

PUBLIC PERCEPTION OF CETACEAN CONSERVATION IN THE DC METROPOLITAN
AREA

by

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ABSTRACT

PUBLIC PERCEPTION OF CETACEAN CONSERVATION IN THE DC METROPOLITAN AREA

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This study aims to assess the knowledge, attitudes, and perceptions held by the public about cetaceans (whales, dolphins and porpoises) and the conservation issues they are facing. The District of Columbia metropolitan area served as the sample area and residents were the focal population for these assessments. The survey was conducted via face-to-face interviews using a standardized questionnaire. The main questions asked were:

1. What did the survey respondents perceive to be the greatest threats to cetacean populations?
2. What was the effect of demographic factors such as age, gender, education level, political leaning, and profession on level of basic knowledge about cetaceans?
3. What is the effect of age, gender, education level, political leaning, and profession on support for marine conservation and education legislative initiatives?

The eight threats that the largest percentage of respondents (N=260) listed as a “serious threat” included: commercial whaling (49.6%); entanglement in fishing gear (38.1%); marine litter/debris (53.1%); introduction of exotic species (31.2%); bacteria/viruses from sewage (48.1%); oil spills (58.1%); loss of coral reefs (39.2%); lack of political interest (38.1%); and climate change (37.7%).

A majority of participants did not know that the United States conducts any kind of whaling - 81.5% were unaware of aboriginal whaling in Alaska. Neither could participants correctly identify the most endangered whale and porpoise species in North America (88.9%, 90.4% failed, respectively) or the world (93.1%, 96.9% failed, respectively). About three-quarters (77.7%) of participants had not heard of the US Marine Mammal Protection Act.

Respondent participation in water-borne activities was the factor most strongly associated with more pro-cetacean behavior and higher levels of knowledge about cetaceans. Age was also found to be correlated with behavior toward cetaceans, with increasing age showing less pro-cetacean behaviors (such as supporting cetacean conservation legislation). A higher average level of knowledge was also found to be correlated with more pro-cetacean attitudes and behaviors.

In order to minimize the impacts that human actions and behaviors have on cetaceans, it is important to understand the current level of knowledge and perception of cetacean conservation issues held by the public, policy makers, and managers. The results of this study will provide useful information for management and decision-making communities involved in marine conservation efforts. The low levels of knowledge

observed in this study indicate that increased efforts to educate the public about cetaceans, and the conservation issues they are facing, may be needed in order to increase support for more cetacean conservation legislation and initiatives.

CHAPTER 1: INTRODUCTION

Profound impacts resulting from human actions on cetacean (whales, dolphins, and porpoises) populations have been recorded throughout history. Socioeconomic, political, and behavioral factors all play a part in the perceptions that guide decision-making processes and ultimately influence the level of regulation on human activities and practices which influence these threats. In order to minimize the impacts that human actions and behaviors have on cetaceans, it is important to understand the current level of knowledge and perception of cetacean conservation issues, and opinions and concerns (or lack thereof), held by the public, policy makers, and managers.

This study aims to assess the knowledge, attitudes, and perceptions held by the public about cetaceans and the conservation issues they are facing. The District of Columbia metropolitan area will serve as the sample area and residents will be the focal population for these assessments. The Washington DC metro area is characterized as having a population that is typically well-educated, with high proportion of them being employed in activities related to the US Government. This population is arguably disproportionately influential when it comes to public policy. According to a report published by the Office of Personnel Management in 2013, the Washington, DC metropolitan area (Washington DC, Arlington, Alexandria) has 283,012 federal government employees and makes up over 24% of the federal government executive

branch workforce (OPM Website). Virginia, Washington DC, and Maryland combined make up 22.1% (404,641 employees) of the entire federal government workforce (Bureau of Labor Statistics Website). Therefore, this population will be useful in representing the perceptions held by a population with a significant percentage of federal employees.

The results of this study will provide useful information for management and decision-making communities involved in marine conservation efforts and will answer the following questions:

4. What do the survey respondents perceive to be the greatest threats to cetacean populations?
5. What is the effect of factors such as age, gender, education level, political leaning, and profession on level of basic knowledge about cetaceans?
6. What is the effect of age, gender, education level, political leaning, and profession on support for marine conservation and education legislative initiatives?

History of Cetacean Conservation Issues

Some of the earliest accounts of hunting whales date back to the 890 AD. and were carried out by Norwegians (Parsons *et al.* 2013 p. 207). Historically, marine mammals were hunted for subsistence, but this activity later evolved into commercial whaling. The first record of a commercial whaling operation was in the Basques (of France and Spain) in the 11th century (Parsons *et al.* 2013 p. 207). From there, commercial whaling operations spread to numerous nations, and by the 18th century, American commercial whalers from New England depleted right whale populations and

began targeting sperm whales (*Physeter macrocephalus*), baleen whales (*Mysticeti*), and smaller cetaceans in coastal waters (Reeves 1999).

Cetacean species were further threatened after 1945 when technological advancements improved fishing vessels and gear (Soulé 2005 p. 21). Consequentially, large predatory species populations are believed to have decreased by 90 percent due to the effects from habitat changes and by-catch (Soulé 2005 p. 21).

By the 1940s, changes in public perception of whales and whale conservation initiatives began to emerge (Parsons *et al.* 2013 p. 212). The United States initiated major conservation efforts in the 1970s, which helped to manage the fisheries and the negative effects they have on marine mammals – most notably the US Marine Mammal Protection Act of 1972. Various international efforts have also been established, many of which were established in this time period. However, many populations that are protected, such as the North Atlantic right whale (*Eubalaena glacialis*) and the Vaquita/Gulf of California Harbor Porpoise (*Phocoena sinus*), have not shown signs of recovery and continue to have high rates of mortality (Fujiwara and Caswell 2001, Jefferson *et al.* 2008).

