2021-2022 CONSERVATION CAPSTONE
FINAL REPORT

CALLS TO CONSERVATION

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Prepared for The Boone & Crockett Club

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Acknowledgements

This project has been a year in the making and would not have been possible without the leadership of a few incredibly talented individuals.

We would like to begin by sincerely thanking the two faculty members who went above and beyond during this capstone project: Dr. Cole Blease Graham and Dr. Perry Barboza. As the advisors of this project, they were with us every step of the way guiding, mentoring, and providing us with professional knowledge. They were always willing to help and share their insight, but also allowed us to make this project our own. It was a special dynamic and an opportunity that we are grateful for.

Second, we would like to thank all of those who participated in our survey. While we have elected to maintain the anonymity of survey participants, we would like to acknowledge that we could not have completed this capstone without the respondents. Their responses provided us with the much needed data regarding students' (ages 18-30) views of wildlife conservation. In many ways, they are this project's unsung heroes.

Lastly, we would like to acknowledge the work that each group member contributed to this project. Each member was a team player and dedicated to the task at hand. The ability to work and learn together speaks volumes about the quality of our team. We are all proud of this finished product and cherish the fun and success we had throughout the year.

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Project Overview

About the Project

Advances in Conservation policy are hampered by opposing viewpoints on decision-making, funding, and managing wildlife and habitats. Therefore, we studied conservation values of 18-30-year-olds to understand better how the next generation will resolve conservation management conflicts. To do this, we adapted a survey instrument from a national study to classify value orientations toward utilizing wildlife as follows:

- traditional uses of hunting and fishing;
- mutual values for non-use and passive uses such as viewing;
- pluralism of both traditional and mutual values, or
- little value of wildlife among the distanced.

We then coupled the instrument with questions asking participants whom they believe should make decisions about wildlife, who should fund conservation, and who should implement the conservation of wildlife in three areas of conflict: species at risk of extinction, invasive species, and harvested species (game). Major takeaways from our research are found in the implications section of this handout.

Our findings indicated that conservation is an important issue for people aged 18 to 30. No matter their value orientation, there is consensus that wildlife can provide both utility and intrinsic value. Respondents believe they are well educated on these issues, so conservationists should take advantage of this knowledge and interest and turn their efforts towards mobilizing this age group with calls to action. Our respondents showed a preference for collaboration across all levels of government; with all value orientations showing widespread support for state and local government control. Wildlife conservation management could prove to be a fertile ground for bipartisan policy making, and legislators should be excited by the prospect to enact popular policy.

Key Definitions:

- Traditionalists: The most extreme in beliefs that wildlife should be used and managed for the benefit of people.
- Mutualists: The most extreme in seeing wildlife as part of their extended social network.
- Pluralists: Different situations or contexts result in this group emphasizing one orientation over the other.
- Distanced: Exhibit low levels of thought about and interest in wildlife (Manfredo et al., 2018 p.14).

Project Overview

The Mission
The objective of this capstone project is to explore how varying value orientations create barriers to conservation efforts.

The Client
Dr. Perry Barboza – Boone & Crockett Club Chair in Wildlife Conservation and Policy at Texas A&M University. The Boone & Crockett Club was established in 1887 with the mission to conserve wildlife and their habitats. Throughout the project, Dr. Barboza has provided insight and guidance to the capstone team and acted as a liaison between The Boone & Crockett Club and the capstone group.

Advisor
Dr. Cole Blease Graham

INTRODUCTION

For the last 30 years, conservation policies have struggled to make meaningful headway in Congress. However, without this legislation, the future of conservation in the United States is uncertain. Luckily, there are organizations dedicated to ensuring conservation efforts remain influential across the nation. The Boone and Crockett Club is dedicated to "promot[ing] the conservation and management of wildlife, especially big game, and its habitat, to preserve and encourage hunting and to maintain the highest ethical standards of fair chase and sportsmanship in North America" (Boone and Crockett Club, 2021). The Boone & Crockett program at Texas A&M is particularly interested in understanding how to effectively engage and educate stakeholders about the importance of wildlife conservation. The capstone group will examine the idea that a discrepancy in values and perception of wildlife conservation may exist between conservation decision-makers and other stakeholders like the Boone and Crockett Club, and the broad public (Van Eeden et al., 2017; Manfredo et al., 2017). This project focuses on exploring this disconnect and aims to make recommendations on how to rectify it.

We sampled the student population at Texas A&M University College Station and Galveston campuses using an instrument developed by Manfredo et al. (2018) for the national survey "America's Wildlife Values." Our sample is biased towards citizens of Texas, as they account for the majority of students at Texas A&M (60,262 students of a total 69,308). However, Texas A&M's diverse population implies that the survey could reach a broad audience from different backgrounds, cultures, and perceptions, presenting a range of results about conservation values. The surveyed students were between the ages of 18 to 30 and U.S. citizens only. This specific cohort is the future generation of taxpayers and decision-makers, so their perception of conservation is crucial to understanding barriers to conservation policy for the next three decades.

For conservation policies to be successful, it is critical to understand public sentiment and priorities for the use of animals and their habitats. Manfredo et al. (2020) contrasts Traditionalist that prioritize direct use of wildlife with Mutualists that prioritize the indirect use and non-use of wildlife as fellow species. Should wildlife be managed for human benefit, or should wildlife be managed for its own benefit (Manfredo, 2020)?

Research Question: How do different value orientations limit conservation policy?

LITERATURE REVIEW- ABRIDGED

This literature review will explore the conservation of biodiversity and wildlife, current land and wildlife management practices in the United States, how public opinion informs public policy, recent public opinion in the United States concerning wildlife conservation, and conservation opinions of college students.

Conserving the natural biodiversity found in the United States is one of the core tenants of conservation management, but also one of the greatest challenges of the 21st century. It is a crucial measure of the health of an ecosystem and critical to gaining economic benefit from proper management of the natural world. There are currently many policies and practices in place to meet this challenge, but the majority fall short in practice or fail to consider the needs of the public. For conservation policies to be successful, it will be critical to understand public sentiment.

Even though the public does influence policy development, this influence is ambivalent. While many Americans prioritize wildlife safety, a growing number believe that wildlife's primary purpose is to be utilized for human consumption, creating a polarizing dynamic. If wildlife is left uncontrolled, it can cause immense property damage. Conversely, governmental overreach into the matters of private property can rapidly result in anti-government sentiment. For conservation policy to meaningfully evolve in the future, several factors need to change. For example, the benefits of biodiversity need to be demonstrated to the public, the opinions of future generations need to be understood and taken into consideration, and intergovernmental partnerships and partnerships between private entities and the government need to occur.

Conserving Biodiversity & Wildlife

Biodiversity, defined as "the variety of life in the world or a particular habitat or ecosystem," is a cornerstone of conservation, as the diversity of life keeps an equilibrium within the environment (National Geographic Society, 2019). The destruction of one species is never an isolated event; it creates a ripple effect. Biodiversity demonstrates the codependent relationship between species and is one crucial measurement for the health of an ecosystem. Species contribute to ecosystem health by filling niches in their ecosystem. A critical aspect of the ecosystem vanishes and its health diminishes if that niche is lost. Therefore, if conservation in the modern era is to succeed, a sufficient understanding of biodiversity is necessary. Due to human activity, the species extinction rate is 1,000 times greater than it would otherwise be (Brooks et al., 2006). This extinction rate has vast consequences that are only now beginning to be understood. Ensuring the survival of various sensitive species will require specialized techniques to be utilized, such as habitat maintenance and targeted species conservation (Dawson et al., 2011). However, to encourage policymakers to consider such costly options, the benefits of biodiversity must be demonstrated.

Using economic concepts to place a value on biodiversity could motivate policymakers to value conservation. Material contributions are the most easily observed benefits from conservation efforts. Whether food, fuel, climate control, pest control, or ecosystem services such as pollination, biodiversity can give tangible benefits (Roches et al., 2021). Protecting biodiversity across the United States is essential to preserving the natural environment of the United States.

U.S. Land & Wildlife Management

Land Management

Currently, two-thirds of United States federal lands legally require leaseholders to diligently develop their land through mineral extraction, grazing, harvesting, or other means. This outdated "use it or lose it" requirement was made a century ago to encourage economic development. Today, the changing values spurred on by an increasingly educated public, income growth, and access to information have caused demand for alternative uses for land—including recreation, scenic views, and protection of ecosystems. In addition, unused natural areas are becoming harder to find as rural areas are developed to support the expansion of urban communities (Leonard, 2021). Due to the power of constituencies who benefit from the extraction of natural resources, efforts to remove the "use it or lose it" requirement have been almost non-existent. Should "non-use rights" to public natural resources be allowed, market forces could advance environmental conservation goals (Leonard, 2021).

Private land conservation plays a vital role in developing conservation policy. Around 40% of threatened or endangered species are found exclusively on private land in the United States (Cooke et al., 2011). Accordingly, private landowners play a significant role in conservation efforts, and policymakers should collaborate with landowners to garner their support (Cooke et al., 2011). Considering the preference of private landowners is important to accomplish conservation goals because landholders are direct consumers of the natural resource that policymakers seek to protect (Cooke et al., 2011). Without collaboration, private landowners may not accept conservation policy decisions.

Wildlife Management

Wildlife management has been an ongoing effort to conserve wildlife and land on both public and private lands. Wildlife management is the science of achieving specific objectives by preserving or modifying wildlife populations and habitats (Knight, n.d.). One tactic of wildlife management is harvesting through hunting or culling. Harvesting aids landowners in maintaining the habitat in which they live (Graham, 2016). It also benefits wildlife populations and ecosystems because it helps reduce overpopulation and overuse of resources (Rocky Mountain Elk Foundation, 2021). In addition, wildlife managers can limit crop damage and assist with disease management (Rocky Mountain Elk Foundation, 2021). Harvesting is subject to rules and regulations under the practice of hunting. In Texas, laws limit users to seasonal activity, require necessary permits, require mandatory hunters education classes, apply fines for wildlife misuse, and establishment of game wardens to police Texas lands and waters to ensure individuals comply with regulations (Texas Parks & Wildlife, 2021). The North American of Wildlife Management is based on a public trust doctrine that eliminates market hunting, and promotes democratic approaches to hunting to allocate wildlife resources based on scientific evidence and the law (Geist & Mahoney, (2019).

However, because of changing value orientations and conservation interests of the public, these same agencies may be out of touch with the constituencies they now serve (Teel and Manfredo, 2009). In the United States, conservation is seen as a noteworthy cause but not a cause for individual responsibility. In general, the American public prefers for others to pay for conservation than for funds to come from their own pocket (Wise et al., 2021).

College Students

Millennials are defined as the age group born between the years 1981-1996. This group succeeds the age group Generation X. The end tail of Millennials, estimated to be between the ages of 26-30, currently shares space in college enrollment with its succeeding generation. The age group succeeding Millennials, born between 1997-2012, is dubbed "Gen Z", and the upper tail of this class is estimated to be between the ages of 18-25. Together, these generations make up a majority of those enrolled in college with Gen Z emerging as the new wave. Their intentions and funding preferences for conservation management are unclear.

Researchers have sought to explore the opinions of college students over conservation efforts and management. One survey in particular, "The future of wildlife conservation funding: What options do U.S. college students support?" was conducted on Gen Z students. The survey found that students believe natural resources should be conserved however, they do not believe they should be personally responsible for providing the funds for those resources and were unwilling to make personal donations to support conservation (Wise et al., 2021). Furthermore, there has been a noticeable decline in support for the user-pay method of funding from the Millennial to the Gen Z generation (Larson et al., 2021). According to "The future of wildlife conservation funding: What options do U.S. college students support?", Gen Z students are more willing to support funding methods such as charging extraction companies instead of utilizing user-pay fees (Larson et al., 2021). Thus, conservation is a concept supported in the abstract, but individuals are reluctant to make substantial efforts to achieve it (Larson et al., 2021).

Current Decision Making Model

In the late 1970s, the regulatory framework to deal with environmental health issues moved from a federally-dominated system to a cooperative federalism model. This structure allows federal and state governments to create statutes and regulations, such as the baseline standards the Environmental Protection Agency (EPA) instructs states to meet or exceed through the Clean Water Act (CWA). Even with the cooperative nature of this model, many contemporary issues have arisen. States have different models of powers split between local and state governments, resulting in a micro-federalism divide in each of the 50 states (Black et al., 2020).

Challenges by state governments to federal conservation policies under the ESA have resulted in a newfound framework to determine if conservation policy will be effective. The Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE) , passed in 2003 (Sobeck & Wieland, 2011, p. 74). This framework encouraged future policy to ensure private landowners who implemented conservation measures per direction from the government did not have additional conservation measures imposed on them (Sobeck & Wieland, 2011, p. 74). Though these policies encourage federal, state, and local government cooperation, updates are needed to the original 2003 PECE framework (Sobeck & Wieland, 2011, p. 80).

Harvesting wildlife contributes to the economy and has proven to be an effective and important technique for conservation. Protecting this activity is essential to maintaining America's wildlife populations.

How Public Opinion Informs Policy Decisions

Public opinion can greatly impact policy decisions (Burstein, 2003). However, the power of public opinion is limited by the public's understanding of an issue. Decisions about conservation policy efforts are made through a complex feedback loop that involves current scientific data and policies, public awareness, and perceptions of conservation needs (Martín-López et al., 2009). Developing a deeper understanding of the relationship between public opinion concerning conservation efforts in the United States and conservation policy efforts could help identify ways to increase conservation salience in the public view, leading to action around conservation policy.

One of the most prevalent reports of defined current public values of wildlife is the Manfredo et al. 2018 study, America's Wildlife Values: The Social Context of Wildlife Management in the U.S.. This study "assesses the social context of wildlife management in the U.S. to understand the growing conflict around wildlife management" (Manfredo et al., 2018 p.8). The researchers identify four groupings of social values that define how Americans think about conservation. According to Manfredo et al. (2018), they are:

1. **Traditionalists/Utilitarians**: "the most extreme in beliefs that wildlife should be used and managed for the benefit of people".
2. **Mutualists:** "most extreme in seeing wildlife as part of their extended social network" - believe wildlife deserve the same rights as humans.
3. **Pluralists:** rotate between traditional and mutualistic views dependent on the context of the human/wildlife interaction.
4. **Distanced:** "exhibit low levels of knowledge and interest in wildlife".

Current Public Opinion

United States

Manfredo's 2018 study of American opinions on conservation shows that, 28% of Americans identify as Traditionalists, 35% identify as Mutualists, 21% identify as Pluralists, and 15% identify as Distanced (Manfredo et al., 2018). However, these value orientations have not always defined the American outlook on conservation and will continue to evolve over time. As the world became more technologically advanced in the 20th century, modernization contributed to disconnections between people and nature (Clayton & Myers, 2015). The transition from rural livelihoods with livestock to urban ones with pets has affected people's view of wildlife as a kindred species (Clayton & Myers, 2015). Specifically, education, income, and urbanization were the strongest predictors of wildlife value orientations (Manfredo et al., 2018). Understanding how, why, and when these shifts occur is imperative to making future policy decisions that concern conservation.

Historically, wildlife conservation has been viewed through a traditionalist lens defined by the value of nature and wildlife providing for human consumption (Teel and Manfredo, 2009).

