anticipate likely cultural changes forthcoming within their ranks. When older age members within TWS retire they age out of active participation, as younger

generations enter the workforce. The aging demographics of the membership, consistent with the baby boomer generation moving through the profession, suggests there will be considerable turnover in personnel in the wildlife profession. More mutualistic value orientations will likely dominate traditional or utilitarian values within the professional culture.

Based on the results presented in the previous 2 chapters, the following recommendations are offered to consider developing future action and research by those in agency staff, professional organizations, and educational institutions. Research from this study provides insights into potential areas of training or education to focus on within the profession. If support among wildlife professionals for various uses of wildlife such as trapping and hunting is desirable to sustain, an investment in continual education about their roles in wildlife management is likely to be helpful. In addition to techniques that address concerns about humane treatment, such as Best Management Practices of trapping, further investigation and description into what constitutes fair chase could facilitate deliberation and awareness among professionals. TWS members, especially those in younger age groups, are less supportive of lethal means of management unless the purpose is motivated by acquisition of food; that belief has become more prevalent over time and reflects similar belief orientations as in the general public. It likely will take more than written material and typical channels of communication to affect a measurable change in acceptance or behavior. The importance of extension-type programming suggests continual workshops, supported by evidence from professional research and practice, likely will be most effective in providing knowledge of trapping and the Best Management Practices associated with it. Programs such as Trapping Matters, Conservation Leaders for Tomorrow, and others may be helpful for wildlife conservation professionals gaining

experience and knowledge in the areas of expertise they are not educated in but are important for their role as trust managers in wildlife management.

Limitations

My data are from only a portion of TWS members whose total membership exceeds 10,500 members employed at various levels in all types of jobs within diverse organizations and are distributed widely throughout North America. My respondents geographically represented 50 states and 15 other countries, yet this population likely does not represent the full spectrum of people who consider themselves wildlife conservation professionals. Although the 2020 survey instrument attempted to be as similar to the 1998 instrument as possible, some sampling differences occurred. For instance, the 1998 sampling scheme attempted to attain an equal sex ratio of respondents. My 2020 sample, however, attempted to mirror the current demographics of TWS membership closely. This difference in sampling schemes may have some effect on estimates.

APPENDICES

APPENDIX A

Survey Email Invitation and Reminders

THE WILDLIFE SOCIETY
Leaders in Wildlife Science, Management and Conservation

January 14, 2020

Dear TWS membership,

I need your help to gain meaningful insights into how the beliefs and attitudes of wildlife conservation professionals are changing. Please click on the link below, which leads to a questionnaire titled, "Changing Values: A Survey of Wildlife Conservation Professionals in the 21st Century."

Results from this questionnaire will be compared to data from a similar survey conducted about TWS membership in 1998. Results from that previous survey were published in a Wildlife Society Bulletin article; plans are to do the same with the data collected in this current questionnaire.

In this day and age of robocalls and social media, I know you get surveyed on everything from political views to your favorite flavor of ice cream. Mine is a different type of request – this is not a poll and the data collected will help your professional society better meet the needs of its members and other wildlife conservation professionals. A high response rate is vitally needed to make accurate comparisons.

The questionnaire is being administered by Dr. Shawn Riley at Michigan State University. Shawn has been an active TWS member for nearly 40 years. The questionnaire is anonymous. Your name cannot be associated with your response, and the data will be safeguarded in accordance with the rules and regulations of Michigan State University's Human Research Protection Program.

Anonymous link to questionnaire: https://msu.co1.qualtrics.com/jfe/form/SV_1XKKvM8k7vsd12t

Should you have any questions, please contact Dr. Shawn Riley at rileysh2@msu.edu or his research assistant on the project, Ms. Rachel Menale at menalera@msu.edu.

Thank you very much for completing this questionnaire in a timely manner. Your input is important to The Wildlife Society.

Sincerely,

Gary C. White, President, CWB®
The Wildlife Society

THE WILDLIFE SOCIETY
Leaders in Wildlife Science, Management and Conservation

January 22, 2020

Dear fellow TWS members,

Last week TWS President Gary White asked you to participate in a questionnaire designed to assess change-over-time in beliefs and attitudes of TWS members toward uses of wildlife. Data from this assessment will be compared directly to a 1998 survey, which will among other outcomes provide insights about contemporary values of wildlife conservation professionals.

We received a tremendous initial response to the questionnaire, but that response rate has diminished the past few days. We need your input to gain reliable inferences!

If you have not already done so, please take a little time to complete the questionnaire as soon as you are able. The questionnaire thus far is completed in an average of 23 minutes (n=1,532).

Anonymous link to questionnaire: **https://msu.co1.qualtrics.com/jfe/form/SV_1XKKvM8k7vsd12t**

Thank you, if you already pitched in and responded–your participation in improving the society is appreciated.