Current Cetacean Conservation Issues and Legislation

Some of the biggest threats to cetacean populations in recent times have included: pollution, disease, introduction of exotic species, climate change, commercial fishing and direct takes, and human overpopulation (Soulé 2005 pp.105-106). An analysis of large whale events that lead to serious injury or mortality was conducted between 2004 – 2008

along the east coast of the United States and Canada. Results showed that out of the recorded events (n=539) involving North Atlantic right, humpback (*Megaptera novaeangliae*), fin (*Balaenoptera physalus*), sei (*B. borealis*), blue (*B. musculus*), northern minke (*B. acutorostrata*), and Bryde's (*B. edeni*) whales, 13% of entanglement events and 53% of ship strikes were fatal. A definitive cause was not able to be confirmed for a majority of the recorded mortalities (Glass *et al.* 2010). The full extent of the impact for many of the threats to cetaceans remains unknown.

The continuation of these activities in their current capacities has led to the Potential Biological Removal (PBR) for species such as right and humpback whales being regularly exceeded. Attempts to regulate this level of mortality have been widely unsuccessful (Van der Hoop *et al.* 2012). The Marine Mammal Protection Act (MMPA) defines PBR as the “maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population” (MMPA 1972). The MMPA section 118 requires that human-caused death of pre-defined species should not exceed the individual PBRs set for those species.

Public Knowledge of Cetaceans

A study conducted during the 1990s showed that respondents were more likely to gain a majority of their knowledge and beliefs about cetaceans from the way media portrayed them (Amante-Helweg 1996). Results from similar studies, which assessed public factual knowledge of cetaceans, yielded results showing a positive correlation

between knowledge of cetacean and other marine species and support of cetacean conservation (O' Bryhim 2009; Denham 2015), echoing findings of studies with other high profile marine species (O'Bryhim & Parsons 2015).

More recently, in Scotland, a study was conducted which showed that residents were not able to correctly identify which species of cetacean were present in local bodies of water regardless of whether they were presented with pictures of the species (Scott and Parsons 2004). Despite being so close to a diverse array of cetaceans, a study conducted in 2001 in south-west Scotland found that urban residents near coastal areas where cetaceans are present had a significant lack of knowledge about their local species (Howard & Parsons 2006). However, residents in rural coastal areas showed a slightly greater understanding and knowledge (Howard & Parsons, 2006; Scott & Parsons, 2005). Similar levels of knowledge can also be seen in recent times among the young adult population in the US. A study on the understanding of cetaceans among DC Metropolitan area university students (George Mason University) found that less than 5% of the test group (n=230) was able to correctly identify the North Pacific right whale as the most threatened whale species (Parsons *et al.* 2010). A lack of foundational knowledge in voting populations has the potential to impact policy, management, and program implementation for cetacean protection. In the same test group, less than a quarter was aware of the International Whaling Commission and its function, although a majority was not aware of the US government's stance on whaling (Parsons *et al.* 2010). This study made evident the need for greater outreach and education for 18-26 year olds regarding cetacean conservation status, and particularly US whaling policy.

Public Knowledge of Other Marine Species

This lack of knowledge among members of the public has been demonstrated for other marine species as well. For example, one study showed low public awareness of the conservation status of the polar bear and penguins, despite their status as an iconic polar species threatened by climate change (Sitar-Gonzales & Parsons 2010). Another study looked at public awareness of shark conservation in the Washington DC metro area: results of this study showed that the same test population as the current study had a low level of knowledge about sharks, despite, again, being high profile marine species (O'Bryhim and Parsons 2015). Interestingly, this study also showed a significant positive correlation between the level of knowledge of sharks and support for conservation measures that would benefit them. The respondents' knowledge and attitude towards sharks was greatly influenced by the way they were portrayed by media (specifically, "Shark Week" on the "Discovery" TV channel), which supports the findings of Amante-Helwig (1996, noted above).

Additionally, decision makers and managers, when constructing policy initiatives that affect cetaceans, are often assumed to possess a foundational understanding and knowledge of the species for which they are making decisions. In fact, a majority of federal legislators (>90%) have not received any form of advanced (college level) education or training in science (Rose & Parsons 2015). Policies and regulations that guide marine activities which have the potential to negatively affect cetacean populations are often put into place by policy makers and managers who do not have a background in

science and may lack access to the information they need to make informed decisions based on actionable, unbiased scientific studies.

American Support of Cetacean Conservation Measures

In 1999, a national study conducted by Kellert, then a student at the Yale University School of Forestry and Environmental Studies, concluded that most Americans were willing to make sacrifices in order to protect marine mammal species regardless of the economic effects on commercial fishing and oil and gas extraction (Kellert 1999). The study also found that Americans thought the Marine Mammal Protection Act and Marine Mammal Commission to be of high importance, indicating strong support for these species from a wide range of Americans (Kellert 1999). These findings were supported by a study conducted in Fairfax, Virginia regarding naval sonar and cetaceans. A majority of respondents believed that federal programs and policies should be mitigated if they negatively impact cetaceans, such as naval sonar testing conducted by the Department of Defense (Zirbel *et al.* 2011).

International Support of Cetacean Conservation Measures

A study conducted in Belize in 2007 and 2008 showed that a majority of a sample group of whale watching tourists (n=166) believed marine mammal conservation laws and policies were of great importance and opposed the hunting of whales. A majority of respondents were also in favor of boycotting visiting countries that supported whaling initiatives. Additionally, respondents of this survey showed strong opposition to keeping

dolphins in captivity and preferred seeing them in their natural habitat (Patterson 2010). Similar findings were found regarding the public's preference of viewing whales in their natural habitat were also reported for studies in the Dominican Republic and Aruba (Draheim *et al.* 2010 & Luksenburg & Parsons 2014)

Findings of this nature, if supported in this study, might have important political and economic implications for the United States. Companies such as Sea World capitalize on exhibits of captive cetacean species. Due to the public's preference towards viewing species in their natural habitat, it might prove economically and educationally beneficial to increase awareness of alternative options for cetacean encounters such as ecotourism and whale watching.