Because of this traditional cultural view, many state and federal agencies responsible for wildlife management were (and still are) defined by a hunting subculture (Teel and Manfredo, 2009). In the past, this was the shared view by most Americans concerned with conservation efforts, so there was little disconnect between managing agencies and public perceptions. In the future, there is a significant chance that various provisions of the PECE will continue to be subject to court interpretation. As a result, the federal government needs to establish a broad, encompassing, and cooperative conservation framework. This framework must encourage innovative, effective, and non-adversarial partnerships that further the goals of the ESA and other federal conservation programs.

Discussion

The literature confirms the critical relationship between conservation policy and conservation management practices. Multiple factors such as education, collaboration, and public opinion influence the effectiveness and efficacy of conservation policy. Further areas to research may be the views and values of conservation decision makers. To explore this, researchers should seek to expand upon the work of Manfredo. Whereas the original Manfredo survey reached a broad cross-section of society, further research may focus on the two young age groups, including Millennial and Gen-Z generations. Individuals from these generations will become the nation's decision makers in the upcoming decades.

RESEARCH DESIGN

Research Design Framework

This study was exploratory and we conducted quantitative analysis to understand how different value orientations limit conservation policy. Exploratory research is not designed to provide conclusive solutions for existing problems but rather to understand them better. (Saunders, 2012). Therefore, our team has opted to use a research survey to reach a broad audience and collect diverse opinions. The advantage of survey data is that it can collect a large and diverse group of opinions across populations. Furthermore, by surveying a specific cohort, it will allow our group to gain a more precise understanding of how certain age groups feel about conservation, and what the possible barriers to it could be. Lastly, one more advantage of survey data is that it is easily dispersed and does not require researchers to spend significant time with a limited number of individuals, such as conducting focus groups.

Research Scope

Our survey sampled the student population at Texas A&M University, College Station and Galvaston campus. Our research aims to address which level of government should be responsible for funding and decision-making about conservation. This sample skews heavily towards citizens of Texas, as they make up 87% of students at Texas A&M. However, Texas A&M is also home to students from different states (4,686 students).

Surveyed students were U.S. citizens between the ages of 18 to 30. This specific cohort will be the future generation of taxpayers and decision-makers, so their perception of conservation is crucial to understanding the barriers that limit conservation policy. Texas A&M has a total student population of 69,308. Therefore, the minimum sample required to represent this population is 384 respondents with a 95% confidence interval and a 5% margin of error. To calculate the sample size, we used the following formula to gauge the necessary sample size:

$$\textbf{Necessary Sample Size} = \frac{(\text{Zscore})^2 \times (\text{Standard Deviation}) \times (1-\text{Standard Deviation})}{(\text{Margin of Error})^2}$$

Z-score = 1.96
Standard deviation = 0.5
Margin of Error = +/- 5%

Survey Overview

The survey of 40 questions was approved by the Institutional Review Board of Texas A&M University. The survey was completed via Qualtrics online platform. The full survey questionnaire is available at the appendix section. The anonymous survey link was distributed among students of Texas A&M University, College Station and Galveston campuses using the Texas A&M University bulk email system. We also had a few in-person tabling sessions at the Memorial Student Center and collected some responses via an anonymous QR code link. The survey was open from January 28 to February 14, 2022. We received a total of 687 responses.

Variables

Survey questions consist of three major parts: demographic data, wildlife value orientation data (derived from the Manfredo et al. 2018), and data on the perspective of the current wildlife management system. Primary data derived from the survey was analyzed to understand the relationship between value orientations and preferred decision-making and funding authorities.

Demographic Variables

The survey used age and status as a Texas A&M University student to include participants. We used race, ethnicity, gender, and hometown size as demographic descriptors.

In order to discern between levels of familiarity of wildlife conservation, wildlife management, and policy, the group gathered the following data:

- Desired occupation
- Participation in outdoor activities, including hunting, fishing, boating, hiking, trailing, backpacking, biking, wildlife viewing, camping, and rv'ing
- Self rated level of wildlife management understanding

We used these variables as indices of the respondent's knowledge of wildlife management. For example, individuals working in forestry or fisheries are likely to have more knowledge of wildlife management than the general public, and those who actively recreate outdoors likely have firsthand experience with wildlife managers and management practices.

Wildlife Value Orientation Variables

The Manfredo et al. 2018 survey provides a scale for assessing attitudes about wildlife. These criteria are critical to this report's analysis. With this estimation, Manfredo et al. (2018) separates subjects into four main categories: Mutualist, Traditionalist, Pluralist, and Distanced.

Perspectives on Current System

Once respondents were categorized into their respective value orientations, the survey asked questions that allowed us to better understand both the knowledge base and individuals opinion of the current management system. Specifically, respondents were asked to gauge their own knowledge base and give their opinions on who should lead funding and deciding policy for three key areas of wildlife; Hunting, Invasive Species Control and Restoring Natural Habitats.

Hypotheses

This report contrasts the attitudes of Traditionalists and Mutualists to funding, decision-making, and implementation of conservation. The hypotheses are as follows:

H1: For funding conservation, State governments and private individuals are favored by Traditionalists whereas the Federal government is favored by Mutualists.

H2: For deciding on conservation, State governments and private individuals are favored by Traditionalists whereas the Federal government is favored by Mutualists.

H3: For implementing conservation, State governments and private individuals are favored by Traditionalists whereas the Federal government is favored by Mutualists.

Analysis Methods

After the survey collection was completed, the data was cleaned and analyzed. Next, an analysis method informed by the tool developed in the "Who Cares About Wildlife?" report was applied to our data (Manfredo, 2008). This tool organizes each variable into one of four categories: Mutualists, Traditionalists, Pluralists, Distanced. After the subjects were categorized, comparisons to demographic variables were made and we analyzed the differences between the categories and their differences in responses. Additionally, robust linear regressions were performed in Stata 16 to identify which variables were impactful in a respondents responses to hold for other factors. The robust linear regressions took the following form:

$$\boldsymbol{\alpha} = \beta 0 + \beta 1 X1 + \beta 2 X2 + \ldots + \beta i Xi + \varepsilon$$

Where $\boldsymbol{\alpha}$, the variable of interest, represented the responses of the 12 exploratory questions at the end of the survey. These questions included respondents' understanding of, respondents belief in the efficiency of, and which level of government should fund and decide on restoration, damage, and hunting policy. For the 3 "understanding of" regressions, i = 6 with each of the 5 demographic variables being included and value orientations. For the remaining 9 regressions, i = 8 with each of the 5 demographic variables being included, value orientations, and both the respondent's average level of understanding of conservation and the respondent's level of understanding for that specific aspect of conservation. The demographic variables included home size, race, participation in activities, future field of occupation, and home state.

For the exploratory data analysis, we collected respondents' opinions on who should be funding and deciding wildlife policy. Using the answers from these two categories, we generated a new category known as implementation. Implementation displays those who wanted control of both funding and decision making to be within the same system. If a respondent chose the federal government for both funding and decision making in the previous questions, they were categorized as federal government for implementation. This analysis also categorized those who chose different agencies for the previous questions as Collaborate.

Limitations

In the IRB approval process, ethical concerns are most important to address. Due to the survey being distributed anonymously these concerns were minimized, thus granting exemption from full IRB approval.There was a monetary incentive in the form of a gift card to incentivize individuals to complete the survey. This may actually insert the bias that respondents may just take the survey to win the gift card. To address this, participants were properly informed that the winner of the gift card would be chosen at random, ensuring that participants did not complete the survey out of an expectation that they would definitely win the gift card. This participation was also solely voluntary. They were given the option to enter their address at the end of the survey only if they wished and the email data were collected separately from the main survey to keep our survey anonymous.

By nature, survey data has inherent limitations and risks that must be accounted for to provide the most representative conclusions possible (Andrade, 2020). Some of the limitations of survey collection include response bias, lack of comprehension of questions, and populations studied. Response bias is the natural bias incurred when asking subjects to volunteer their time to respond to a survey. In addition, subjects may not fully understand the survey questions. Although providing ample information may mitigate this error, removing lack of understanding is difficult to do. Finally, the population this report studies also introduces limitations to the data; the students of Texas A&M may not accurately represent the consensus of all college students in Texas. In order to prevent the limitations described from biasing results, the capstone group sought as many responses as possible. Finally, this final report and recommendations made considered these limitations.

METHODS AND PROCEDURES

Data Collection & Cleaning

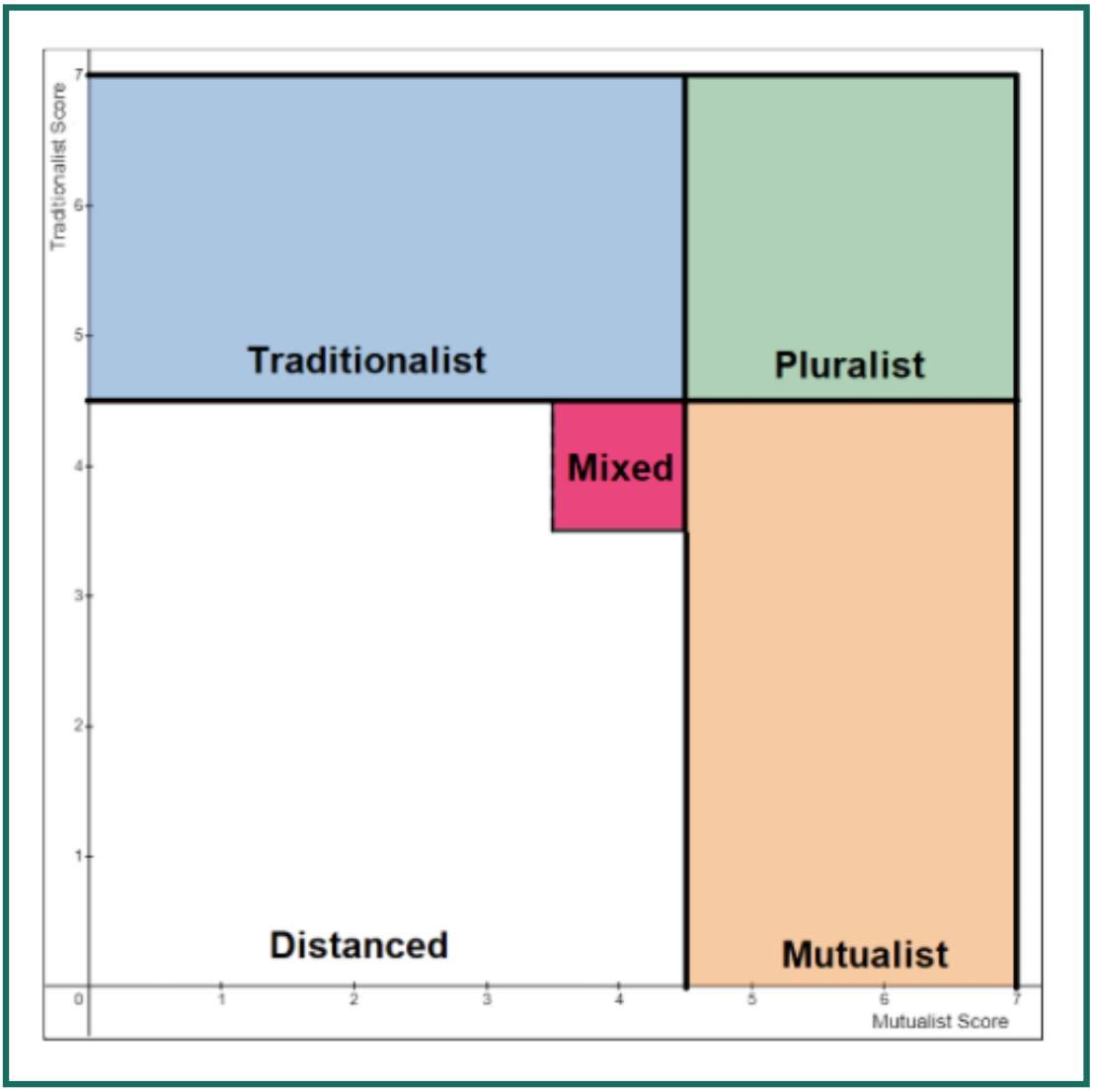
We censored the data set to remove duplicate entries, incomplete surveys, and entries that were outliers in response time. To identify possible duplicate responses, we looked at the IP address and answers given by each respondent recorded in Qualtrics. If an IP address was used more than once, and was not a Texas A&M University IP address and the responses to the Manfredo model questions were identical, we assumed the response was invalid as it indicates the same person may have completed the survey more than once. There were 179 responses with shared IP addresses, a majority of which came from Texas A&M University IP addresses, duplicate Texas A&M University IP addresses were not removed. In total, we deleted 45 responses believed to have been duplicates. Surveys where the Manfredo model was not completed were excluded, as these responses cannot be used to generate a Mutualist or Traditionalist score needed to categorize the respondents. Partial and incomplete surveys comprised 103 responses.

Next, we looked for the outliers in response time. We looked at the average response time of participants, which was 3,632 seconds, or just over an hour. If the respondent's survey duration was too short or too long, this means the respondent may not have taken the survey seriously or they kept the survey open for too long and finished later. Any responses below the 5th percentile, or 66 seconds, or above 10 hours in duration were excluded from the dataset. In total, 33 responses were excluded based on time. After cleaning the sample, we had 499 responses as the final sample size, which met our validation criteria of 384 responses.

Data Analysis

The responses were analyzed using STATA 16 & 17 and Microsoft Excel to perform data cleaning, regression analysis, ANOVA, and graphs. Using the survey responses and Manfredo's framework, we generated mutualist scores and traditionalist/utilitarian scores based on respondents' average response rate to their corresponding questions. We categorized individuals as Pluralist if both scores were above 4.5, Mutualist if their mutualist score was above 4.5 and their traditionalist score below 4.5, Traditionalist if their traditionalist/utilitarian score was above 4.5 and their mutualist score beneath 4.5, mixed if both of traditionalist and mutualist scores were between 3.5 and 4.5, and Distanced if both scores are beneath 4.5 and either one score or neither scores are between 3.5 and 4.5. A graphic representation can be found in Figure 1 below.

1. **Traditionalists (or Utilitarians)** – Score high (above the midpoint) on the domination scale and low (at or below) the midpoint on the mutualism scale; i.e., they are the most extreme in beliefs that wildlife should be used and managed for the benefit of people.
2. **Mutualists** – Score high on the mutualism scale and low on the domination scale; i.e., they are the most extreme in seeing wildlife as part of their extended social network.
3. **Pluralists** – Score high on both mutualism and domination scales; i.e., different situations or contexts result in this group emphasizing one orientation over the other.
4. **Distanced** – Score low on both mutualism and domination scales; i.e., they exhibit low levels of thought about and interest in wildlife (Manfredo et al., 2018 p.14).



After generating the respondents' Manfredo category, we took demographic data available and analyzed their responses to questions regarding their level of understanding of and preferences for funding, decision making, and implementing conservation. This was done by performing linear regressions and by comparing the different categories' response rates to identify differences in the overall categories' preferences.

RESULTS

Results

The results of our study are broken down into three categories based on the type of questions included in our survey, descriptive, framework, and exploratory questions. Descriptive questions describe the data set and include: demographics, state, size of hometown, preference for future field of occupation, participation in conservation related activities and questions that gauge participants' understanding of the conservation system. Next, framework questions such as "to what extent do you agree with the following statement, animals should have rights similar to human beings", were adopted from the 2018 *America's Wildlife Values* study. These questions were used to categorize respondents into one of the four categories developed in the Manfredo et al. 2018 study, Traditionalists, Distanced, Pluralists, Mixed and Mutualists. Finally, exploratory questions asked participants to consider who they believe (federal government, state government, or non-government entities) should fund, manage and make decisions on wildlife conservation. Note that where "Texas A&M University" is used, it should be considered to mean both the College Station and Galveston campuses.