With all the possible combinations of servers, software and hardware configurations out there, we experienced a few technical hiccups related to compatibility with Qualtrics. Most those issues are resolved. The one issue we haven't resolved is that federal employee, who attempt the questionnaire from their official workstations, frequently get an error message. Those who try from their personal computers seem not to have an issue.

Your response is important wherever you live and whatever your current employment status, whether you work with game, non-game, populations, habitat, humans or any other aspect of wildlife conservation. The questionnaire is focused on uses of wildlife – utilitarian for the most part – to closely compare with the 1998 data. Nonetheless, results will enable better alignment of TWS programming and services for members. An increased number of responses will increase accuracy of the results. **To maintain anonymity, we are surveying everyone with an anonymous link.**

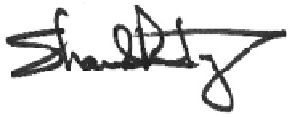
Anonymous link to questionnaire: **https://msu.co1.qualtrics.com/jfe/form/SV_1XKKvM8k7vsd12t**

The software will not, however, allow an individual to take the questionnaire more than once. **Your name cannot be associated with your response, and the data will be safeguarded in accordance with the rules and regulations of Michigan State University's Human Research Protection Program.**

Should you have any questions, please contact me at rileysh2@msu.edu or my research assistant, Rachel Menale at menalera@msu.edu.

Thank you for completing this questionnaire in a timely manner. Your input enables continual improvement of The Wildlife Society and other wildlife conservation professionals.

Sincerely,



Shawn J Riley, Parish Storrs Lovejoy Professor of Wildlife Management
Department of Fisheries and Wildlife
Michigan State University
East Lansing, MI, 48864 USA

THE WILDLIFE SOCIETY
Leaders in Wildlife Science, Management and Conservation

February 4, 2020

Greetings,

A few weeks ago, I asked that you participate in a survey of TWS membership on changing values toward uses of wildlife. Results from this current questionnaire will be compared to date from a nearly identical questionnaire from 1998 and be used to help guide professional programming aligned with the needs of members. While this is going on with TWS, the same questionnaire is being completed by members of the North American Wildlife Enforcement Officers Association, who also participated back in 1998.

If you have completed the questionnaire, as nearly 3,000 TWS members have done, thank you. If you have not completed the questionnaire, please take a little time now to do so. The greater the response rate, the stronger the inferences.

Anonymous link to questionnaire:
https://msu.co1.qualtrics.com/jfe/form/SV_1XKKvM8k7vsd12t

The questionnaire only takes about 20 minutes to complete. Your response cannot be tied to your identity in any way. The study is being facilitated by Dr. Shawn Riley at Michigan State; all investigators involved are all serving TWS members including Past President John Organ, who was instrumental in the 1998 effort.

Thank you,

Gary C White

Gary C. White, President, CWB®
The Wildlife Society

THE WILDLIFE SOCIETY
Leaders in Wildlife Science, Management and Conservation

February 18, 2020

I'm not the sort of person who likes to hound people, but inclusion is important to creating meaningful decisions. And, when it comes to wildlife management, I take that charge seriously. We've heard from only about one-third of TWS members. Thank you if you have already completed the survey! If you have not already done so, please take just a bit of time (average is 21 minutes) to complete the simple online questionnaire.

Link to questionnaire: https://msu.co1.qualtrics.com/jfe/form/SV_1XKKvM8k7vsd12t

Data from this questionnaire will be compared to 1998 survey results to assess how beliefs about uses of wildlife are changing among wildlife professionals. The data will help guide education and communication for professional development and provide Council a better sense of its constituents. I don't have to tell you how important sample size is when making such comparisons – your response is needed for accurate inferences. This survey is sponsored by The Association of Fish and Wildlife Agencies in cooperation with The Wildlife Society and the North American Wildlife Enforcement Officers Association.

Please do not pass this link along to anyone else. We made it anonymous to assure your response cannot be associated in any way with your identify. The survey is voluntary and there are no risks associated with your participation. Be assured any data you provide will be safeguarded in accordance with the rules and regulations of Michigan State University's Human Research Protection Program.

Do not hesitate to contact me if you have any questions or concerns:

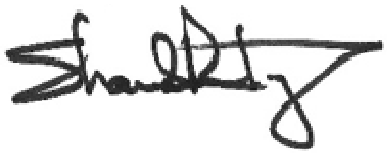
Shawn Riley: rileysh2@msu.edu

Or my research assistant:

Rachel Menale: menalera@msu.edu

Your input is needed for valid conclusions and recommendations. Thank you for your participation!

Sincerely,



Shawn J. Riley, Professor of Wildlife Management
Michigan State University

APPENDIX B

Survey Instrument, Consent Form and Percent Responses

Changing Values: A Survey of Wildlife Conservation Professionals in the 21st Century

Consent Form

Changing Values: A Survey of Wildlife Conservation Professionals in the 21st Century

Purpose of the study: Understand the beliefs and attitudes of wildlife conservation professionals towards uses of wildlife and the implications of these attributes for future conservation, education, communication, and programming by state wildlife agencies.