However, a survey in Scotland showed that less than half of the tourists who were surveyed knew about whale-watching in the area (Scott and Parsons 2005). The results of this study also showed that only 43% of participants in the DC metro area were aware of whale-watching opportunities in Virginia and Maryland. Increasing awareness of responsible whale-watching tours that are available could help to increase utilization of alternatives to captive cetacean encounters.

Purpose of Study

The purpose of this research project is to acquire insight regarding the public perception of cetaceans and current conservation issues that are affecting them. In recent years, public opinion has been able to affect political decision-making on issues such as same-sex marriage and the death penalty. Conservation policy decision-making and

campaigning, however, is often conducted under the assumption - probably an erroneous one - that the public has formed their opinions concerning conservation issues with an accurate foundational knowledge about species and the issues themselves.

As noted above, few studies have been conducted to assess the level of knowledge and public perception of cetacean conservation issues, despite this group of animals being arguably one of the highest profile and iconic groups among marine species. The District of Columbia metropolitan area (hereafter referred to as the "DC metro area") is a unique location that is optimal for an assessment of this kind due to its proximity to a marine environment where cetaceans are present (just 1 hour from the sea coast and on a major estuary), as well as its proximity to the nation's hub for policy and decision-making. In order to assess the perception and level of knowledge held by residents of the DC metropolitan area, interviews were carried out at over fifteen sample sites with a broad cross-section of the public, such as coffee shops, gyms, and public transportation stations. Participants were selected at random and interviewed via a standardized survey questionnaire.

CHAPTER 2: METHODS

Questionnaire Design

After reviewing available literature on previous studies that assessed public knowledge, behavior, and attitudes of cetaceans, a survey questionnaire (Appendix I) was compiled. The questionnaire was designed in accordance with the George Mason University Human Subjects Review Board's standards. It is broken up into four sections: public perception and attitudes, knowledge, support for policy and engagement, and demographics. The survey can be found in Appendix I. Respondents were asked which marine issues they considered to be the greatest threats to cetacean populations. In the first section, respondents were asked to rate threats to cetaceans (on a list that was provided) from high concern to low concern using a Likert scale ranging from one to five (where 1= Serious Threat, 2= Moderate Threat, 3= Minor Threat, 4= No Threat, 5= I Don't Know). Threats were divided into four categories: fishing/commercial industry, environmental pollution and effects, political/governmental, and other. Each category gave multiple examples of threats to cetaceans with varying levels of impact.

The fishing/commercial industry category included: fishery by-catches, commercial whaling, hunting by native/indigenous people, dredging activity, whales/dolphins taken into captivity, and entanglement in fishing gear. The environmental pollution and effects category included: marine litter/debris, introduction

of exotic species, bacteria/viruses from sewage, oil spills, nutrient pollution, air pollution, reduction of available prey, loss of seagrass beds, and loss of coral reefs. The politics/governmental category included: military activities, lack of conservation funding, and lack of political interest. The other category included: climate change, whale/dolphin watching, injury from boat traffic, and population trends (human).

The second section of the survey covered public knowledge. General cetacean biology and conservation facts that the participants were tested on included: where whaling occurs today; most endangered whale and porpoise in US; most endangered whale and porpoise in world; whether there are whales in Virginia and Maryland; the most common species found in the region; and knowledge pertaining to Marine Mammal Protection Act and International Whaling Committee.

In the third section of the survey, respondents were asked questions pertaining to legislation. Legislation questions include: attitudes toward legal protection for cetaceans in U.S.; U.S. legislation for commercial whaling; US legislation for whaling by Native Americans; political candidate support correlation to laws protecting whales; and marine environmental education in the school system.

The final section asked questions regarding the respondent's demographic characteristics. The demographics collected for this study include: participation in water activities; gender; profession; age; formal education level attained; years living in DC metro area; number of people living in household; whether they were a member of environmental groups; and political leaning.

Finally, personal information was collected such as whether participants had viewed documentaries related to marine conservation such as Blue Planet, The Cove, Blackfish, and whether respondents had visited Seaworld, the Baltimore Aquarium, or had been whale-watching. If respondents had visited any of these they were also asked if their visit was within the past five years and to provide examples of knowledge they had gained from their experience (up to three things they had learned). If they had not visited a location they were asked if they would consider visiting in the future.

The questionnaire was designed to guide an interview that would draw a representation of the participants' perceptions of potential threats to cetaceans, attitudes towards legislation for cetacean conservation, and knowledge of basic cetacean information for both local and international populations.

Interview Process and Selection

This study investigated a subject group (n=260) of adult (over the age of eighteen) residents of the DC metropolitan area in 2014. An almost equal ratio of men to women participated in the surveys (52.3% and 46.1% respectively, the remaining respondents did not identify a gender). Participants were approached at random in public DC metropolitan areas such as malls, coffee shops, Virginia Railway Express (VRE) stations, metro stations, and grocery stores. Locations were selected based on their low probability of having a high volume of tourists or non-residents present.