Framework Questions

This figure (*Fig. 2*) represents the combination of all framework questions used to score respondents and categorize them into one of the four categories (Mutualist, Traditionalist, Pluralist, Distanced) and identify the number of respondents who are mixed. Figure 2 shows the amount of respondents in each value orientation category. Mutualist is the largest group in our sample with 33%, followed by Traditionalist (32%), Pluralist (27%), Mixed (6%), and Distanced (1%).

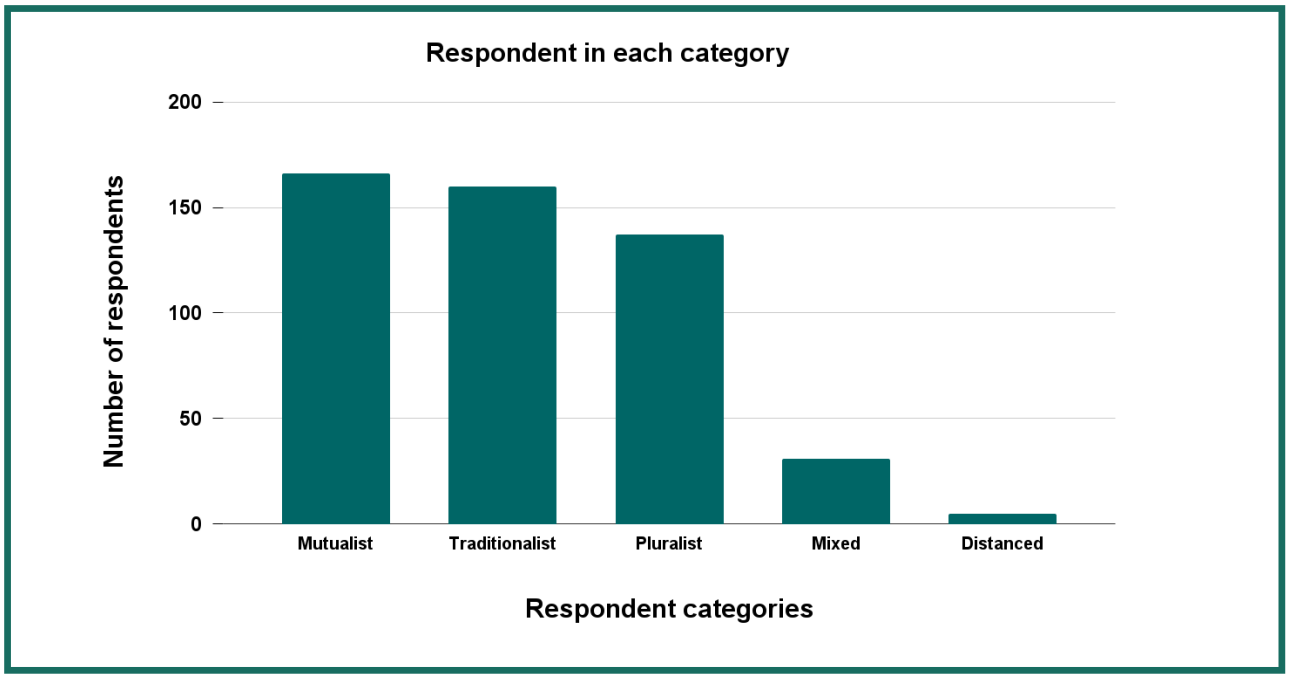


Figure 2. Number of respondents in each category

RESULTS

Descriptive Questions- Demographics

Race: We collected race information to compare with the national and Texas A&M population. The percentage of the White participants is comparable to the national and Texas A&M population and is the largest category. Participation of Asian and Black is comparable to Texas A&M's population but differs from the national population. The respondents who identified themselves as two or more races are greater than the national percentage.

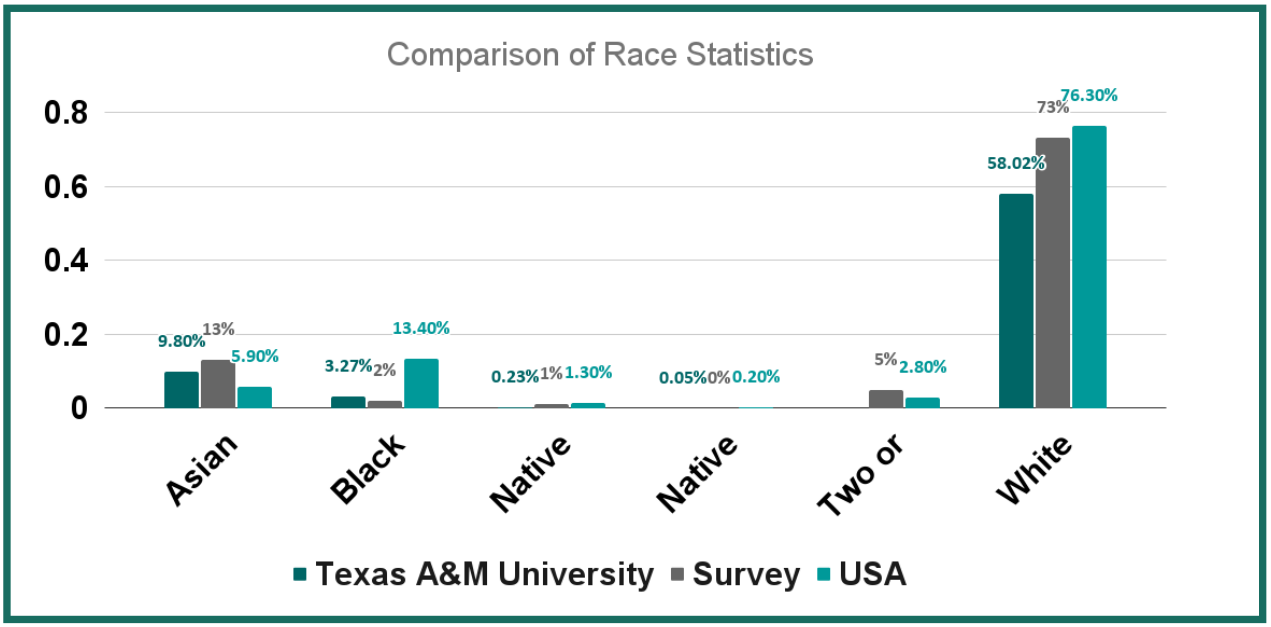


Figure 3. Comparison of respondent race

We did not collect information on Hispanic respondents, so we were unable to compare that with the greater population of Texas A&M and the United States. Overall, our sample resembles the Texas A&M population and national level in most categories. For comparison, data is used from Texas A&M University and U.S. Census Bureau (Texas A&M Accountability Office, 2021; Census Bureau, 2021).

RESULTS

Descriptive Questions- Demographics

Gender: Our survey contains more female respondents than males: 67% of our respondents are identified as female and 30% are male, whereas the national and Texas A&M stats show about a 1:1 ratio of male and female (Texas A&M Accountability Office, 2021; Census Bureau, 2021).

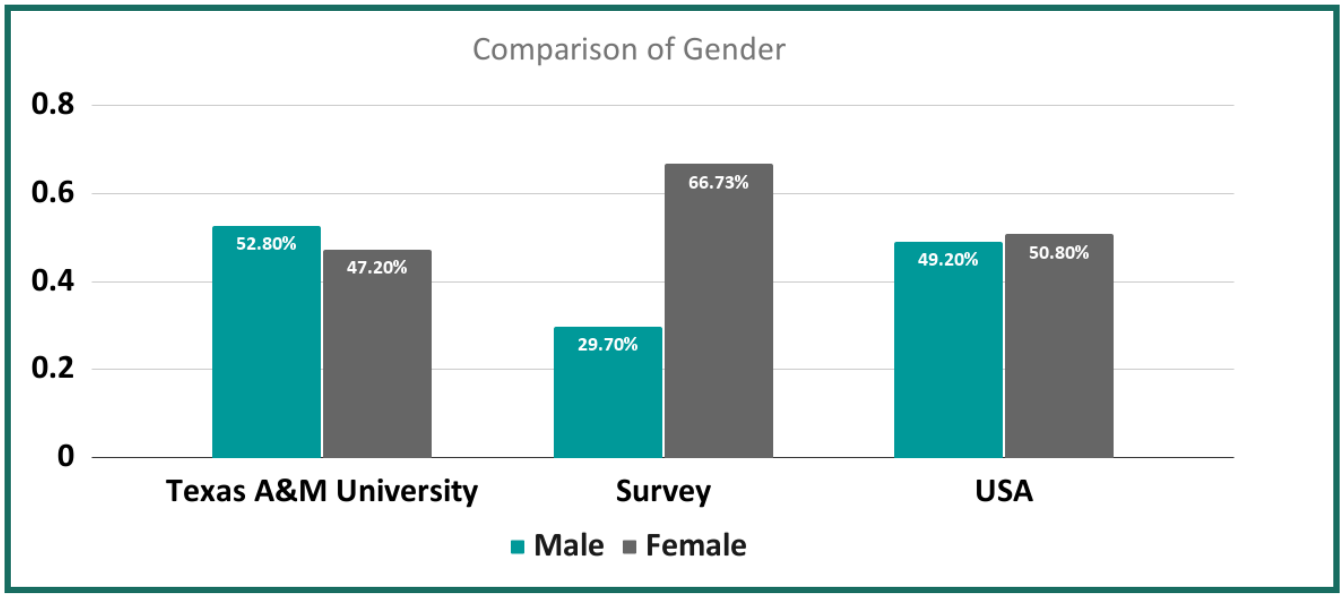


Figure 3. Comparison of respondent gender

RESULTS

Descriptive Questions- Demographics

Figure 4. Number of respondents by State

Respondents State

Figure 4 show a heavy skew toward Texan respondents - 442 respondents out of 499 are from Texas. This makes up about 87% of the sample. Any other states have less than 10 respondents. This follows the geographic distribution of Texas A&M students, about 87% of students are from Texas (Texas A&M University, 2021).

RESULTS

Descriptive Questions- Demographics

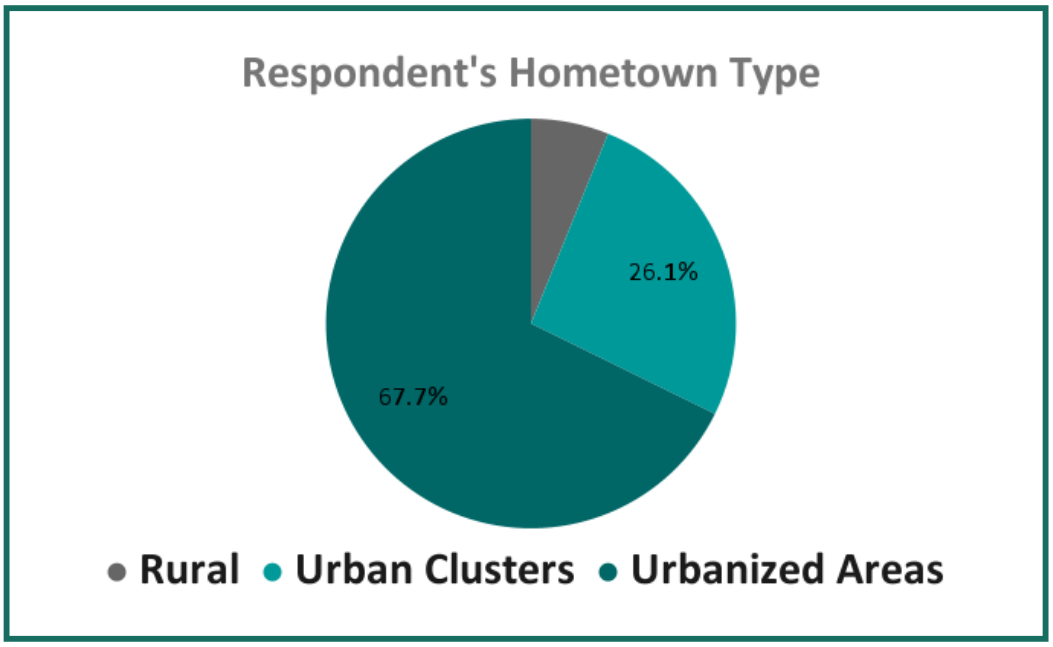


Figure 5. Respondents Hometown Type

Respondents Hometown Type

We also collected data on the hometown population for the respondents, as seen in *Figure 5*. We then categorized their hometown as Rural, Urban Clusters, and Urbanized areas as per U.S. Census Bureau classification (U.S. Census Bureau, 2021). Rural areas are defined as areas with people less than 2,500, urban clusters are between 2,500 and 50,000, and finally, urbanized areas contain more than 50,000. The data suggests that the majority of our respondents are from urbanized areas. This data corresponds to state data, as the majority of Texans (85%) live in urban areas (White et al., 2017). Furthermore, this also corresponds with national data where the majority of respondents (80%) are also from urbanized areas (Census Bureau, 2021).