Principal Researchers:
Dr. Shawn Riley- Professor of Wildlife Management, Michigan State University
Rachel Menale – Graduate Research Assistant, Michigan State University

Background You are being asked to participate in a research study of how wildlife conservation professionals view various uses of wildlife. You will need to complete an online survey. You must be at least 18 years old to participate in this research.

Risks and benefits There are no foreseeable risks to participating in this study. You will not receive compensation for participating. We will provide a final report from this survey upon request. All data will be reported only in the aggregate – no individual identifiers of any kind will be reported.

Your participation is completely voluntary and confidential Participation in this research project is completely voluntary. You have the right to say, "no thank you" and not participate. You may change your mind at any time and withdraw. You also may choose not to answer specific questions or to stop participating at any time. Only researchers associated with this project and MSU's Human Research Protection Program may have access to information you provide. The responses to this survey will be confidential and no identifying information will be linked to your survey responses after you complete the survey.

Contact information for questions or concerns If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researcher (Rachel Menale: menalera@msu.edu) If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-

432-4503, or e-mail irb@msu.edu or regular mail at 4000 Collins Rd, Suite 136, Lansing, MI 48910.

Consent

By clicking on the button below, you indicate your voluntary agreement to participate in this online survey.

- I consent
- I do not consent

This questionnaire includes questions about hunting and trapping throughout. You should assume that what is meant by this is legal, regulated hunting and trapping authorized in accordance to the rules and regulations appropriate to the states in where they occur. Your response will be kept confidential to greatest extent possible.

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Thank you for your time – your participation is greatly appreciated and will help provide insights into conservation programming.

I. Sources of Information

1. The sources of information that wildlife conservation professionals use to inform themselves about wildlife issues are important for a variety of reasons. When you think about all the wildlife issues of interest and importance to you, (e.g., technical biology, management, social values, resource conflicts, etc.), please tell us how important each source is in providing you with information.

EI= Extremely Important, MI= Moderately Important, SI= Somewhat Important, SI= Slightly Important, NI= Not at all important

	n	EI	MI	SI	SI	NI
Newspaper/ News magazines	3,204	7.0%	21.3%	28.5%	30.9%	11.0%
Sporting magazines	3,190	1.5%	7.8%	18.0%	29.9%	41.0%
On-line resources (e.g., social media, blogs, internet, etc.)	3,209	18.0%	24.3%	23.3%	24.8%	8.5%
Radio	3,196	2.8%	12.3%	20.9%	32.3%	30.2%
Television	3,194	3.3%	11.7%	20.8%	32.7%	29.9%
Movies	3,182	1.4%	4.3%	7.0%	23.0%	61.7%
Conservation Organizations (e.g., DU, NWTF, RMEF, NTA, QDMA, etc.)	3,223	33.4%	39.2%	18.2%	6.8%	1.6%
Professional Associations (e.g., The Wildlife Society, Society for Conservation Biology, etc.)	3,235	74.9%	19.6%	3.8%	1.1%	0.2%
Environmental Organizations (e.g., National Audubon Society, Sierra Club, etc.)	3,229	27.5%	39.8%	20.2%	9.6%	2.2%
Animal Protection Organizations (e.g., PETA, HSUS, etc.)	3,214	2.6%	5.7%	13.0%	32.4%	45.4%
Internet, listservers, web browsing	3,213	16.4%	27.5%	28.1%	20.2%	6.8%
Friends and relatives or acquaintances	3,210	3.8%	13.2%	29.0%	38.9%	13.9%
Professional colleagues and peers	3,231	66.0%	26.6%	5.8%	1.0%	0.2%
Personal experiences in the field	3,235	71.9%	21.9%	4.8%	0.9%	0.2%
College classes	3,205	33.6%	35.8%	16.5%	7.2%	5.6%
Professional workshops and short courses	3,217	46.4%	32.9%	11.6%	5.2%	3.0%
Wildlife extension programs	3,180	24.5%	31.0%	19.7%	12.8%	10.0%
Professional meetings and conferences	3,210	59.5%	26.9%	8.8%	2.8%	1.0%
Scientific journals (e.g., Journal of Wildlife Management, Conservation Biology, Human Dimensions of Wildlife, etc.)	3,229	75.9%	17.0%	4.7%	1.4%	0.5%