At most sample sites, interviewees were approached by the researcher. The refusal rate was very low (approximately one in twenty people) when individuals were

approached in locations where they were seated such as mall food courts and coffee shops. In locations where individuals were asked to participate as they walked in and out of a location (VRE stations, grocery stores, etc.) the refusal rate was much higher (approximately one in three). However, at VRE stations and grocery stores, individuals frequently approached the researcher and were able to participate in the study. This could potentially lead to bias due to self-selecting participation. Participants were given no incentives to complete the questionnaire. Individuals who agreed to participate in the survey were read the Informed Consent Form (Appendix II) out loud by the researcher; and provided verbal agreement that they understood the conditions of the survey before they were able to proceed to answer the survey questions. Participants were given as much time as they needed in order to complete the survey (generally ~5 minutes).

There was no option given on many questions for a response of “I don’t know” however, due to the large amount of survey participants who requested the option of being able to respond to questions with this answer, all survey respondents were given the option of writing “I don’t know” next to questions they did not feel they had the knowledge needed to answer, or to leave these questions blank. Surveys were checked for completeness once they were returned to the researcher in order to ensure questions were not left blank by mistake.

Data Analysis

Once the target number of surveys was completed all survey data were entered into an Excel spreadsheet, each survey was assigned a number that correlated with the

data entered into the spreadsheet, and the survey responses were number coded using a uniform coding system (Appendix III). All descriptive statistics (count, percent, etc.) were calculated using the Excel program functions. The number coded data from Excel were entered into SPSS statistical software via the George Mason University Virtual Computing Lab. The inferential statistics were computed using SPSS statistical software functions.

In order to calculate support for policy and engagement, attitudes, and knowledge as each category relates to cetaceans, an index was created for each. The survey questions were numbered 1-51 based on the order they appeared on the survey. Each question was also assessed and labeled by index category by letter: A=Attitude, B=Behavior (policy and engagement), K=Knowledge, D=Demographic. Questions related to general demographics were also labeled using the same number and lettering system, but were not given an index.

The knowledge index included ten questions and was labeled (v23K, v24K, v25K, v26K, v27K, v28K, v29K, v30K, v43K, or v44K). The knowledge category included questions regarding which whale/porpoise the respondent thought was most endangered in North America and internationally. There were also four questions that asked participants whether whaling occurs today; if the U.S. conducts whaling; if cetaceans are present on the Maryland/Virginia coast; whether you can go whale watching on the Maryland/Virginia coast; and about whaling regulation and legislation. A binary coding system was used for these questions where 0=incorrect response and 1=correct response. All questions with the response “I don’t know” were coded as an incorrect response. The

knowledge index was created by adding together all eight of the knowledge response questions (highest score possible is ten points) for each respondent. A higher score is representative of a higher level of knowledge.

The index for attitudes toward cetacean conservation issues included 29 questions and was labeled (v1A, v2A, v3A, v4A, v5A, v6A, v7A, v8A, v9A, v10A, v11A, v12A, v13A, v14A, v15A, v16A, v17A, v18A, v19A, v20A, v21A, v22A). Questions 1A-22A asked participants to rate cetacean conservation issues on a scale from high concern to low concern using a Likert scale ranging from one to five (where 1= Serious Threat, 2= Moderate Threat, 3= Minor Threat, 4= No Threat, 5= I Don't Know). A score for the attitude index was created by adding together all of a participant's answers in the attitude category (maximum score = 88, minimum score = 22) where a higher score represents an attitude geared towards believing threats to cetaceans are more serious and lower scores represent an attitude geared toward thinking these threats are less serious or do not represent a threat at all to cetaceans. All responses of "I don't know" were coded as "no threat" as the participant was unaware of the issue.

The index for policy and engagement related to cetaceans included six questions and were labeled (1B, 2B, 3B, 4B, 5B, 6B). A binary coding system was used for these questions where 0= does not support cetacean conservation legislation and engagement or 1= exhibits support for cetacean conservation legislation and engagement. All questions with the response "I don't know" were coded "0." The policy and engagement index was created by adding together the six policy and engagement question responses for each

respondent. The highest score is six and a higher score is representative of a higher level of support for cetacean legislation and engagement.

Demographics included eight questions (31B, 32B, 33B, 34B, 35B, 36B, 37B, 45D, 46D, 47D, 48D, 49D, 50D, 51D, 52D). These questions were used for statistical analysis only. Variables were tested against one another in order to prove or disprove statistically significant positive or negative relationships between them. Age, gender, education, profession, household size, and years as a DC metropolitan resident were all tested against knowledge, attitude, and policy and engagement indexes. Linear regression, one-way ANOVA, and independent t-tests were all used to test variables and assess how different variables affected respondents' knowledge, attitude, and support for cetacean conservation legislation and engagement.

CHAPTER 3: RESULTS

Demographics Responses

Survey respondents were 53% male (N=136) and 47% female (n=120). Four respondents did not select a gender. The average age of the respondents, who provided information, was 43 years old (N=239, SD=13.89) with a range of 19 to 78 years old. The age groups with the greatest representation included 19-24 (N=33) and 45-49 (N=33), while age groups 40-44 (N=31) and 50-54 (N=30) also had high rates of response.

A high percentage of respondents (45%; N=115) held a graduate/professional degree and a substantive majority 69% (N=177) held a bachelor's degree or higher (Table 1). This is consistent with data from the United States Census Bureau regarding education levels in the DC metropolitan area, which will be discussed later. The number of respondents with some college (but no degree) made up 18% (N= 45) of the sample and a small percentage (6%; N=16) held an Associates' degree. Only one respondent (0.4%) held less than a high school diploma and three people did not provide information regarding their education.

Table 1. Responses to the question “What is the highest level of formal education that you completed?” Answers represented by frequency and percentage for each education level (N=257).