Respondents Involvement in Activities Related to Conservation

96% of our respondents have participated in one or more activities related to wildlife conservation. These activities include hunting, fishing, boating, hiking, trailing, biking, backpacking, wildlife viewing, camping, and RVing. This data indicates that most of our respondents have some sort of experience with activities that may contribute to wildlife conservation. Below we have the respondents' participation by certain demographic characteristics:

RESULTS

Descriptive Questions- Demographics

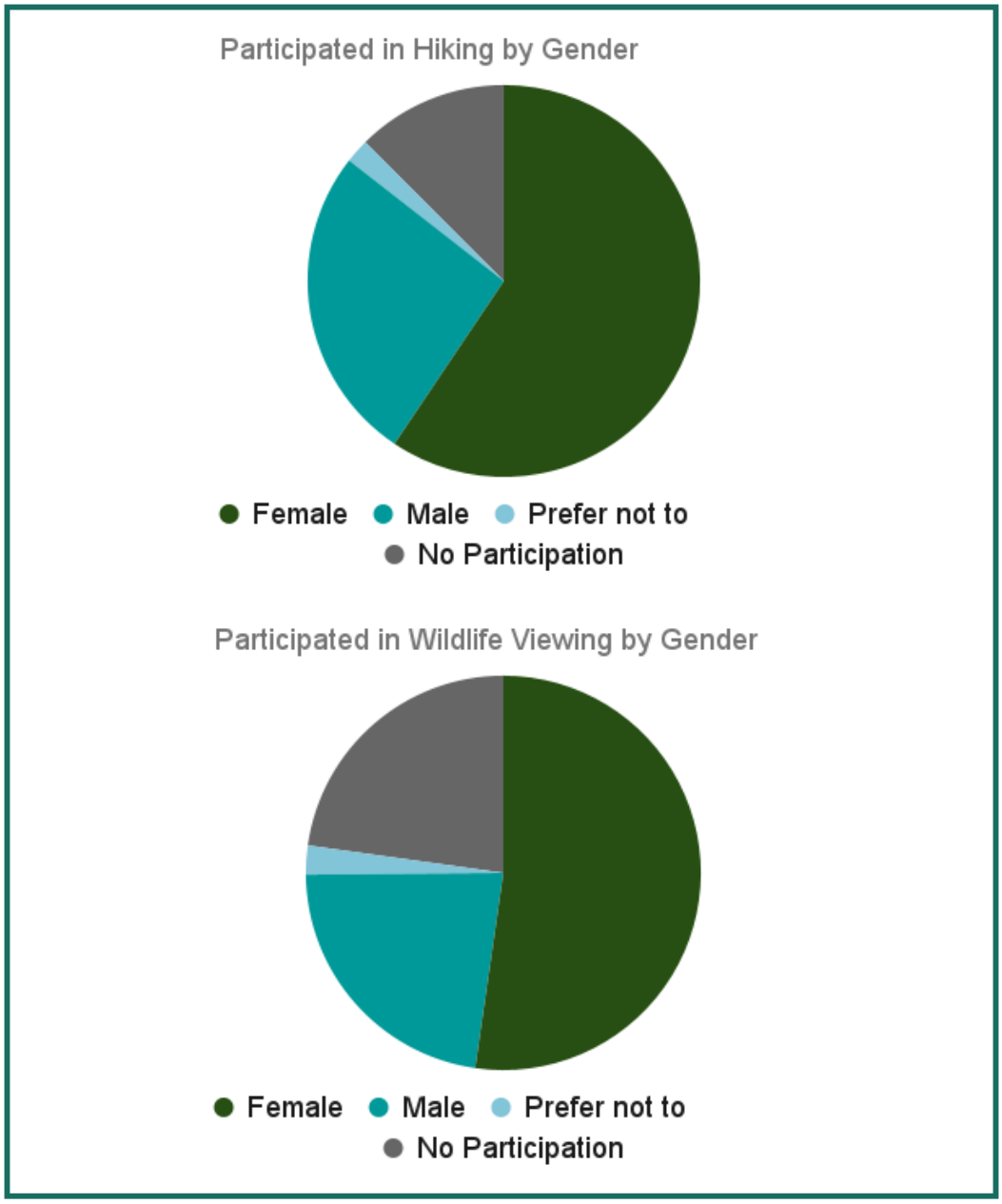


Figure 6.1-6.2 Participation in conservation related activies by gender

These responses are what we would anticipate given the demographic composition of our survey sample. Worth noting is a slight overrepresentation in female participation in wildlife viewing compared to males and higher proportion of males than females that participate in hunting. In Texas at large, for instance, only 27 percent of fishing license purchasers and 11 percent of hunters in Texas were women (Griffith, 2021).

RESULTS

Descriptive Questions- Demographics

While it appears we have a proportional and large amount of fishing participation among males and females, hunting–a male dominant sport–is largely underrepresented in our survey sample. It is encouraging, then, that we still see a consistent spread of value orientations despite this underrepresentation of hunting.

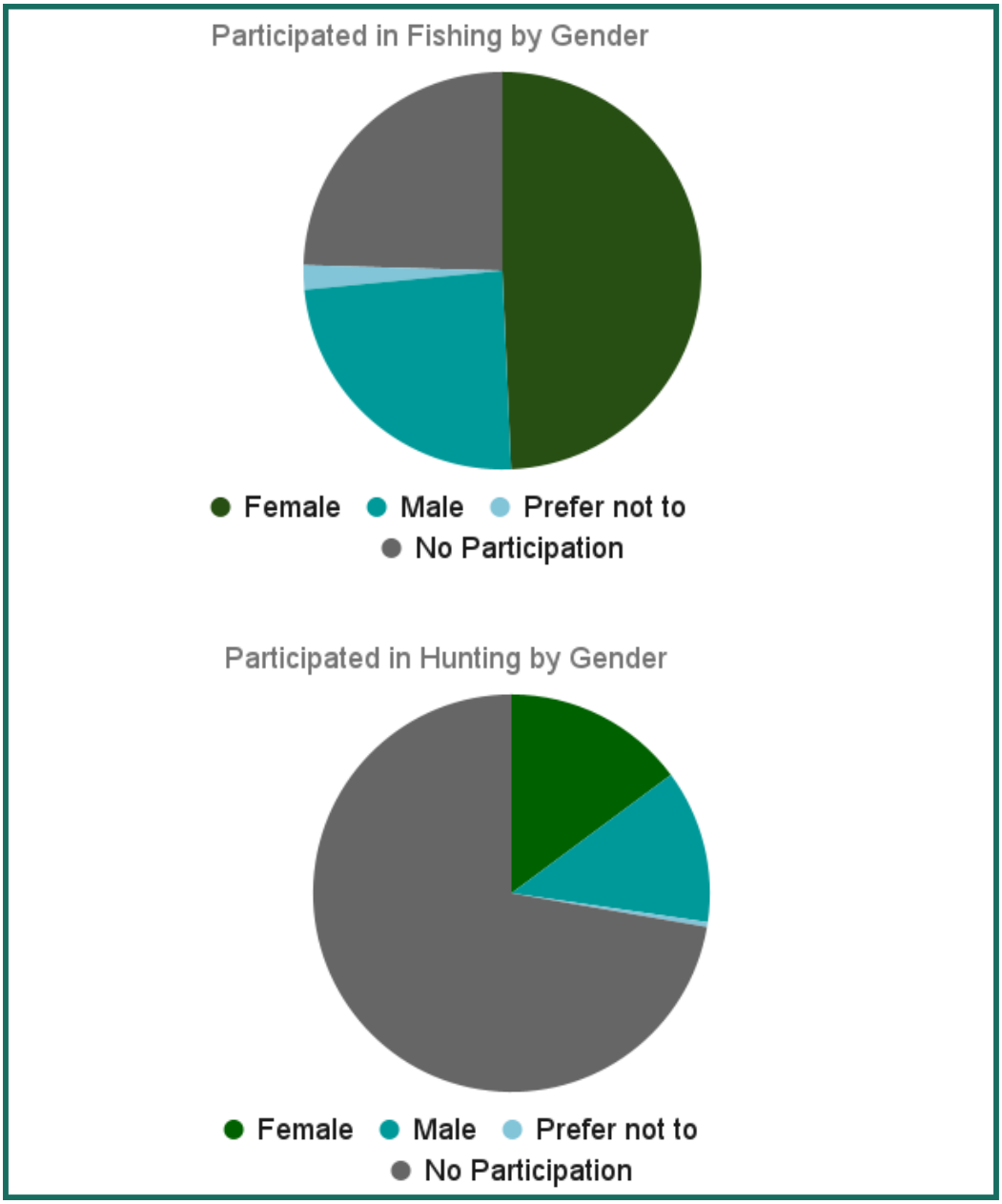


Figure 6.3-6.4. Participation in conservation related activies by gender

RESULTS

Descriptive Questions- Demographics

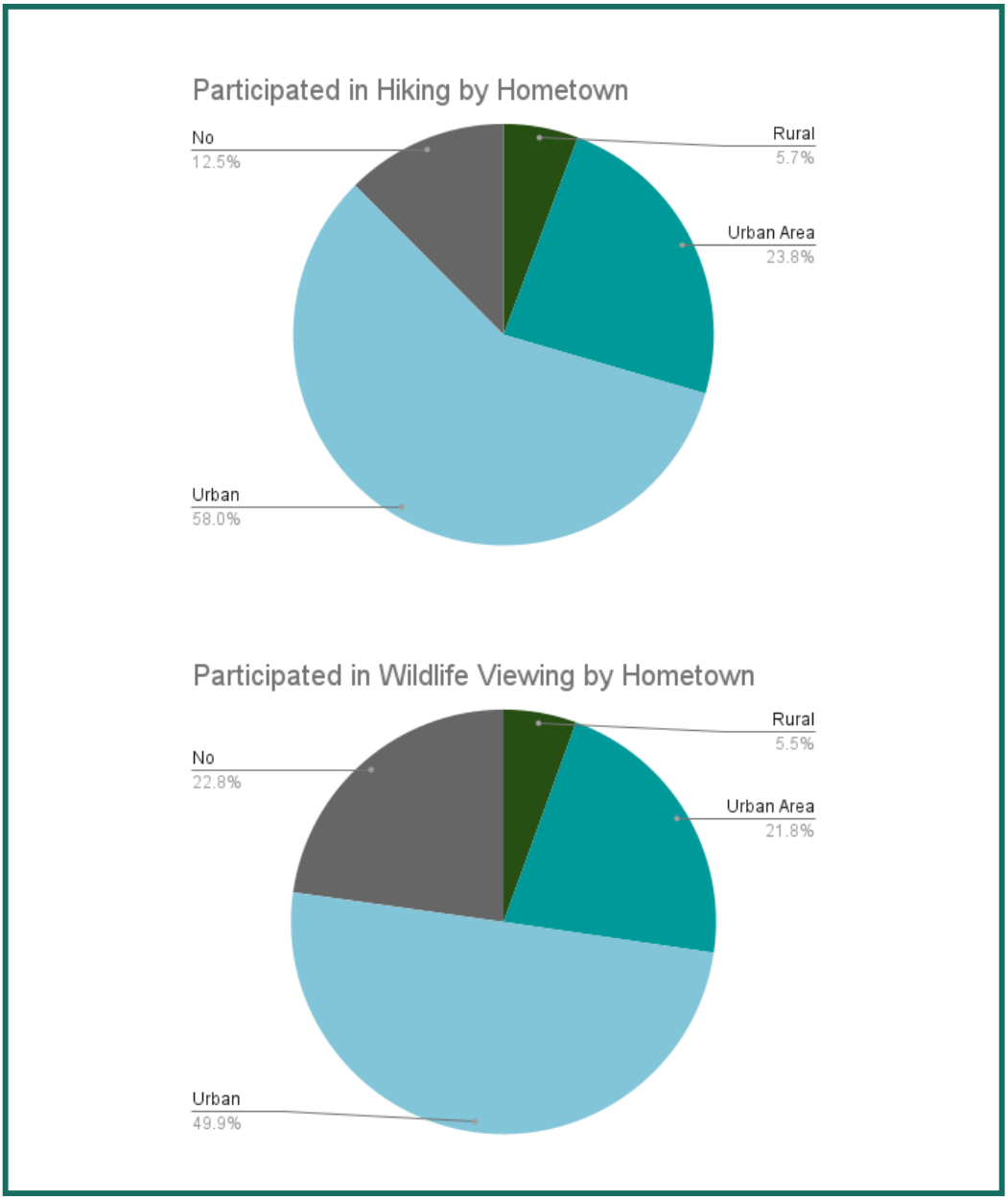


Figure 7.1-7.2 Participation in conservation related activies by hometown size

These results on activity by hometown size are largely proportional to the number of respondents in each hometown size category. **Hunting had the lowest participation at only 27.7% of the respondents whereas participation in fishing, hiking and wildlife viewing exceeded 75%** (*Fig 7*).

RESULTS

Descriptive Questions- Demographics

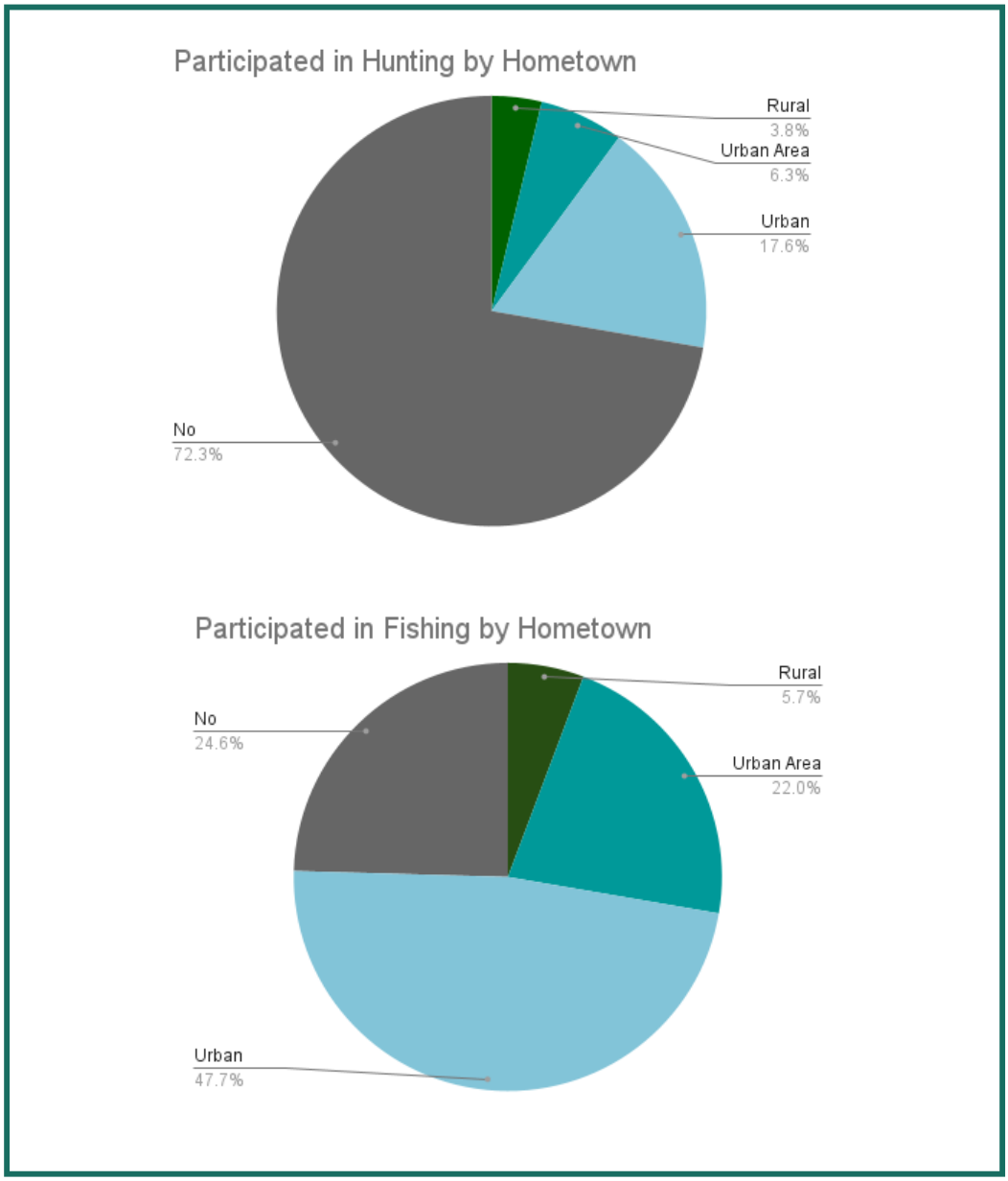


Figure 7.2-7.4 Participation in conservation related activies by hometown size

Despite this result–or perhaps due to the influence of angling, we still have Traditionalist representation equal in proportion to Manfredo's results. This indicates that more than those with high traditionalist scores are participating in extractive activities, or put another way this indicates that even some mutualist scores are participating in extractive activities.