II. Outdoor activity

2. The following questions are intended to assess the regularity with which you participate in various activities. Within the last five years, how frequently have you participated in the following activities? **(0– Not at all, 1– Less than 5 times, 2– 5-20 times, 3– More than 20 times)**

	n	Not at all	Less than 5 times	5-20 times	More than 20 times
a. Bird watching	2,566	3.0%	9.0%	18.1%	48.9%
b. Other wildlife viewing	2,566	0.7%	3.8%	14.7%	59.8%
c. Wildlife photography	2,559	11.3%	16.2%	23.5%	27.8%
d. Citizen science and/or other volunteer conservation activities	2,558	11.9%	22.7%	24.2%	20.0%
e. Gather wild edibles or foraging	2,555	25.7%	22.2%	18.8%	11.9%
f. Canoeing or boating	2,557	9.0%	18.9%	24.8%	26.1%
g. Sportfishing	2,556	21.7%	14.6%	18.1%	24.4%
h. Commercial fishing	2,548	70.5%	6.5%	1.0%	0.5%
i. Big game hunting	2,556	35.0%	10.2%	10.6%	22.9%
j. Upland bird hunting	2,552	39.6%	13.4%	11.4%	14.2%
k. Waterfowl hunting	2,554	49.8%	10.8%	7.8%	10.3%
l. Other small game hunting	2,550	46.4%	13.7%	9.9%	8.5%
m. Regulated fur trapping	2,545	65.7%	7.0%	2.4%	3.3%
n. Target shooting	2,554	25.3%	18.6%	18.6%	16.2%
o. Geo-caching	2,548	62.7%	12.0%	2.4%	1.3%
p. Camping	2,561	9.6%	17.0%	21.6%	30.6%
q. Hiking	2,569	1.8%	5.2%	14.6%	57.5%
r. Mountain biking or trail riding	2,546	44.5%	14.1%	8.3%	11.3%
s. Other	361	1.2%	0.9%	1.5%	7.5%

III. Views about Management

To better serve you through educational and communication programs, it is important for us to understand your views on wildlife management and the use of wildlife.

3. For each of the following statements, please click the answer from the drop-down list that most closely represents the extent to which you approve or disapprove with each statement.

SA= Strongly Agree, A= Agree, N= Neither, D= Disagree, SD= Strongly Disagree, DK= Don't know

	n	SA	A	N	D	SD	DK
Legal hunting	3,246	72.6%	20.8%	3.6%	1.7%	1.2%	0.2%
Legal Trapping	3,245	44.2%	27.5%	10.8%	9.7%	6.9%	0.9%
Other people legally hunting, regardless of your opinion on hunting	3,243	72.3%	22.7%	2.7%	1.3%	0.6%	0.3%
Other people legally trapping, regardless of your opinion on trapping.	3,241	49.4%	26.5%	9.2%	8.2%	5.5%	1.0%

4. The following questions are intended to ascertain beliefs about management held by wildlife conservation professionals. To what extent do you agree or disagree with the following questions? Remember, your responses are confidential and will only be reported in the aggregate with other wildlife conservation professionals across North America. please click the answer from the drop-down list that most closely represents the extent to which you agree or disagree with each statement.

SA= Strongly Agree, A= Agree, N= Neither, D= Disagree, SD= Strongly Disagree, DK= Don't know

	n	SA	A	N	D	SD	DK
a. Wildlife species have value in and of themselves above and beyond use by humans.	3,245	89.2%	9.4%	0.8%	0.3%	0.2%	0.1%
b. The focus of wildlife management should be on the biodiversity of the entire ecosystem rather than on individual species.	3,244	44.8%	40.1%	10.6%	3.8%	0.2%	0.4%
c. A primary responsibility of managers should be to restore ecosystems that have been damaged.	3,246	36.0%	48.0%	11.4%	4.0%	0.3%	0.3%
d. Although biodiversity is important, managers should give priority to harvestable species.	3,244	3.0%	13.9%	21.7%	38.5%	22.3%	0.6%
e. Humans can harvest surplus production of wildlife populations without harming their long-term population viability if done properly.	3,238	57.6%	32.1%	4.1%	3.5%	1.5%	0.9%
f. Wildlife should not be managed because management often leave wildlife in a worse condition.	3,240	0.6%	0.9%	5.8%	34.3%	57.5%	0.7%
g. Wildlife are resources to be harvested in a sustainable way and used for human benefit.	3,239	15.4%	30.8%	25.0%	17.5%	10.7%	0.2%

	n	SA	A	N	D	SD	DK
h. The regulated harvest of wild animals by humans is compatible with natural resource conservation.	3,244	48.1%	41.6%	5.9%	2.3%	1.3%	0.7%
i. Killing wildlife for management purposes is seldom acceptable.	3,243	1.9%	6.4%	8.1%	44.4%	38.5%	0.6%
j. It is preferable that wildlife die a natural death.	3,236	3.7%	15.1%	46.1%	21.5%	11.5%	1.8%
k. Wildlife need to be managed to minimize conflicts with humans.	3,239	15.2%	48.8%	18.8%	13.1%	3.1%	0.8%
l. Some wildlife needs to be managed to limit their adverse effects on other species and habitats.	3,244	39.1%	53.5%	4.4%	1.9%	0.7%	0.4%
m. Hunting and trapping of certain species are sometimes necessary to prevent other species from becoming endangered.	3,244	34.3%	52.2%	7.8%	3.2%	1.0%	1.4%
n. The current public user-pay model of funding will continue to support wildlife conservation in the future.	3,239	5.7%	20.8%	9.4%	34.7%	18.0%	11.1%

5. There are ethical issues to consider with all wildlife management activities. To what extent do you agree or disagree with the following statements?