Education Level	N	Percent
12 th grade or less (no diploma)	1	<1
High school diploma (or GED)	15	6
Some college (no degree)	45	18
Associate or technical degree	16	6
Bachelor’s degree	62	24
Graduate degree/professional	115	45

Responses to the question “What is your profession?” are summarized in Table 2. The percentage of respondents who identified their profession as being directly employed by the government (generally active military or “government/federal employee”) was 17% (N=41). It can be assumed that a percentage of government-employed workers are not accounted for in these results, however. The US government employs individuals from all of the categories represented (scientists, health care professionals, etc.) who may have identified their profession without specifying the federal government as their employer. A smaller percentage (4%; N=11) of respondents also identified a profession in the legal field (lawyers, police officers, etc.).

In addition, 15% of respondents identified their profession as being in a field within the sciences or healthcare (9% N=22; 6% N=14, respectively), both of which

presume some form of education background in the sciences. Students and educators represented 20% of respondents (11% N=28; 8% N=20, respectively).

The remaining professions represented, which comprised 44% (N= 120), were not specifically identified as being in the government, the sciences, or education. Six % (N=15) of respondents chose not to identify a profession.

Table 2. Responses to the question “What is your profession?” Answers are represented in frequency (N) and percentage for each category of profession (N=245).

Profession	N	Percent
Science	22	9
Health	14	6
Information Technology	23	9
Finance	22	9
Government	41	17
Education	20	8
Retail	11	4
Student	28	11
Legal	11	4
Other	53	22

A slight majority of respondents who chose to answer the question “What is your political leaning?” identified as “conservative” (56%; N=109) with a smaller percentage identifying as “very conservative” (15%; N=29) and a larger proportion identifying as “moderately conservative” (41%; N= 80). Left-leaning respondents made up a total of 44.1% (N=86), with 9% (N=18) identifying as “very liberal” and 35% (N=68) identifying as “moderately liberal”. This question had the highest percentage of non-responses on the survey. In total, a quarter (25%; N=65) of respondents did not answer this question.

Reasons may have included reluctance to provide the information, or feeling as though they did not fit into any of these categories.

Table 3. Responses to the question “What is your political leaning?” Answers are represented in frequency (N) and percentage for each category of profession (N=195).

What is your political leaning?	N	Percent
Very conservative	29	15
Moderately conservative	80	41
Moderately liberal	68	35
Very liberal	18	9

Just over half (53%; N=135) of respondents answered the question “How many people are currently living in your household?” with “3-5 people”. Just over a third (39%, N=99) responded that they have 2 or less people currently living in their household and only 6.11% (N=18) people responded that they have 6 or more people. The non-response to this question was relatively low (3%; N=7).

Table 4. Responses to the question “How many people are currently living in your household?” Answers are represented in frequency (N) and percentage for each category (N=253).

How many people are currently living in your household?	N	Percent
1	36	14
2	63	25
3-5	135	53
6+	18	7

A majority (64%; N=167) of respondents identified as being an active participant in water-borne/related activities. Swimming was the most common water activity respondents claimed to participate in. Respondents who did not answer this question were classified as a “no” response.

Table 5. Responses to the question “Do you participate in water activities?” Answers are represented in frequency (N) and percentage for each category (N=260).

Do you participate in water activities?	N	Percent
Yes	167	64
No	93	36

Knowledge Responses

Table 7 shows responses to the questions pertaining to knowledge. Out of the knowledge category questions only two out of ten questions asked (“Does whaling occur today?” and “Can you find whales off the Maryland/Virginia coast?”) received a majority of correct responses. Although a majority of participants were aware that there were whales off of the Maryland and Virginia coast, almost half (43%) of participants were not. Moreover, whilst 57% of participants were aware that there are cetacean species off the coast of Maryland and Virginia, only 43% of participants were aware that it is possible to go whale-watching in this location.

A majority of participants did not know that the United States conducts any kind of whaling: (82% were not aware of aboriginal subsistence whaling in Alaska. Moreover, the majority could not correctly identify the most endangered whale (North Atlantic right whale, *Eubalaena glacialis*) and porpoise species (the vaquita, *Phocoena sinus*) in North

America (89% and 90% failed to identify these species, respectively) or, indeed, the world (93%, 97% failed to identify, respectively). About three quarters (78%) of participants had not heard of the most significant US legislation specifically for cetaceans, the Marine Mammal Protection Act. Moreover, none of the participants were able to provide an accurate description.

Table 6. Responses to the questions in the knowledge category. Answers are represented in percentage (%) for each category (N=260).

Question	Correct Response	Correct	Incorrect
Does whaling occur today?	Yes	82	18
Does the US conduct any whaling?	Yes	35	65
What is the most endangered whale in the US?	North Atlantic Right Whale	11	89
What is the most endangered whale in the world?	North Atlantic Right Whale	7	93
What is the most endangered dolphin or porpoise in North America?	Gulf of California porpoise (Vaquita)	10	90
What is the most endangered dolphin or porpoise in the world?	Gulf of California porpoise (Vaquita)	3	97
Can you find whales off the MD/VA coast?	Yes	57	43
Can you go whale watching in MD/VA?	Yes	43	57
Have you heard of the Marine Mammal Protection Act?	Yes	22	78
Do you know who regulates whaling internationally?	IWC	7	93

Attitude Responses

A substantive majority (73%) of the threats to cetaceans that were listed were considered by respondents to be either “serious” or “moderate” threats. The eight threats that the greatest percentage of respondents listed as a “serious threat” included:

commercial whaling (50%); entanglement in fishing gear (38%); marine litter/debris; (53%) introduction of exotic species (31%); bacteria/viruses from sewage (48%); oil spills (58%); loss of coral reefs (39%); lack of political interest (38%); and climate change (38%).