RESULTS

Descriptive Questions- Demographics

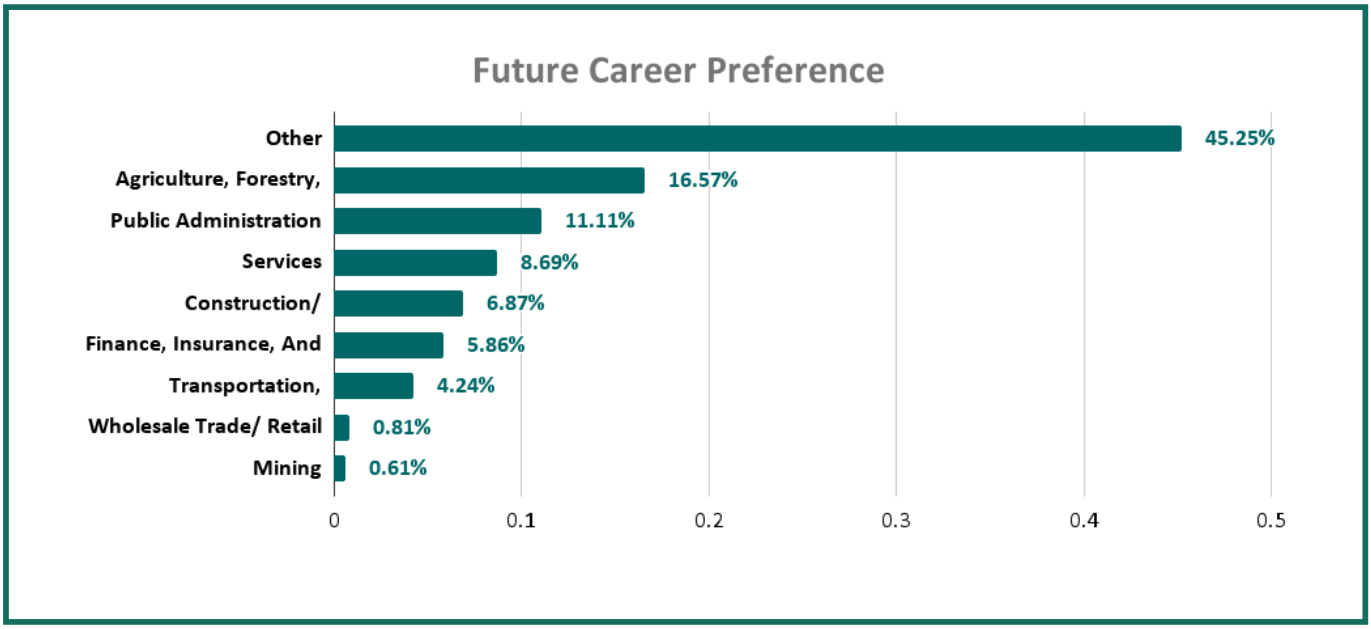


Figure 8. Respondents future career preference

Respondents Future Career Preferences

About 16% of our respondents have future career goals to work in the wildlife-related sector. However, the majority (45%) of our respondents selected other sectors. We condensed the sector into eight major divisions according to standard industry classification provided by the U.S. Bureau of Labor Statistics' 2022 Industry Classification Overview

Descriptive Questions - Understanding of Wildlife Conservation Systems

Figures 9 to *11* are further descriptive questions that gauge how well respondents understand the current system for managing fish and wildlife conservation including hunting and fishing, damage from invasive species, and restoration. These questions provide insight to how well respondents may or may not understand wildlife conservation as it currently stands. Overall, the data shows around 50% of our respondents understand the above mentioned conservation issues either fully or partially. However, 38% respondents do not understand these either fully or partially and around 13-14% are uncertain about their understanding of the system.

RESULTS

Descriptive Questions - Understanding of Wildlife Conservation Systems

Figure 9 illustrates that 49% of our respondents understand the current system used to manage fish and wildlife for hunting and fishing fully or partially (8% understand it fully). However, 38% of respondents do not understand the system either fully or partially (12% had no understanding). 13% of respondents ranked their knowledge of the system as neutral.

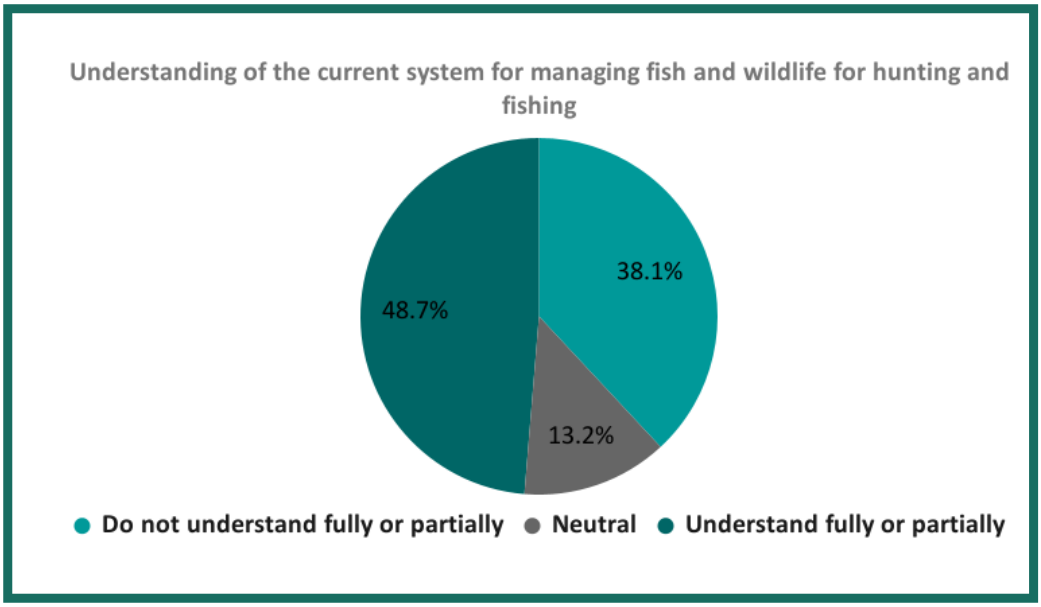


Figure 9. Respondents understanding of the current system for managing fish and wildlife for hunting and fishing

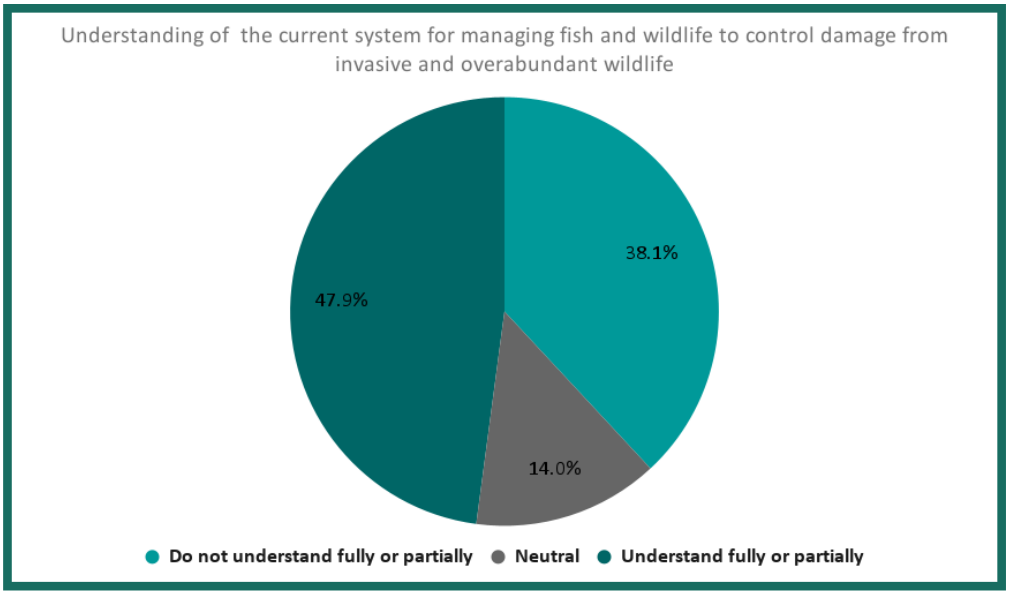


Figure 10. Respondents understanding of the current systemto control damage from invasive and overabundent wildlife

Figure 10 shows 48% of respondents understand the current system for managing fish and wildlife to control damage from invasive and overabundant wildlife fully or partially (7% understand fully). 38% do not understand the system fully or partially (12% had no understanding). 14% of respondents ranked their knowledge of the system as neutral.

RESULTS

Descriptive Questions - Understanding of Wildlife Conservation Systems

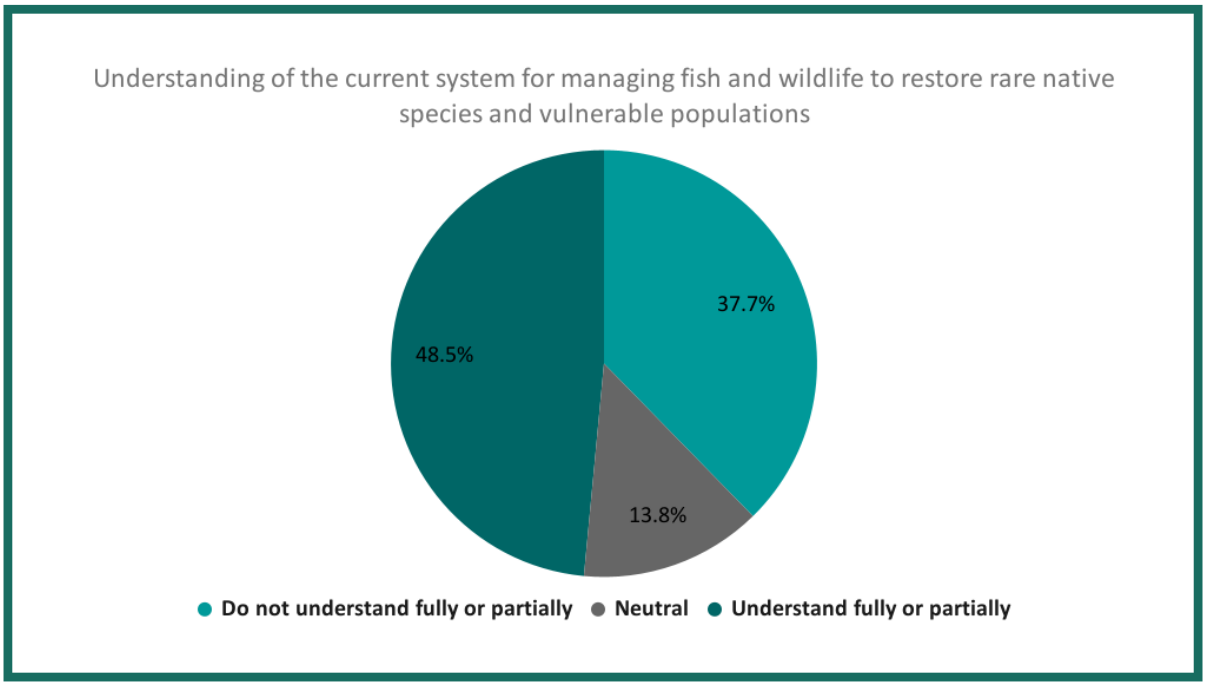


Figure 11. Respondents understanding of the current systemto restore rare native species and vulnerable populations

Figure 11 shows 48% of our respondents understand the current system used to manage fish and wildlife to restore rare native species and vulnerable populations fully or partially (8% understand fully). 38% of respondents do not understand the system either fully or partially (12% had no understanding). 14% of respondents ranked their knowledge of the system as neutral.

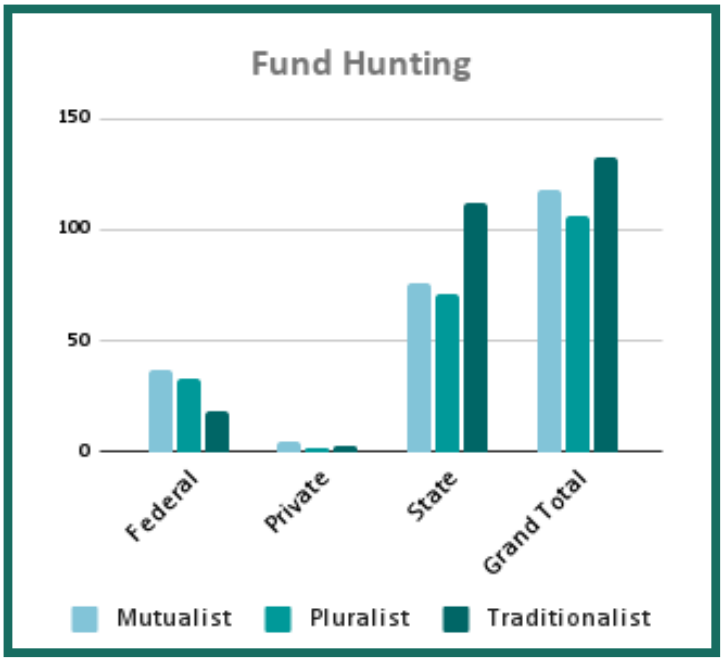
Exploratory Questions

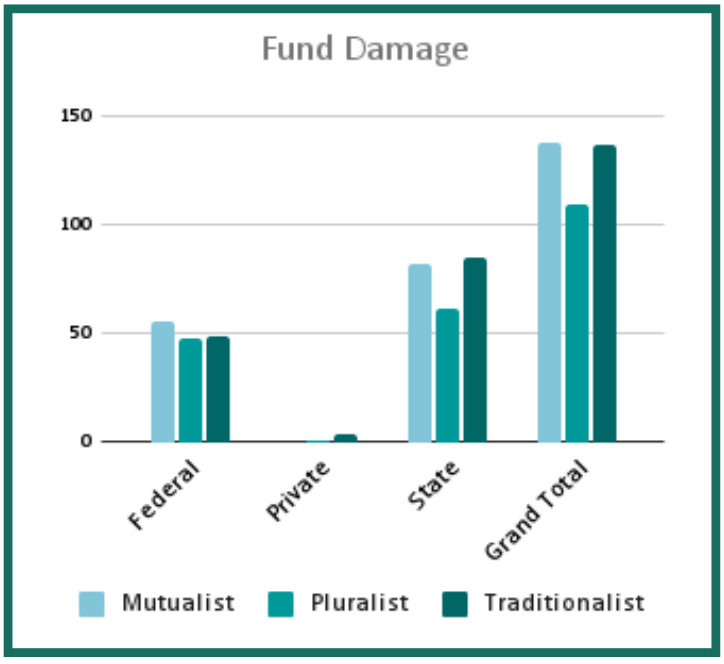
Figures 12 to *15* illustrate answers to our exploratory questions. Categorized by their respective value orientations, the respondents were asked their opinions on funding and decision making for three key areas of wildlife conservation: Hunting, Invasive Species Damage and Restoring Natural Habitats.

RESULTS

Exploratory Questions

The data in *Figure 12.1-12.3*, represent three different value orientations and their opinions on funding. Traditionalists (Dark Green) have the most responses followed by Mutualists (Forest Green) and then Pluralists (Light Green). The three categories of funding in this study include: funding for hunting and fishing; funding damage caused by invasive species (fund damage) and funding restoration projects for natural habitats (fund restore). It is important to note that there are no responses from our respondents indicating that they believe that private landowners should fund restoration, therefore they are not represented in the graph.