SA= Strongly Agree, A= Agree, N= Neither, D= Disagree, SD= Strongly Disagree, DK= Don't know

	n	SA	A	N	D	SD	DK
a. I believe wild animals have the same rights as humans.	3,245	6.5%	13.9%	16.6%	35.1%	26.5%	1.3%
b. It is morally wrong to kill wildlife for human sport or recreation.	3,242	5.9%	10.8%	10.2%	35.9%	36.3%	0.7%
c. Hunting is a cruel activity that dehumanizes the people who participate in it.	3,244	1.2%	1.4%	4.6%	31.5%	61.1%	0.2%
d. Trapping is a cruel activity that dehumanizes the people who participate in it.	3,245	3.5%	7.3%	10.1%	32.6%	45.2%	1.2%
e. Minimizing the pain and suffering of individual animals should be important criteria in wildlife management.	3,244	42.7%	41.1%	9.0%	4.5%	2.1%	0.5%
f. Hunting on property where wildlife are confined by high fences is unethical.	3,244	34.4%	33.7%	20.2%	7.7%	1.7%	2.2%

6. Harvest of wildlife is more ethically acceptable to me the more:

SA= Strongly Agree, A= Agree, N= Neither, D= Disagree, SD= Strongly Disagree, DK= Don't know

	n	SA	A	N	D	SD	DK
a. it reduces the period of time that a harvested animal may potentially suffer.	3,207	45.9%	43.9%	7.%3	1.2%	0.4%	
b. it involves fair chase and sportsmanship.	3,229	60.1%	31.6%	4.5%	1.9%	1.3%	
c. it utilizes the harvested animal.	3,241	76.6%	21.1%	1.4%	0.5%	0.2%	
d. it benefits the long-term health and viability of the species being harvested.	3,233	65.9%	28.6%	3.9%	0.7%	0.3%	
e. it reduces nonagricultural land damage.	3,212	27.7%	47.6%	16.3%	6.2%	1.2%	
f. it reduces agricultural damage.	3,226	17.1%	47.5%	21.3%	11.3%	2.2%	
g. it reduces potential animal damage conflicts.	3,202	18.8%	53.4%	16.3%	8.4%	1.7%	
h. it reduces risk to human health and safety problems.	3,224	26.5%	52.7%	13.1%	5.8%	1.2%	

7. Opportunities to participate in regulated hunting should be maintained because:

SA= Strongly Agree, A= Agree, N= Neither, D= Disagree, SD= Strongly Disagree, DK= Don't know

	n	SA	A	N	D	SD	DK
a. Hunting creates revenue to sustain the current user-pay model for state wildlife conservation.	3,213	39.5%	43.8%	8.3%	5.4%	2.0%	
b. Hunting provides participants with opportunities for spiritual growth.	3,094	25.1%	37.0%	20.6%	8.0%	4.5%	
c. Hunting provides recreational opportunity.	3,235	32.2%	47.1	10.7%	6.2%	3.5%	
d. Hunting provides participants with opportunities for personal ethical development.	3,151	29.2%	42.4%	15.7%	6.8%	3.0%	
e. Hunting is an important way of life for some people.	3,237	52.2%	39.9%	4.8%	1.7%	1.0%	
f. Hunting provides wild-harvested food.	3,239	61.2%	34.4%	2.6%	0.8%	0.7%	
g. Hunting manages wildlife populations to protect property.	3,210	20.4%	46.0%	19.0%	11.0%	2.5%	
h. Hunting provides an opportunity to obtain a trophy.	3,235	3.7%	15.6%	25.5%	21.3%	33.5%	

8. Opportunities to participate in regulated trapping should be maintained because:

SA= Strongly Agree, A= Agree, N= Neither, D= Disagree, SD= Strongly Disagree, DK= Don't know

	n	SA	A	N	D	SD	DK
a. Trapping creates revenue to sustain the current user-pay model for state wildlife conservation.	3,233	22.0%	38.3%	14.8%	12.6%	7.7%	4.2%
b. Trapping provides participants with opportunities for spiritual growth.	3,234	14.2%	28.2%	25.5%	13.0%	10.9%	7.8%
c. Trapping it provides recreational opportunity.	3,232	19.9%	43.1%	13.3%	10.9%	10.7%	1.7%
d. Trapping provides participants with opportunities for personal ethical development.	3,234	18.1%	33.9%	19.9%	11.4%	10.3%	6.0%
e. Trapping is an important way of life for some people.	3,234	36.6%	44.1%	7.8%	4.5%	4.4%	2.2%
f. Trapping provides wild-harvested food.	3,228	19.7%	35.7%	17.1%	16.9%	7.1%	3.0%
g. Trapping manages wildlife populations to protect property.	3,234	21.4%	43.0%	14.7%	11.4%	6.8%	2.2%
h. Trapping provides an opportunity to obtain a trophy.	3,230	2.7%	10.6%	21.8%	23.4%	38.6%	2.4%

IV. Management activities

The following questions are intended to clarify the extent to which you believe that the following specific management activities and uses are appropriate or inappropriate in contemporary North America. In responding to each statement, assume that the activity is taking place in a legal, regulated, and sustainable way.