The six threats that the greatest percentage of respondents listed as a “moderate threat” included: fishery by-catches (31%); nutrient pollution (34%); air pollution (32%); reduction of available prey (36%); loss of seagrass beds (33%); lack of conservation funding (34%); and human population trends (30%).

Four threats were listed by the highest percentage of respondents as minor threats, which included hunting by native/indigenous people (39%); whales and dolphins in captivity (30%); military activities (34%); and injury from boat traffic (47%). Whale-watching was the only issue listed by a noteworthy percentage (47%) of respondents as being considered to pose “no threat” to cetaceans. Dredging activity was the only threat listed where the highest percentage of respondents chose “don’t know” as their answer. During survey collection, this latter issue was the only question that the researcher was frequently asked about. Many participants asked for the definition of dredging, but were not given the information upon request.

Table 7. Responses to questions in the attitude category. Answers are represented in percentage (%) for each category (N=260).

Threat	Serious Threat	Moderate Threat	Minor Threat	No Threat	Don't Know
Fishing/Commercial Industry					
Fishery by-catches	20	31	15	7	25
Commercial whaling	50	26	12	1	11
Hunting by native/indigenous people	5	12	39	28	13
Dredging activity	16	29	18	2	34
Whales and dolphins in captivity	21	28	30	9	11
Entanglement in fishing gear	38	32	16	2	12
Environmental Pollution & Effects					
Marine litter/debris	53	27	10	38	9
Introduction of exotic species	31	25	19	5	19
Bacteria/viruses from sewage	48	29	12	0	10
Oil spills	58	22	15	0	4
Nutrient pollution	30	34	16	2	15
Air pollution	25	32	22	7	13
Reduction of available prey	28	36	15	3	16
Loss of seagrass beds	27	33	18	1	21
Loss of coral reefs	39	28	14	2	17
Political/Governmental					
Military activities	15	25	34	8	16
Lack of conservation funding	29	34	21	4	12
Lack of political interest	38	26	15	7	13
Other					
Climate change	38	23	21	10	8
Whale/dolphin watching	2	9	32	47	9
Injury from boat traffic	12	25	47	7	10
Population trends (human)	25	30	23	9	12

Behavior Responses

Questions in the behavior category obtained a large majority of responses indicating pro-cetacean behavior, although only 10% of respondents were members of an environmental group. A majority of respondents (53%) indicated that they do not feel there is currently sufficient legal protection for cetaceans in the United States. Respondents were also more likely than not to believe the U.S. should have legislation specifically for commercial whaling and in support of whaling by Native Americans (79% and 47% respectively). Nearly half (48%) of respondents indicated that they would view a political candidate more favorably if they were in support of proposing laws specifically for protected areas for whales. A majority of respondents (79%) were also in favor of increasing marine environment education in school curriculum.

Table 8. Responses to questions in the behavior category of the survey. Answers are represented in percentage (N=260). Highest percentage is emboldened.

Question	Yes	No	Don't Know
1. In your opinion, is there currently sufficient legal protection for cetaceans in the US?	26	53	20
2. Should the US have legislation specifically for commercial whaling?	79	8	12
3. Should the US have legislation specifically in support of whaling by Native Americans?	47	37	15
4. Would you view a political candidate more favorable if they were in support of proposing laws specifically for protected area for whales?	48	38	13
5. Are you in favor of increasing marine environment education in school curriculum?	79	11	10
6. Are you a member of any environmental groups?	10	87	3

Knowledge Analysis

A knowledge index was created using the ten questions in the knowledge category (v1K, v2K, v3K, v4K, v5K, v6K, v7K, v8K, v9K, v10K). Each question in the knowledge index was coded as 1=correct answer and 0=incorrect answer. The highest score possible for the knowledge index was ten and the lowest score was 0. A higher score is representative of a higher level of knowledge. For statistical analysis of this variable, an average of each participant's answers to all of the knowledge category questions was used, with an average of 0.295. The minimum knowledge score average was 0.00, the maximum knowledge score average was 0.80 (SD=0.161), and the

maximum possible was 1. The average of the knowledge scores were distributed normally.

An independent t-test was conducted in order to determine if there was a statistically significant difference between knowledge levels of men and women (the sample included 136 men and 120 women). The mean knowledge level of men was 0.323 (SD=0.013) and the mean knowledge for women was 0.267 (SD=0.015). According to the independent t-test knowledge levels of men and women were significantly different ($t = -2.815$, $df = 254$, $p = 0.005$). A higher score is indicative of a higher level of knowledge; therefore, men were significantly more likely to have higher levels of knowledge about cetaceans than women, in this sample.

Table 9. Mean levels of knowledge, sample size, and SD for males and females. A higher average knowledge score represents more knowledge of cetaceans.

Gender	N	Mean	Std. Deviation
Male	136	0.323	0.013
Female	120	0.267	0.015

The results from a one-way ANOVA concluded that there was a statistically significant difference in knowledge between different professions ($F(9,235) = 2.983$, $p = 0.002$). The profession with the lowest knowledge score average was finance (.232) and the profession with the highest knowledge score average was legal workers (.446).

Respondent's knowledge score averages were significantly different between

respondents who participate in water-based activities and participants who do not participate in such, as was determined using an independent t-test ($t = -2.871$, $df = 249$, $p = 0.004$). The mean average knowledge level was 0.32 ($N=167$; $SD=0.016$) for participants who participate in water activities and 0.26 ($N=84$; $SD=0.012$) for those who did not. A higher average knowledge score average was associated with higher knowledge of cetaceans. Therefore, participants who participate in water activities have statistically significantly higher levels of knowledge about cetaceans than those who do not, in this sample.

Knowledge score averages were assessed among four political leaning categories (very conservative, moderately conservative, moderately liberal, and very liberal) and a one-way ANOVA was conducted in order to conclude whether there were statistically significant differences among categories. The results showed that there was not a statistically significant difference in knowledge among those with different political leanings ($F(3, 191) = 0.741$, $p = 0.529$).