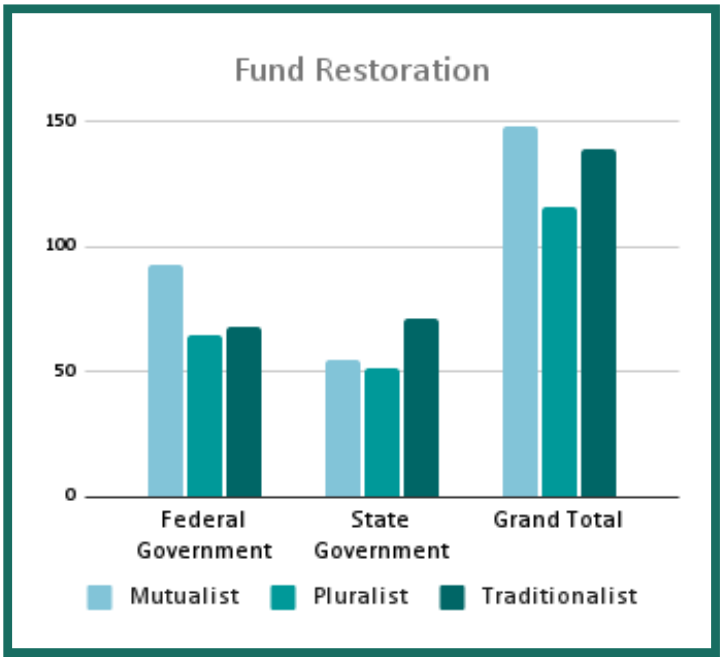
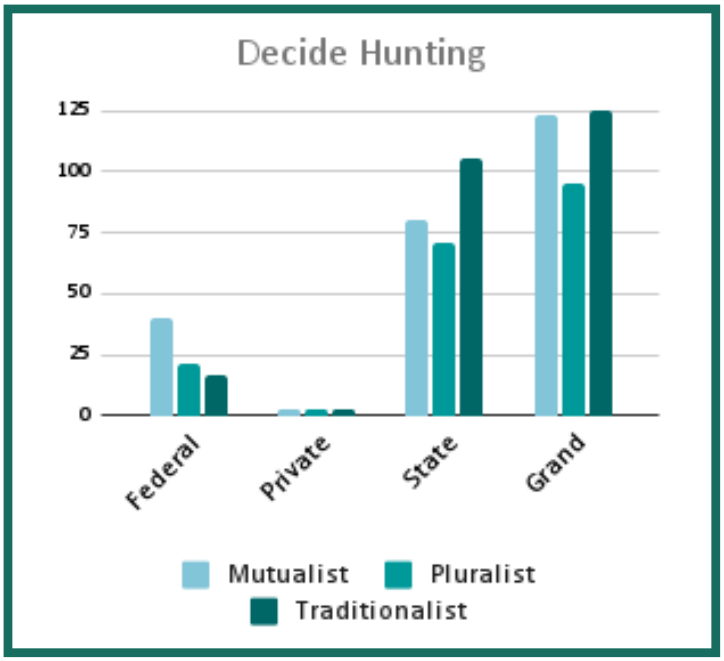


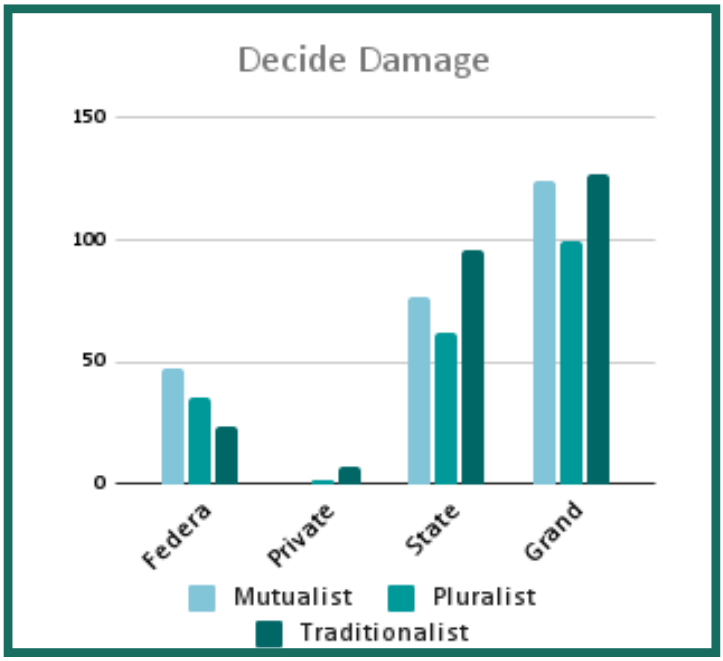
Figure 12.1-12.3: H1: For funding conservation, State governments and private individuals are favored by Traditionalists whereas the federal government is favored by Mutualists.

RESULTS

Exploratory Questions

The data visualized in figure 13.1-13.2, represents the Traditionalist (Dark Green) Pluralist (Light Green) and Mutualists (Forest Green) categories and their opinions on who should decide policy for three categories of conservation; hunting and fishing policy, managing damage by invasive species policy and restoring habitats policy.





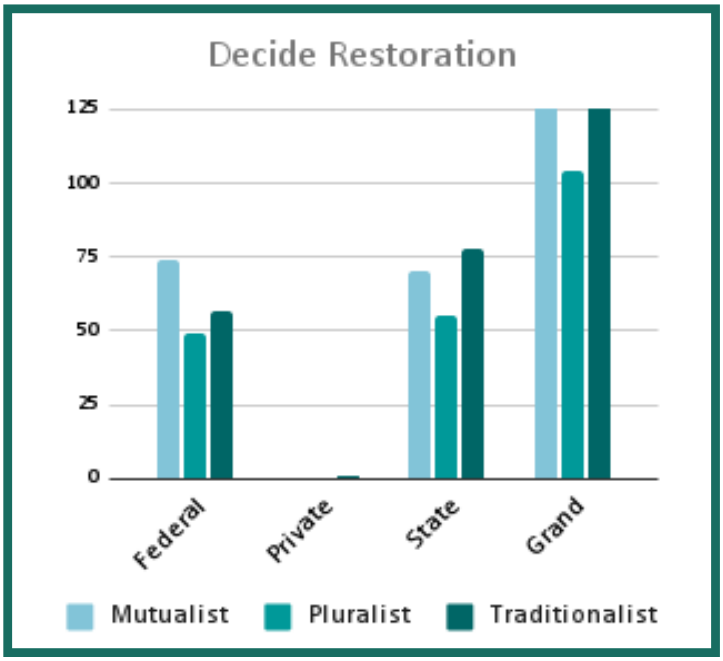
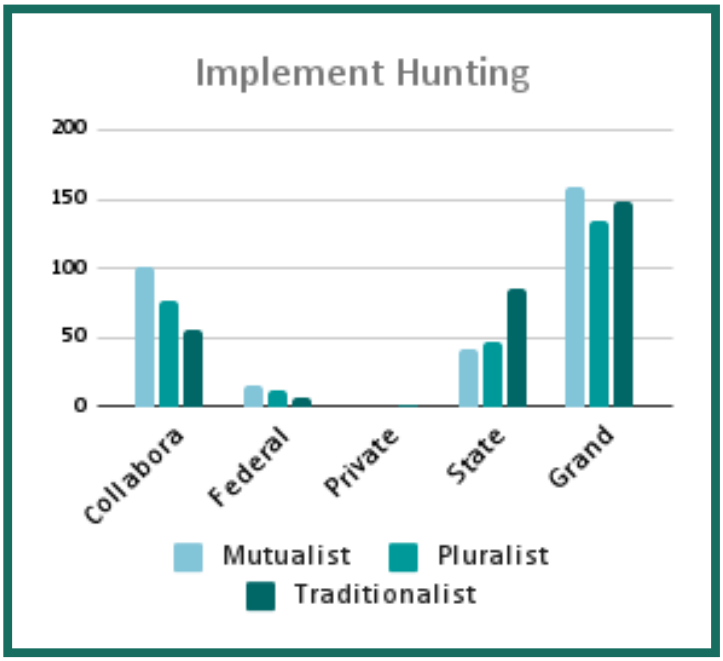


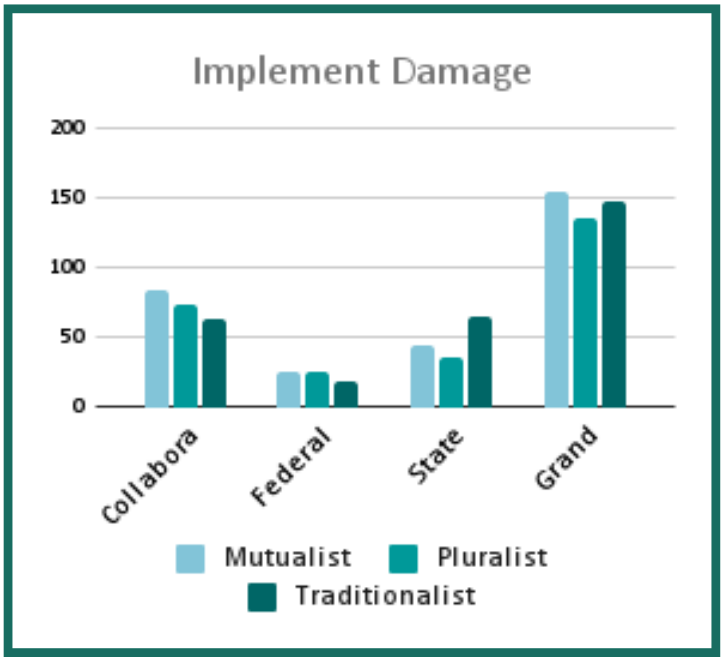
Figure 13.1-13.2: H2: For deciding on conservation, State governments and private individuals are favored by Traditionalists whereas the federal government is favored by Mutualists.

RESULTS

Exploratory Questions

The data displayed in *Figure 14.1-14.3* are an estimate of all survey answers where individuals considered both funding and decision making to be the responsibility of either the federal government, the state or the private landowner. For example, if someone believed that funding and decision making should be handled by the Federal government, then they are for Federal implementation. However, the majority of survey respondents requested some sort of collaboration between stakeholders, these individuals are placed in the Collaborate bin.





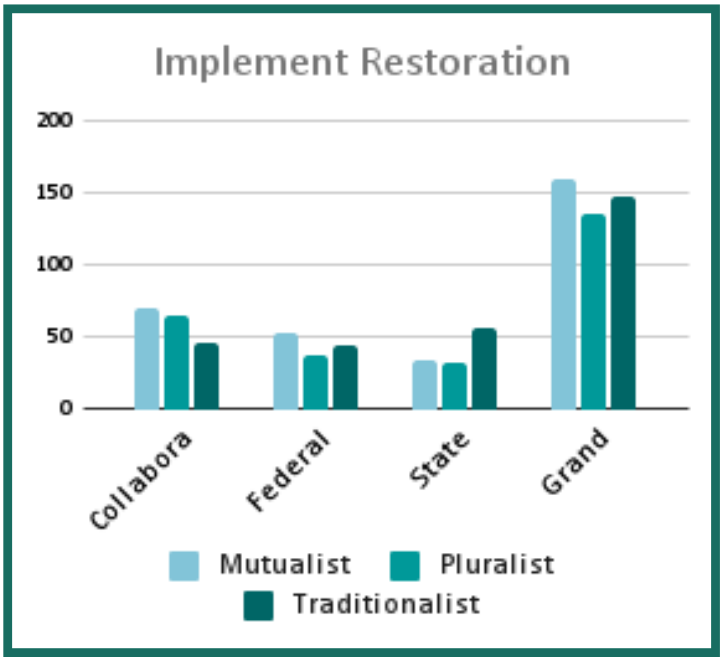
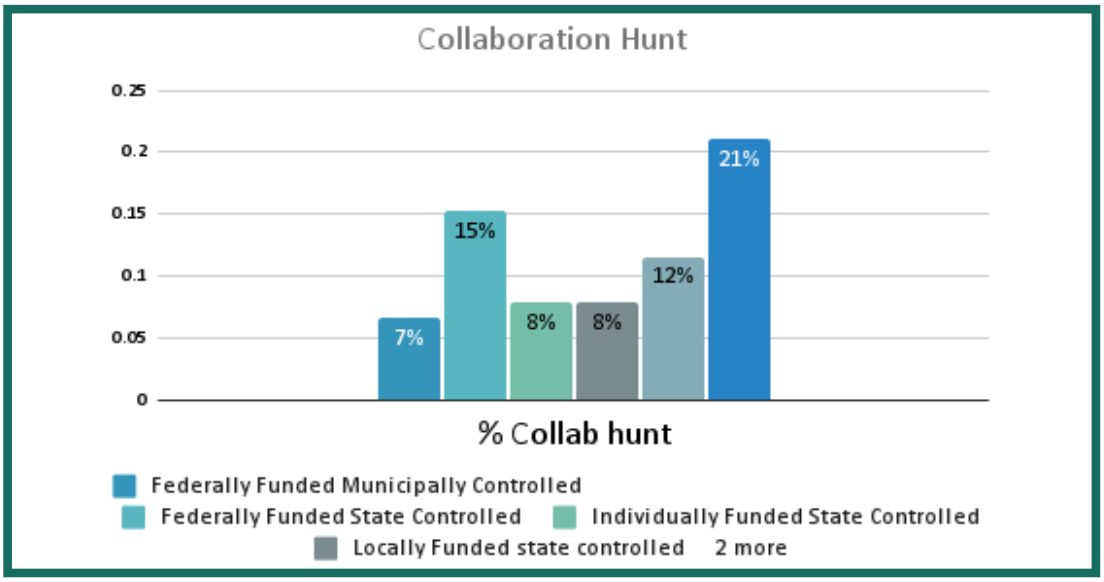
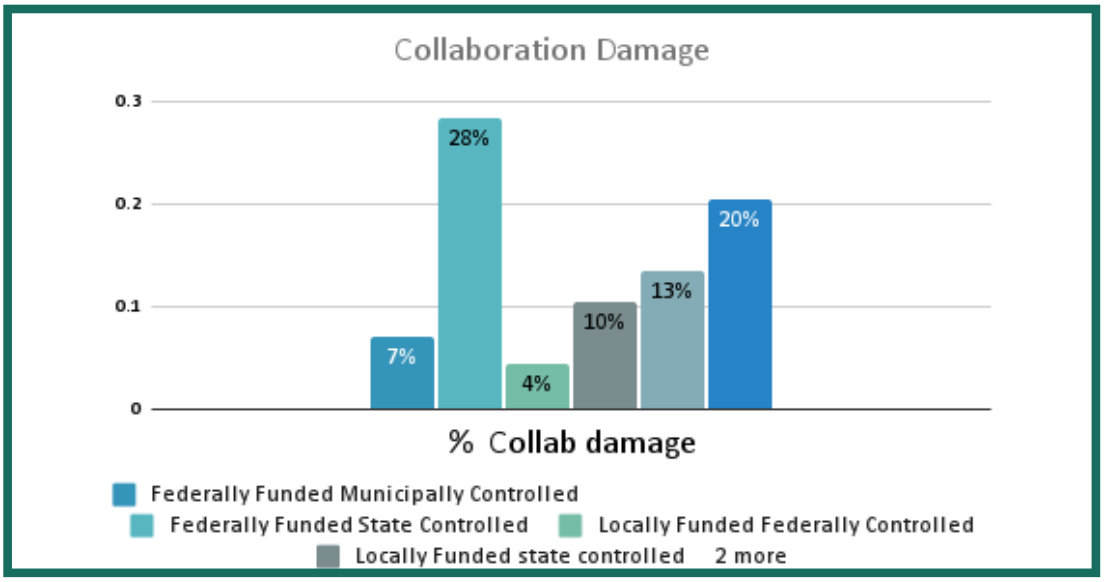


Figure 14.1-14.3: H3: For implementing conservation, State governments and private individuals are favored by Traditionalists whereas the federal government is favored by Mutualists.