For each statement, please select the answer that most closely represents your personal views.

9. Management Activities

EA= Extremely Appropriate, A= Appropriate, N= Neither, IA= Inappropriate, EI= Extremely Inappropriate, DK= Don't Know

	n	EA	A	NA	I	EI	DK
a. Fertility control as a method for managing wildlife populations.	3,241	12.1%	46.5%	13.3%	16.8%	7.9%	3.2%
b. Stocking of native game animals to reestablish a viable population.	3,242	34.9%	55.3%	5.9%	2.5%	0.4%	0.8%
c. Shooting by trained professionals (e.g., sharpshooters) to manage wildlife.	3,240	20.4%	58.2%	11.5%	6.7%	2.0%	0.9%
d. Lethal poisoning as a method of predator control for managing wildlife.	3,240	2.2%	16.3%	15.2%	33.0%	31.0%	2.1%
e. Use of traditional archery equipment (e.g., longbow, recurve) to hunt wildlife.	3,238	40.3%	48.0%	5.8%	2.8%	1.7%	1.1%
f. Use of advanced archery equipment (e.g., compound bows, sights, crossbows, etc.) to hunt wildlife.	3,241	32.0%	51.3%	8.5%	4.7%	1.8%	1.6%

	n	EA	A	NA	I	EI	DK
g. Use of dogs to hunt upland birds.	3,239	43.6%	41.9%	5.8%	4.1%	2.3%	1.9%
h. Use of dogs to hunt (pursue and tree) raccoons.	3,238	21.8%	34.6%	15.3%	16.2%	7.1%	4.6%
i. Use of dogs to hunt deer.	3,238	4.5%	17.6%	17.9%	36.0%	18.4%	5.4%
j. Use of dogs to hunt nonnative feral pigs.	3,237	39.9%	39.1%	7.6%	6.4%	3.5%	3.2%
k. Use of dogs to hunt (pursue and tree) mountain lions.	3,238	12.1%	29.6%	14.5%	21.8%	16.8%	4.8%
l. Use of dogs to hunt (pursue and tree) black bears.	3,241	10.3%	25.3%	15.5%	25.9%	17.9%	5.0%
m. Use of bait to hunt deer.	3,240	2.2%	11.7%	12.8%	38.4%	33.8%	0.9%
n. Use of bait to hunt other ungulates.	3,238	1.7%	9.6%	13.6%	39.4%	33.3%	2.2%
o. Use of bait to hunt black bears.	3,236	3.3%	17.6%	13.7%	32.2%	30.6%	2.2%
p. Releasing captive-reared upland game birds to provide hunting opportunities.	3,238	4.6%	30.2%	25.4%	26.7%	10.6%	2.2%
q. "Varmint" hunting (the shooting of woodchucks, crows, prairie dogs, or other animals not commonly used by humans).	3,237	4.6%	21.2%	20.1%	29.7%	22.2%	2.0%
r. Raising furbearer species in commercial facilities (e.g., mink ranches, fox farms) for eventual sale of the pelts on the commercial fur market.	3,239	3.9%	27.1%	22.9%	22.4%	18.7%	4.7%
s. Hunting wildlife for a large set of antlers/horns, or to have the animal mounted by a taxidermist.	3,237	5.9%	27.7%	26.0%	22.7%	16.6%	0.7%

	n	EA	A	NA	I	EI	DK
t. Game ranching, in which big game species are raised behind a fence.	3,239	1.0%	9.7%	18.4%	34.1%	34.6%	1.9%
u. Trapping by trained wildlife agency personnel to manage wildlife.	3,235	37.6%	50.5%	6.5%	2.2%	2.0%	0.8%
v. Trapping by private animal pest control firms to control nuisance wildlife.	3,237	23.4%	54.1%	12.3%	5.6%	2.8%	1.6%
w. Fur trapping by people who intend to use money from selling pelts and products to support their family.	3,238	29.8%	44.1%	11.7%	6.8%	5.5%	1.8%
x. Use of foothold traps by fur trappers to harvest pelts and products.	3,236	18.3%	31.6%	12.2%	18.4%	14.6%	4.6%

V. Trapping

In this section, we are interested in your view about trapping as a wildlife harvest activity. Please select the answer that best represents your view.