A one-way ANOVA also determined that there was not a statistically significant difference in knowledge between levels of education ($F(4, 249) = 1.372$, $p = 0.244$), household sizes ($F(4, 248) = 1.627$, $p = 0.168$). Independent t-tests showed that there was not a significant difference in knowledge respondents who had participated in whale watching ($t = 1.008$, $df = 258$, $p = 0.316$), or visiting SeaWorld ($t = -2.225$, $df = 255$, $p = 0.844$).

A linear regression was conducted in order to explain the relationship between each of the three statistically significant variables (gender, profession, and participation

in water activities) and the participants' knowledge score average when other predictor variables are held constant. A binary variable was created for each profession within the profession category in order to better determine these individual relationships (1=respondent is in this profession, 0=respondent is not in this profession). When entered into the linear regression, it was then possible to see the relationship between individual professions and average knowledge score average.

Once all other variables were held constant, the only variables that remained significantly related to the knowledge score average were participation in water activities ($B = 0.060$, $p = 0.004$); gender ($B = 0.041$, $p = 0.04$); finance professionals ($B = -0.09$, $p = 0.011$); and respondents in "other" professions ($B = -0.056$, $p = 0.022$).

For respondents who participate in water activities, the predicted knowledge score average would be 0.06 points higher than participants who do not participate in water activities, therefore, respondents who participate in water activities would have statistically significantly more knowledge about cetaceans. Male respondents are predicted to have average knowledge scores .041 points higher than female participants. Finance professionals and respondents in "other" professions were both predicted to have significantly lower knowledge score averages than respondents in other professions by .09 and .056 points, respectively. This model only explained about 8% ($R^2 = .079$) of the variance in the data.

Table10. Results from linear regressions showing differences in significance between participants who participated in water activities; participants who were male/female; participants who were in the finance profession; participants who were in “other professions,” and their associated knowledge of cetaceans.

Variable	Unstandardized Coefficients		Sig.
	B	Std. Error	
(Constant)	0.258	0.020	0.000
Water Activities	0.060	0.021	0.004
Gender	0.041	0.020	0.040
Finance Profession	-0.090	0.035	0.011
“Other” Profession	-0.056	0.024	0.022

In order to determine if questions used to assemble the knowledge index contained a reasonably low amount of variance, a Cronbach’s Alpha reliability test was conducted. The results showed that the questions have a moderately high level of variance (Alpha=0.464). The binary nature of the knowledge index question answers might have affected these results.

Attitude Analysis

An attitude index was created using the 22 questions in the attitude category (v1A, v2A, v3A, v4A, v5A, v6A, v7A, v8A, v9A, v10A, v11A, v12A, v13A, v14A, v15A, v16A, v17A, v18A, v19A, v20A, v21A, v22A). The highest score possible for the knowledge index was 88 and the lowest score was 22. A higher score is representative of a more pro-cetacean attitude. For statistical analysis of this variable, an average of each

participant's answers to all of the attitude category questions was used, with an average of 2.64. The minimum possible average was 1 and the maximum possible average was 4.

The results of a one-way ANOVA concluded that there was indeed a statistically significant difference in attitudes among different professions ($F(9,235) = 2.282, p = 0.018$). The profession with the least pro-cetacean attitude was the retail profession (Mean = 2.41; SD=0.94) and the profession with the most pro-cetacean attitudes was the health profession (Mean=2.94; SD=0.49).

Watching marine conservation-themed documentaries proved to be significantly correlated with more pro-cetacean attitudes as well. An independent t-test was conducted and determined significant differences in average attitude index scores between respondents who had watched the documentaries Blue Planet ($t = -4.172, df = 258, p = 0.015$) and Blackfish ($t = -4.867, df = 258, p = 0.01$) and those who had not. The results showed that the mean attitude index average of participants who watched Blue Planet was 2.84 (SD=.054) and was 2.98 (SD=.069) for participants who watched Blackfish.

A one-way ANOVA was used to assess attitudes toward cetaceans between different political leanings. The results showed that there was a statistically significant difference in attitudes between different political leanings ($F(3,191) = 5.157, p = 0.002$). Respondents who identified as very liberal were found to have the most pro-cetacean attitudes (Mean=2.91;SD=0.61) and the political leaning with the least pro-cetacean attitudes was the very conservative category (Mean=2.45;SD=0.62).

According to the results of an independent t-test ($t = 0.511, df = 238, p = 0.61$), there was not a statistically significant difference between average attitude levels of men

(N = 136) and women (N = 120). Therefore, men and women from this sample population were not likely to have statistically significantly different attitudes towards cetaceans.

A one-way ANOVA was used to ascertain if respondents' average attitude scores were different between education levels attained. The results showed that there was not a statistically significant difference in knowledge between levels of education ($F(5, 248) = 0.84, p = 0.522$). The educational level with the least pro-cetacean attitude was respondents with a graduate degree (Mean=2.59;SD=0.06) and the most pro-cetacean attitudes were found in respondents with an associate or technical degree (Mean=2.88;SD=0.53).

In addition, a one-way ANOVA also showed that there was not a statistically significant difference in attitudes between different household sizes ($F(4,248) = 0.548, p = 0.701$) and an independent t-test showed that there was not a statistically significant difference in attitudes between respondents who participate in water activities and participants who do not participate in water activities ($t = -0.914, df = 249, p = 0.362$), participating in whale watching ($t = -1.826, df = 258, p = 0.289$), or visiting SeaWorld ($t = 1.311, df = 255, p = 0.503$).