RESULTS

Exploratory Questions





The data displayed in *Figure 15.1-15.3* represent the break up of the Collaboration Category in *Figure 14*. The data shows that for all three categories, the largest percentage of people believed in state or local control. It is important to note that several categories were excluded from the final visualization in order to maintain an organized and coherent image. Therefore, the percentages displayed above do not equal 100%. Hunting represents 86% of survey respondents, Damage represents 82% of survey respondents and Restoration represents 81% of survey respondents.

RESULTS

Exploratory Questions

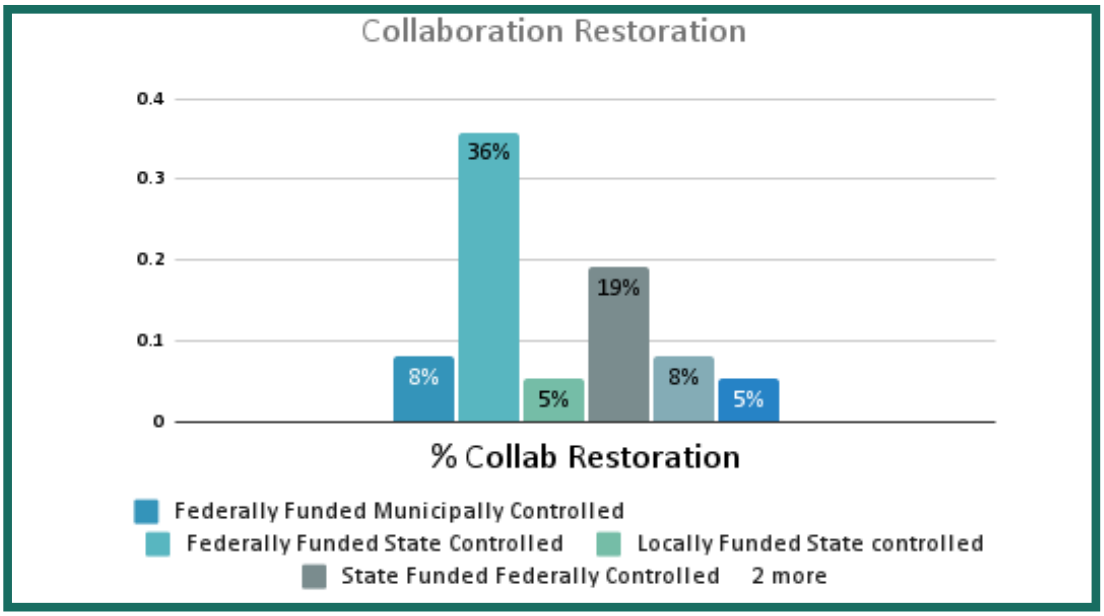


Figure 15.1-15.3: Respondents favor a collaborative effort with management at the lower level of government and funding at the higher level of government

DISCUSSION

Based on the results of the data, both Mutualists and Traditionalists agree that the state government should fund hunting and fishing as well as manage damage caused by invasive species. However, when it comes to funding restoration projects, Traditionalists are split between federal and state, while Mutualist participants seem more sure that federal money should fund wildlife restoration. It is also clear that none of the three value orientations represented believe that private owners should fund any of the three areas of conservation presented. Another interesting discovery is that across all value orientations, very few individuals believed that funding for any conservation should fall on private owners.

The data indicates that all three categories Traditionalist, Pluralist and Mutualists agree that states should be deciding on these policy areas. However, when it comes to policy regarding restoration of natural wildlife habitats, Traditionalists and Mutualists are split between who should decide, states or the federal government. Pluralists, however, have a large majority believing that states should decide restoration policy. Further, we find that while the vast majority of individuals agree that the state should decide policy for hunting and damage, the picture becomes blurry when looking at restoring natural habitats. Again, just like in funding, very few people believe private landowners should decide conservation policy and no one believes private owners should decide restoration policy.

The data also indicates that of the three orientations Traditionalists strongly believe that the state should bear the full responsibility for wildlife policy when it comes to hunting and fishing and managing invasive species damage. There is much more speculation among restoration projects. It is also important to note that across the three areas of policy, about half of the respondents believed in some sort of collaboration while the other half believed in total control by one single entity.

Regression Analysis

Seen in Appendix 2, our regression table, shows the results from a regression on the influences many of our control variables have on how people respond. In particular, a person's level of understanding and all available demographic variables were used in the analysis.

Taken as a whole and looking for consistent trends across regressions, the regression table shows mixed results with very little consistent trend across responses. For a given regression on, for instance, which level of government should fund a given aspect of conservation, the influential variables for the hunting aspect are different than the restoration aspect. Further, for different exploratory questions the influential variables are different. For example, for the hunting aspect of conservation the influential variables are different for which level of government should fund and which level of government should decide. However, there are some overall takeaways.

One aspect that is interesting is the influence of home size on a person's stated level of understanding of conservation.

DISCUSSION

Urban and Urban Area residents were statistically more likely to state they understand conservation than rural respondents. Further, a respondent's Manfredo classification influences which respondents think the current system for all three categories is efficient, with Mutualists and Mixed respondents more likely to believe the entire system is inefficient and Pluralist respondents believe the hunting system is inefficient. All in all, the variation present within groups and demographic information collected makes it difficult to state any other observations with a reasonable level of confidence.

For the regression analysis, not all variables were equal. As the regression was performed with a series of categorical variables handled like dummy variables, the amount of responses in a given category varied wildly and made some aspects yield unreliable responses. For instance, the variable state included very few responses for states other than Texas and has a large number of possibilities in general. Similarly, there are a large number of possible responses for future field of occupation and race. In future research some of these values could be restricted in order to get clearer results.

Limitations of Study

Some of the limitations of survey collection include response bias, lack of comprehension of questions, and populations studied (Andrade, 2020). Response bias is the natural bias incurred when asking subjects to volunteer their time to respond to a survey. In addition, subjects may not have fully understood the survey questions. Literacy is necessary but it is possible that individuals are challenged with the wording of the question(s). Multiple of the questions used were the same from the Manfredo et al. 2018 survey. Using the same questions is for consistency and for comparison with this published study.

Another limitation of the survey is the lack of questions designed to elaborately explore an individual's understanding of the management system of conservation. The decision to not further investigate an individual's understanding was due to the high number of questions already written into the survey. Any more questions would risk receiving a lower amount of responses and less answers of quality.

Further limitations include time, respondent integrity, and data interpretation. This survey was conducted over a short period of time of two weeks, from January 28, 2022 and was closed February 14, 2022. In regards to respondents, they may have completed the survey due to the $25 gift card incentive. It is possible that the answers received from these individuals were not representative of their actual perspective. As stated before, the population this report studies introduced constraints to the data; the students of Texas A&M may not have accurately represented the consensus of all college students in Texas. In order to prevent the limitations described from skewing results, the capstone group sought as many responses as possible.

IMPLICATIONS

Overall, conservation is an important issue for people aged 18 to 30. No matter their value orientation, there is consensus that wildlife has intrinsic value and can provide utility. Respondents believe they are well educated on these issues, so conservationists should take advantage of this knowledge and interest and turn their efforts towards mobilizing this age group with specific calls to action. Our respondents showed a preference for collaboration across all levels of government; with all value orientations showing widespread support for state and local government control. Wildlife conservation management could prove to be a fertile ground for bipartisan policy making, and legislators should be excited by the prospect to enact popular policy. After conducting a survey and analyzing the results we have identified the following implications, many of which align closely with the work of Manfredo et al. (2018). While these findings do not explicitly tell us why conservation bills like Recovering America's Wildlife Act (RAWA) have not passed, it allows us to understand the perspectives of respondents:

Issue Importance

- Wildlife conservation is an important issue to our respondents (only 1% of total respondents were classified as distanced from wildlife and nature)
- Young people have the same range of value orientations as the wider population: Our respondents included 32% Traditionalists that prioritize the use of wildlife by society; 33% mutualists that prioritize the intrinsic value of wildlife, and 27% that shift their priority with the context of use.
- Of the 499 respondents, 48% were confident that they understood the system for deciding, funding and managing wildlife. Conservationists will need to engage the public actively on issues that are relevant to their economic and social wellbeing. Passive educational information is not likely to alter strongly held beliefs of the public that are confident in their knowledge.

Varying Value Orientations

- Traditionalists may be cautious of including Mutualists in policymaking out of fear of anti-hunting or other restrictions. However, tolerance of hunting was high among respondents, with 67% of respondents agreeing that individuals who wish to hunt should be provided the opportunity to do so; including 19.74% of Mutualists. More so than hunting, participation in fishing, hiking and wildlife viewing was much more popular amongst Traditionalists and Mutualists.
- Participation in hunting was lower than fishing, hiking and wildlife viewing. Respondents apparently accept a wide range of activities whether or not they actively participate in those activities.

IMPLICATIONS

- Diverse value orientations may not be an impediment to enacting conservation policies. Although values differ, attitudes are more closely aligned, driven by strong positives rather than negatives. This suggests that people are willing to negotiate and compromise.
- The distribution of value orientations align with previous work but results indicate they may not be the primary driver of attitudes.

Management Preferences

- Survey respondents value governmental collaboration for many aspects of conservation management and policy. The majority of respondents prefer larger governments to fund conservation needs with control at the state and local level:
  - Almost 53% of respondents preferred government collaboration for implementation of hunting policies.
  - 50% of respondents preferred government collaboration for implementation of damage management policies.
  - 41% of respondents preferred government collaboration for implementation of restoration management policies.

- Individuals would prefer the government to make fundamental restoration decisions over nongovernmental organizations and private landowners.
- Respondents support multiagency coordination of management of invasive species. Respondents who prefer collaboration showed preference for the following:

  - *Hunting Management*
    - 51% wanted either state or local management
    - 22% wanted federal funding with state or local management
  - *Invasive Species Management*
    - 65% wanted either state or local management
    - 35% wanted federal funding with state or local management
  - *Habitat Restoration*
    - 57% wanted either state or local management
    - 41% wanted federal funding with state or local management

- Very few respondents (<1%) selected private landowners as the primary entity for decision making, implementing, or funding conservation issues.

CONCLUSION

Our experiment builds upon the work of Manfredo et al. 2018 by focusing upon a specific subset of the population. The age range surveyed, 18 – 30, are young taxpayers and the future decision-makers for conservation in the United States. Millennials and Generation Z account for 21.9 and 20.4 % of the 2020 census (Statista, 2021), that is the majority of the population and thus the pool of voters.

Of those surveyed, about half claimed to understand the current system for wildlife conservation in the United States. Conservation advocates may find more success in engaging citizens in conservation planning and action, rather than spending time trying to teach them about a familiar topic. Instead of teaching how conservation management works, conservation advocates should focus on demonstrating how conservation management crosses over into the daily lives of citizens who do not regularly engage with outdoors activities.

Additionally, examining what categories the survey respondents fell into can teach us about conservation attitudes amongst the youth, and how conservation policies should be implemented. Although Mutualists and Traditionalists may seem diametrically opposed by definition alone, the results of the survey indicate that the two categories have more in common than we hypothesized. Further research should delve into more precise differences and commonalities between the two groups. Discovering common ground between these two groups and what major beliefs they share is the key towards creating popular conservation policy that can be passed and implemented successfully.

Recovering America's Wildlife Act (RAWA) is the ideal bill for supporting conservation and correlates to many results of our survey. RAWA would provide federal funding for state level governments to implement conservation policy (The Wildlife Society, 2022). This is a notion popular with both Mutualists and Traditionalists, as both categories support federal funding but state or local implementation. Furthermore, RAWA would provide state agencies with the authorization to implement conservation policy in an effective manner (The Wildlife Society, 2022). The authorization of RAWA would accomplish the desires of Mutualists and Traditionalists, pushing forward conservation policy that is effective and widely popular.

CONCLUSION

The key findings of the survey are listed below:

- The majority of respondents believe they have, at least, a partial understanding of the current system of wildlife management.
- Respondents largely fell into one of the two main value orientations, either **Mutualists** (33%) or **Traditionalists** (32%). **Pluralists** (28%) made up the majority of the respondents not categorized as Mutualists or Traditionalists; leaving only 1% in the **Distanced** category.
- Most survey respondents believe that the creation and implementation of wildlife management should be a cooperative effort between different levels of government. More specifically, there is a considerable pattern among all value orientations toward a local and state management system with federal funding.
- Mutualists and Traditionalists, while disagreeing on fundamental values, largely agree with each other on management of hunting and invasive species policy. For example, Both Mutualists and Traditionalists agree that policy on hunting and policy on mitigating the effects of invasive species should be decided at the state level.

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Appendix A

Consent Information
Title of Research Study: Survey of Wildlife Value Orientation
Investigator: Dr. Cole Blease Graham

Why am I being asked to take part in this research study?

You are invited to participate in this study because we are trying to learn more about the value orientation for wildlife conservation among the people between 18-30 years of age. You were selected as a possible participant in this study because as a young citizen of this country your opinion regarding wildlife conservation is valuable for our study. You must be between 18-30 years of age to participate.

Why is this research being done?

The survey is designed to provide useful information for our capstone research project on the view of the students of Texas A&M University between 18-30 years of age on orientation of values for wildlife conservation.

How long will the research last?

It will take about 15-20 minutes to complete the survey.

What happens if I say "Yes, I want to be in this research"?

If you decide to participate, please follow the instructions for completing this survey on the next page.

What happens if I do not want to be in this research?

Your participation in this study is voluntary. You can decide not to participate in this research and it will not be held against you. You can leave the study at any time by closing your browser tab or window.

Is there any way being in this study could harm me?

There are no sensitive questions in this survey that should cause discomfort. However, you can skip most of the questions you do not wish to answer, or exit the survey at any point.

What happens to the information collected for the research? You may view the survey host's confidentiality policy at : https://www.qualtrics.com/privacy-statement/ Your email address will be stored separately from your survey data, and is only being collected for randomized drawing for gift card if you choose to participate in randomized drawing at the end of the survey. All identifiable information will be kept on a password protected computer and is only accessible by the research team. Compliance offices at Texas A&M may be given access to the study files upon request. Your information will be kept confidential to the extent allowed by law. The results of the research study may be published but your identity will remain confidential.

What else do I need to know?

If you agree to take part in this research study, we might provide you with a digital gift card sent to the email address you provide at the end of the survey and if it is selected in randomized drawing. This is optional if you do not want to provide your email address. You may complete the survey without providing your email address for randomized drawing if you choose so.

Who can I talk to?

Please feel free to ask questions regarding this study. You may contact me later if you have additional questions or concerns at:
Telephone number: (979) 458-8028 or
E-mail address: cole_graham@Texas A&M University.edu
Dr. Cole Blease Graham, investigator of this research
You may also contact the Human Research Protection Program at Texas A&M University (which is a group of people who review the research to protect your rights) by phone at 1-979-458-4067, toll free at 1-855-795-8636, or by email at irb@Texas A&M University.edu for: additional help with any questions about the research, voicing concerns or complaints about the research, obtaining answers to questions about your rights as a research participant,concerns in the event the research staff could not be reached the desire to talk to someone other than the research staff
If you want a copy of this consent for your records, you can print it from the screen using your browser's print option.
If you wish to participate, please click the “I Agree” button and you will be taken to the survey.