10. Use of foothold traps to trap species classified as a furbearer should be outlawed. (Select one)

	n	Strongly agree	Strongly disagree	No opinion
TWS	3,232	33.0%	45.0%	21.6%

a. Please tell us why you think the use of foothold traps to trap furbearers should be outlawed. (Select all that apply)

	TWS *n*= 1,071
Trapping is unethical.	29.8%
Trapping is not a necessary management tool.	27.2%
Trapping is unsporting.	29.2%
Trapping inflicts unnecessary pain/stress on furbearers that are trapped.	85.3%
Trapping is in conflict with public values	27.4%
Trapping is inappropriate for humans to derive pleasure from.	34.7%
Trapping is a wasteful use of wildlife.	23.2%
Trapping poses the possibility of harming or killing non-target species.	84.6%
Other	10.5%

b. Please tell us why you think the use of foothold traps to trap furbearers should not be outlawed. (Select all that apply)

	TWS *n*= 1,460
Trapping is ethical.	71.2%
Trapping is an important tool for managing furbearer populations.	84.0%
Trapping is an efficient method to harvest furbearers.	83.0%
Trapping does not adversely affect furbearer populations.	61.6%
Trapping can be an important part of some people's lifestyle.	76.6%
Trapping provides important benefits and satisfactions to participating trappers.	66.4%
Trapping is not a wasteful use of wildlife.	66.6%
Trapping allows the possibility of releasing non-target species.	74.5%
Other	11.0%

C. Please tell us why you do not have a formulated opinion?

	TWS *n*= 673
I don't know enough about the topic.	75.5%
I have an opinion, but I don't care to express it.	44.6%

Best Management Practices of Trapping

We are interested in your level of familiarity and view of best management practices of trapping. Please check the space that best represents your familiarity and view.

11. How much would you say you know about trapping best management practices?

	n	EF	MF	VF	NF
TWS	3,233	15.7%	43.7%	31.1%	9.0%

12. Overall, do you support or oppose best management practices?

	n	SS	S	N	MO	SO	DK
TWS	2,813	50.5%	27.7%	6.7%	1.1%	0.5%	

a. What are the main reasons you support best management practices?

	TWS *n*= 2,541
Humane/ ethical/ animal welfare	85.0%
Good for future of trapping/ preserve the heritage	56.0%
Provide guideline for proper use of traps	84.0%
Good for non-target animals	70.0%
Provide good research/ scientific analysis	67.0%
Better traps/ equipment	61.0%
Other	3.4%
Don't know	0.8%

b. What are the main reasons you oppose best management practices?

	TWS *n*= 53
Too much regulation / too universalized	4.0%
Regulations come from uninformed people	19.0%
Too much politics	32.0%
They will be used to stop or hinder trapping in the long run	0.0%
Disagree with testing methods	28.0%
They are unnecessary	15.0%
Other	57.0%
Don't know	9.0%

VI. Demographics

In the final section of the questionnaire provides an opportunity to share a little about your background, education, and training.

13. What is your highest level of education completed? (Select one)

	TWS *n*= 3,244
Graduate of technical/ trade school beyond high school	0.7%
Completed some college courses but did not graduate	1.8%
Two-year community college degree (Associate's degree)	0.6%
College/University degree (Bachelor's degree)	27.5%
Master's degree	42.6%
Professional school degree (e.g., Law, Veterinary Medicine)	1.2%
Doctorate (Ph.D. or equivalent)	25.6%

14. In what academic or professional fields did you earn your college level degree? (e.g., wildlife biology, law, fisheries science, zoology, political science, public administration, other, etc.)

Technical/trade degree
Associate (2 yr.)
Bachelors
Masters
Doctorate
Professional Degree

15. Are you currently a student?

	TWS *n*= 3,235
Yes	14.0%
No	85.6%

16. Please check any of the following professional development programs you have attended:

	TWS *n*= 544
Conservation Leaders for Tomorrow Program (CLfT)	32.0%
Trapping Matters	37.3%
National Conservation Leadership Institute (NCLI)	13.6%
Other- text box 1	63.2%
Other- text box 2	18.4%

17. Which of the following best describes you currently?

	TWS *n*= 3,234
Currently employed in a natural resource organization	64.9%
Currently employed not in a natural resource organization	8.2%
Previously employed in the natural resource field	9.2%
Never employed in the natural resource field	3.7%
Retired	14.0%

18. How long have you been or were you employed in your professional field? (Select one)

	TWS *n*= 3,212
Less than 5 years	21.1%
5–10 years	17.9%
11–20 years	19.7%
More than 20 years	41.3%

19. With what kind of organization are you employed?

	TWS *n*= 3,139
Federal agency	19.9%
State agency	29.2%
Local government agency	3.4%
Private sector corporation or business	14.2%
Institution of higher education (college, university, etc.)	22.9%
Non-profit/ non-governmental organization (NGO)	10.3%

20. What are the primary responsibilities of your job(s)? (Select all that apply)

	TWS *n*= 3,130
Non-Game Species Management (including Rare/Endangered)	40.2%
Biodiversity/ Landscape Biology	34.5%
Administration (personnel, budget, etc.)	23.3%
Planning/ Regulations/ Permitting	26.6%
Clerical/ Support Staff	1.4%
Game Species Management	32.0%
Education/ Teaching	24.8%
Real Estate/ Land Appraisal/ Land Acquisition	3.8%
Political Activity/Activism	2.8%
Land Management	33.4%
Policy Formulation	10.5%
Public Information/ Outreach Activities/ Interpretation	19.7%
Law Enforcement	3.4%
Research	53.1%
Monitoring	42.6%
Other	11.0%

21. With which of the following organizations, societies or associations are you affiliated? (Yes, No, I was formerly but no longer)

	n	Yes	No	I was formerly, but am no longer
An environmental/conservation organization (e.g., TNC, Ducks Unlimited, Rocky Mountain Elk Foundation, Sierra Club, National Wildlife Federation, etc.)	3,127	56.8%	20.4%	20.0%
An animal rights/ animal protection organization (e.g., PETA, Humane Society, Fund for Animals, etc.)	3,057	3.1%	88.4%	2.7%
A sportsman's organization (hunting/fishing/trapping organization, rod & gun club, etc.)	3,078	26.3%	57.0%	11.5%
Association of Fish and Wildlife Agencies	2,942	12.7%	72.8%	5.1%
Society for Conservation Biology	2,929	9.6%	65.9%	14.7%
Ecological Society of America	2,912	10.4%	69.7%	9.6%
Society for Range Conservation	2,756	2.3%	77.9%	4.6%

22. How would you describe the place where you currently live? (Select one)

	TWS *n*= 3,237
Rural Area (less than 2,500 people)	21.2%
Town (2,500 and 10,000 people)	17.8%
Small City (10,001 and 50,000 people)	23.1%
Medium City (50,001 and 250,000 people)	22.0%
Large City (more than 250,000 people)	15.8%

23. How would you describe the area where you lived most of your childhood? (Select one)

	TWS *n*= 3,231
Rural Area (less than 2,500 people)	26.5%
Town (2,500 and 10,000 people)	20.1%
Small City (10,001 and 50,000 people)	19.9%
Medium City (50,001 and 250,000 people)	18.1%
Large City (more than 250,000 people)	15.4%

24. In which state do you currently reside?

	TWS	
	n= 3,203	%
Alabama	34	1.0
Alaska	89	2.7
Arizona	70	2.2
Arkansas	53	1.6
California	253	7.8
Colorado	145	4.5
Connecticut	10	0.3
Delaware	11	0.3
District of Columbia	8	0.2
Florida	86	2.6
Georgia	58	1.8
Hawaii	11	0.3
Idaho	94	2.9
Illinois	50	1.5
Indiana	36	1.1
Iowa	29	0.9
Kansas	40	1.2
Kentucky	33	1.0
Louisiana	27	0.8
Maine	40	1.2
Maryland	40	1.2
Massachusetts	31	1.0
Michigan	73	2.2
Minnesota	75	2.3
Mississippi	47	1.4
Missouri	51	1.6
Montana	110	3.4
Nebraska	46	1.4
Nevada	48	1.5
New Hampshire	21	0.6
New Jersey	25	0.8
New Mexico	49	1.5
New York	90	2.8
North Carolina	67	2.1
North Dakota	40	1.2

Ohio	44	1.4
Oklahoma	25	0.8
Oregon	108	3.3
Pennsylvania	74	2.3
Rhode Island	9	0.3
South Carolina	47	1.4
South Dakota	25	0.8
Tennessee	56	1.7
Texas	176	5.4
Utah	49	1.5
Vermont	27	0.8
Virginia	79	2.4
Washington	112	3.4
West Virginia	30	0.9
Wisconsin	119	3.7
Wyoming	69	2.1
I do not reside in the U.S.	164	5.1

25. Reside out of the U.S.

	TWS
	n= 164
Canada	95
Alberta	1
British Columbia	1
Manitoba	1
New Brunswick	-
Newfoundland and Labrador	-
Ontario	1
Saskatchewan	1
Quebec	1
Argentina	1
Australia	3
Belize	1
Brazil	1
Gabon	1
Germany	2
Mexico	1
Myanmar	1

Norway	2
South Africa	1
Sweden	2
United Kingdom	4
US Virgin Islands	1
Guam	1

26. In what year were you born?

	TWS *n*= 3,145
Average	46
19 and under	3
20-29	504
30-39	726
40-49	606
50-59	483
60-69	516
70 and beyond	306

27. What is you gender? (Select one)

	TWS *n*= 3,229
Male	59.7%
Female	37.7%
Non-binary	0.4%
Prefer not to answer	2.2%

If you have any additional comments or views that you would like to share with us, please feel free to type them in the space below.

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