If you do not wish to participate in this study, please select “I Disagree” or select X in the corner of your browser
I Agree
I Disagree

Survey of Wildlife Value Orientation

Thank you for taking a few minutes to answer several questions about yourself. The purpose of our project is to provide useful information for our capstone research project on the view of the students of Texas A&M University between 18-30 years of age on orientation of values for wildlife conservation. Your personal identifier will be kept confidential. This research is approved/waived by the Institutional Review Board (IRB) (IRB number if any). Several questions of this survey have been adapted from previously published standardized surveys by Manfredo et. al 2018**. If you are not comfortable answering any question, please leave it blank. You may also discontinue the survey at any time.

We use the following definitions in this survey:

The term “management” refers to a practice designed to conserve, restore, and maintain habitat for native plants and animals; The term "fish and wildlife" refers to free-living animals and does not include animals kept as pets or those raised for other domestic purposes (e.g., farm animals)

Work Cited:

Manfredo, M. J., Sullivan, L., Don Carlos, A. W., Dietsch, A. M., Teel, T. L., Bright, A. D., & Bruskotter, J. (2018). America’s Wildlife Values: The Social Context of Wildlife Management in the U.S. National report from the research project entitled “America’s Wildlife Values”. Fort Collins, CO: Colorado State University, Department of Human Dimensions of Natural Resources.

Please select one (or more) answer(s) for each of the following questions

Age

Q1. Are you between the ages of 18-30?
Yes
No

50 States

Q2. What is your home State?

Demographic Question

Q3. What is your gender?
Male
Female
Prefer not to disclose

Q4. What is the size of your hometown?
(Please choose 250,000 if your hometown size is higher than that.)
1 50001 100001 150000 200000 250000
Hometown Population

Q5. Where would you like to work? In what sector of the economy do you want to participate in the next 5 years as an employee or investor?

Q6. Choose one or more races that you consider yourself to be:
White Native Hawaiian or Pacific Islander Black or African American Prefer not to answer American Indian or Alaska Native Other Asian

Q7. Have you ever participated in these activities?
Hunting
Fishing and Boating
Hiking/Trailing/Biking/Back Packing
Wildlife Viewing/Camping/RV
None
Wildlife value orientation
Q8. Humans should manage fish and wildlife populations so humans benefit
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q9. Animals should have rights similar to the rights of humans
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q10. We should strive for a world where there is an abundance of wildlife for hunting and fishing
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q11. I view all living things as part of one big family
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q12. Hunting does not respect the lives of animals
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q13. I feel a strong emotional bond with animals
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q14. The needs of humans should take priority over fish and wildlife protection
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q15. I care about animals as much as I do about other people
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q16. Fish and wildlife are on earth primarily for people to use
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q17. I take great comfort in the relationships I have with animals
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q18. I believe that wildlife have intentions
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q19. It is acceptable for people to kill wildlife if they think it poses a threat to their property
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q20. We should strive for a world where humans and fish and wildlife can live side by side without fear
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q21. It is acceptable for people to kill wildlife if they think it poses a threat to their life
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q22. I value the sense of companionship I feel from animals
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q23. People who want to hunt should be provided the opportunity to do so
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q24. Wildlife are like my family and I want to protect them
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q25. It is acceptable for people to use fish and wildlife for research even if it may harm or kill some animals
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q26. It would be more rewarding for me to help animals rather than people
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q27. Hunting is cruel and inhumane to the animals
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q28. I believe that wildlife appear to experience emotions
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Perception about fish and wildlife management

Q29. Who should fund fish and wildlife management for hunting and fishing?
Federal Government
State Government
Local Government
Nonprofit Organizations
Private Landowners
Individual User

Q30. Who should fund fish and wildlife management to control damage from invasive and overabundant wildlife?
Federal Government
State Government
Local Government
Nonprofit Organizations
Private Landowners
Individual User

Q31. Who should fund fish and wildlife management to restore rare native species and vulnerable populations of fish and wildlife?
Federal Government
State Government
Local Government
Nonprofit Organizations
Private Landowners
Individual User

Q32. Who should decide on managing fish and wildlife for hunting and fishing?
Federal Government
State Government
Local Government
Nonprofit Organizations
Private Landowners
Individual User

Q33. Who should decide on controlling damage from invasive and overabundant wildlife?
Federal Government
State Government
Local Government
Nonprofit Organizations
Private Landowners
Individual User

Q34. Who should decide to restore rare native species and vulnerable populations of fish and wildlife?
Federal Government
State Government
Local Government
Nonprofit Organizations
Private Landowners
Individual User

Q35. Our system for managing fish and wildlife for hunting and fishing is efficient.
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q36. Our system for managing fish and wildlife to control damage from invasive and overabundant wildlife is efficient.
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q37. Our system for managing fish and wildlife to restore rare native species and vulnerable populations is efficient.
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q38. I understand the current system for managing fish and wildlife for hunting and fishing.
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q39. I understand the current system for managing fish and wildlife to control damage from invasive and overabundant wildlife.
Strongly disagree
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

Q40. I understand the current system for managing fish and wildlife to restore rare native species and vulnerable populations.
Strongly disagree
Somewhat disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Somewhat agree
Strongly agree

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Appendix B

The regression table below is intended to be read vertically, with each column representing a different regression and each row representing a variable. There are 12 separate regressions divided into 4 categories for 3 topics based on survey results. The first 2 columns indicated the variables. The next 3 columns–the first columns containing data–are on an individual's level of understanding, with values ranging from -3 to +3, with positive values indicating a higher level of understanding for the given topic–damage mitigation, hunting, and vulnerable species restoration. The next three column are on an individual's belief that the current system is efficient, with values ranging from -3 to +3, with higher values indicating higher levels of beliefs that the current system is efficient for the given topic. The next 3 columns are on which level of government an individual believes the government should decide on a given topic, with 0 indicating the federal government and 1 indicating state and local government. The last 3 columns are on which level of government an individual believes should fund a given topic. Some variable values are dropped for multicollinearity, of which two important variables are listed, which represent the baseline value for a given variable: for value orientations the value traditionalist and for home size the value rural. Reiterated in the table itself, standard errors are listed in parentheses under the beta value.

		-3 through +3; stronger (-) the less likely to understand.			-3 through +3; stronger (+) the more respondent believes the system is efficient			0 if Federal; 1 if State OR Local government. Higher (+) value is more state/local inclination					
		Understanding of...			Believe the system is efficient			Which government should decide on...			Which government should fund...		
VARIABLES	Variable Value	Damage	Hunt	Restoration	Damage	Hunt	Restoration	Damage	Hunt	Restoration	Damage	Hunt	Restoration
X_1, Value Orientation	Mutualist	0.281	0.282	0.420*	-0.950***	-1.308***	-0.922***	-0.0954	-0.0866*	-0.118*	-0.00361	-0.116**	-0.202***
		(0.221)	(0.225)	(0.230)	(0.189)	(0.182)	(0.194)	(0.0579)	(0.0523)	(0.0685)	(0.0645)	(0.0551)	(0.0684)
X_1, Value Orientation	Pluralist	0.358*	0.262	0.467**	-0.296	-0.511***	-0.231	-0.121**	-0.0262	-0.0617	-0.0265	-0.161***	-0.107
		(0.213)	(0.217)	(0.222)	(0.183)	(0.176)	(0.188)	(0.0571)	(0.0514)	(0.0684)	(0.0624)	(0.0534)	(0.0669)
X_1, Value Orientation	Distanced	-0.351	-0.243	0.479	0.439	-0.206	-0.106	0.0455	-0.189	0.0636	0.113	-0.343**	-0.00730
		(0.713)	(0.726)	(0.742)	(0.612)	(0.588)	(0.624)	(0.184)	(0.178)	(0.263)	(0.223)	(0.174)	(0.260)
X_1, Value Orientation	Mixed	0.562	0.710*	0.591	-0.812***	-0.932***	-0.959***	-0.0176	0.0215	-0.0842	0.273**	-0.0883	0.0446
		(0.367)	(0.373)	(0.381)	(0.314)	(0.303)	(0.322)	(0.0950)	(0.0863)	(0.122)	(0.109)	(0.0923)	(0.112)
X_2, Average Understanding	Average Understanding				0.512**	-0.0145	0.370	0.100	-0.0898	-0.0868	0.00740	-0.145*	-0.0836
					(0.249)	(0.249)	(0.240)	(0.0760)	(0.0708)	(0.0863)	(0.0844)	(0.0746)	(0.0869)
		-3 through +3; stronger (-) the less likely to understand.			-3 through +3; stronger (+) the more respondent			0 if Federal; 1 if State OR Local government. Higher (+) value is more state/local inclination					

					believes the system is efficient								
		Understanding of...			Believe the system is efficient			Which government should decide on...			Which government should fund...		
VARIABLES	Variable Value	Damage	Hunt	Restoration	Damage	Hunt	Restoration	Damage	Hunt	Restoration	Damage	Hunt	Restoration
X_3, Understand Damage	Understand Damage				-0.0733			-0.0389*			-0.0212		
					(0.0707)			(0.0218)			(0.0240)		
X_4, Understand Hunting	Understand Hunting					0.121*			0.0101			0.0341	
						(0.0696)			(0.0199)			(0.0209)	
X_5, Understand Restoration	Understand Restoration						-0.100			0.0177			-0.00206
							(0.0657)			(0.0235)			(0.0237)
X_6, Home Size	Urban Area	0.857**	0.657*	1.279***	-0.0702	0.0707	0.198	-0.0676	-0.0240	0.136	0.0414	-0.0966	0.140
		(0.381)	(0.387)	(0.396)	(0.327)	(0.315)	(0.337)	(0.103)	(0.0885)	(0.120)	(0.109)	(0.0958)	(0.120)
X_6, Home Size	Urban	0.608*	0.385	0.974***	0.173	0.128	0.236	-0.122	-0.0635	0.0981	0.0152	-0.0455	0.164
		(0.358)	(0.364)	(0.372)	(0.307)	(0.296)	(0.316)	(0.0959)	(0.0829)	(0.113)	(0.103)	(0.0895)	(0.112)
X_7, Field	Construction/ Manufacturing	0.366	0.645*	0.224	0.543*	0.460	0.468	-0.0923	-0.0918	-0.150	0.131	-0.0291	-0.0526
		(0.361)	(0.368)	(0.376)	(0.310)	(0.299)	(0.317)	(0.0991)	(0.0881)	(0.115)	(0.108)	(0.0908)	(0.110)
		-3 through +3; stronger (-) the less likely to understand.			-3 through +3; stronger (+) the more respondent believes the system is efficient			0 if Federal; 1 if State OR Local government. Higher (+) value is more state/local inclination					

		Understanding of...			Believe the system is efficient			Which government should decide on...			Which government should fund...		
VARIABLES	Variable Value	Damage	Hunt	Restoration	Damage	Hunt	Restoration	Damage	Hunt	Restoration	Damage	Hunt	Restoration
X_7, Field	Finance, Insurance, And Real Estate	-0.515	-0.235	-0.515	0.225	-0.117	0.222	-0.124	-0.110	-0.0652	0.0159	0.0201	-0.165
		(0.390)	(0.398)	(0.406)	(0.335)	(0.321)	(0.343)	(0.104)	(0.0934)	(0.123)	(0.115)	(0.0997)	(0.118)
X_7, Field	Mining	1.214	0.719	0.642	0.303	1.522	-1.131	-0.129	0.0443	-0.346	-0.231	0.283	0.494
		(1.191)	(1.213)	(1.240)	(1.020)	(0.981)	(1.043)	(0.307)	(0.274)	(0.364)	(0.340)	(0.357)	(0.410)
X_7, Field	Other	-0.771***	-0.716***	-0.898***	-0.0499	-0.0417	0.0606	-0.0928	-0.110*	-0.104	0.0367	-0.0251	-0.0869
		(0.238)	(0.242)	(0.248)	(0.207)	(0.198)	(0.213)	(0.0646)	(0.0566)	(0.0759)	(0.0702)	(0.0588)	(0.0738)
X_7, Field	Public Administration	-0.746**	-0.450	-0.626*	-0.0748	0.103	0.241	-0.0577	-0.129*	-0.171*	-0.0505	0.0647	-0.0171
		(0.317)	(0.323)	(0.330)	(0.275)	(0.262)	(0.280)	(0.0848)	(0.0749)	(0.0999)	(0.0925)	(0.0784)	(0.0994)
X_7, Field	Services	-0.956***	-0.786**	-0.942***	0.282	0.214	0.284	-0.177*	-0.124	-0.00757	0.0635	0.00975	-0.0869
		(0.337)	(0.343)	(0.351)	(0.292)	(0.280)	(0.298)	(0.0907)	(0.0811)	(0.106)	(0.100)	(0.0838)	(0.105)
X_7, Field	Transportation, Communications, Electric, Gas, And Sanitary Services	-1.172***	-0.729	-0.903*	-0.714*	-0.00735	-0.129	0.136	0.0144	0.163	0.143	-0.0993	-0.0585
		(0.451)	(0.459)	(0.469)	(0.389)	(0.372)	(0.396)	(0.124)	(0.109)	(0.150)	(0.130)	(0.112)	(0.142)
		-3 through +3; stronger (-) the less likely to understand.			-3 through +3; stronger (+) the more respondent believes the system is efficient			0 if Federal; 1 if State OR Local government. Higher (+) value is more state/local inclination					
		Understanding of...			Believe the system is efficient			Which government should decide on...			Which government should fund...		

VARIABLES	Variable Value	Damage	Hunt	Restoration	Damage	Hunt	Restoration	Damage	Hunt	Restoration	Damage	Hunt	Restoration
X_7, Field	Wholesale Trade/ Retail Trade	-0.161	-0.602	-0.883	0.452	0.603	1.052	-0.154	0.216	0.158	0.399	0.264	-0.487*
		(0.919)	(0.935)	(0.956)	(0.787)	(0.756)	(0.806)	(0.237)	(0.233)	(0.276)	(0.262)	(0.258)	(0.274)
X_8, Participation	Fishing and Boating, Hiking/Trailing/Biking/Back Packing	0.443	0.449	0.508	-0.623	-0.306	0.405	-0.169	-0.0732	0.102	0.00643	0.00853	0.0642
		(0.666)	(0.678)	(0.693)	(0.570)	(0.548)	(0.583)	(0.173)	(0.168)	(0.212)	(0.208)	(0.162)	(0.201)
X_8, Participation	Fishing and Boating, Hiking/Trailing/Biking/Back Packing, Wildlife Viewing/Camping/RV	0.472	0.405	0.843	-0.522	-0.149	0.683	-0.111	-0.0443	0.249	0.0829	0.0292	0.226
		(0.604)	(0.615)	(0.628)	(0.516)	(0.497)	(0.529)	(0.158)	(0.154)	(0.193)	(0.191)	(0.146)	(0.183)
X_8, Participation	Fishing and Boating, Hiking/Trailing/Biking/Back Packing, Wildlife	4.877**	2.102	5.046**	-2.090	-0.428	1.132	0.248	-0.0466	0.644	0.529	0.526	0.0444