A linear regression was conducted in order to explain the relationship between the two statistically significant variables (political leaning, profession, Blue Planet, and Blackfish) and the attitude score average when other predictor variables are held constant. A binary variable was created within both categories for each category in order to better determine these relationships. For example, each profession was made into a

new binary variable (1=respondent is in this profession; 0=respondent is not in this profession). When entered into the linear regression, it was then possible to see the relationship between individual professions and average attitude levels. The same was done for political leaning.

Once all other variables were held constant, the only variables that remained significantly related to the attitude score average were the “student” profession ($B=0.239$, $p=0.048$), whether respondents had watched the documentary Blue Planet ($B=0.26$, $p=0.001$), and whether and whether respondents had watched the documentary Blackfish ($B=0.317$). In other words, students were significantly more likely to have more pro-cetacean attitudes with average scores that were 0.4 points higher. Respondents who had viewed the documentaries Blue Planet and Blackfish were also showed more pro-cetacean attitudes with an average attitude index score .26 points higher for Blue planet and .317 points higher for Blackfish.

Table 11. Results from linear regressions showing differences in significance between participants who were students; participants who had watched the documentary Blue Planet; participants who had watched the documentary Blackfish, and their associated attitudes toward cetaceans.

Variables	B	Std. Error	Sig.
Students	.239	.121	.048
Blue Planet	.260	.199	.001
Blackfish	.317	.179	.003

In order to determine if questions used to assemble the attitude index contained a reasonably low amount of variance, a Cronbach’s Alpha reliability test was conducted.

The results showed that there is a low level of variance between the questions in the index (Alpha=0.918), therefore, it is a reasonable index to use for this analysis.

Policy and Engagement Analysis

A behavior index was created using the six questions in the behavior category (v1B, v2B, v3B, v4B, v5B, v6B). The highest score possible for the behavior index was 6 and the lowest score was 0. A higher score is representative of a more support for cetacean conservation legislation and engagement. For statistical analysis of this variable, an average of each participant's answers to all of the policy and engagement category questions was used to create an index. The average policy and engagement index score for the survey participants was 0.51 with a range from 0.00 to 1.

A statistically significant correlation was found between age and support for cetacean conservation legislation and engagement at the 0.05 level using a Pearson correlation. A higher level of support was correlated with younger aged participants.

Table12. Results from Pearson Correlation showing significant difference between age and the associated support for cetacean legislation and engagement for cetaceans.

Age	Policy and Engagement	
	Pearson correlation	-0.129*
	Sig. (two-tailed)	0.046
	N	239

The results of a one-way ANOVA showed that there was a statistically significant

difference level of support for cetacean conservation legislation and engagement between different political leanings ($F(3, 191) = 2.837, p = 0.039$). The least supportive political leaning category was very conservative (Mean=0.471; SD=0.271) and the most supportive political leaning category was very liberal (Mean=0.62;SD=0.234).

To assess whether there were significant differences between respondents who participated in water-borne activities, an independent t-test was used. The results showed that there was a statistically significant difference in the level support between respondents who participate in water activities ($N = 167$) and respondents who do not ($N = 84$) ($t = -3.017, df = 249, p = 0.007$). The mean average behavior level was 0.557 (SD=0.016) for participants who participate in water activities and 0.462 (SD=0.03) for those who do not. Respondents who participate in water activities were significantly more likely to be supportive of cetacean conservation legislation and engagement.

A significant difference in average policy and engagement scores was found between participants who watched the documentaries *The Cove* and *Blackfish*, and participants who had not. An independent t-test showed that average policy and engagement index scores were significantly higher (more pro-cetacean conservation legislation) for participants who watched the documentaries *The Cove* ($t = -5.341, df = 258, p = 0.022$) and *Blackfish* ($t = 10.748, df = 258, p = 0.001$) and those who had not. The mean attitude index average was 0.613 (SD=0.032) for participants who watched *The Cove* and .637 (SD=.026) for participants who watched *Blackfish*.

Using an independent t-test, it was determined that there was no significant difference ($t = -0.392, df = 254, p = 0.695$) between levels of support for conservation

legislation and engagement of men ($N = 136$) and women ($N = 120$). The mean index score average for policy and engagement of men was 0.523 ($SD=0.018$) and 0.511 ($SD=0.025$) for women.

Responses for support of cetacean conservation legislation and engagement were also not shown to be significantly different between different professions ($F(9, 235) = 1.136, p = 0.338$). Similarly, another such test showed that there was not a statistically significant difference in support between levels of education ($F(4, 249) = 2.042, p = 0.089$), nor was there a statistically significant difference in support between different household sizes ($F(4, 248) = 1.493, p = 0.205$), participating in whale watching ($t = -1.812, df = 258, p = 0.755$), or visiting SeaWorld ($t = 1.343, df = 255, p = 0.248$).

A linear regression was conducted in order to explain the relationship between each of the three statistically significant variables (age, political leaning, participation in water activities, and viewing the documentaries *Blackfish* and *The Cove*) and the participants' average level of support for cetacean conservation and engagement when other predictor variables are held constant. Again, a binary variable was used for each profession within the profession category in order to better determine these individual relationships (1=respondent is in this profession, 0=respondent is not in this profession). The same was done for the political leaning category (very conservative, moderately conservative, moderately liberal, very liberal). When entered into the linear regression, it was then possible to see the relationship between individual professions/political leaning and average attitude levels.

Once all other variables were held constant, the only variables that remained significantly related to support for cetacean conservation legislation and engagement was participation in water activities ($B=0.08$, $p=0.013$). For respondents who participate in water activities, the predicted average index score for policy and engagement would be 0.08 points higher than participants who do not participate in water activities, therefore, respondents who participate in water activities would be statistically significantly more supportive of cetacean conservation legislation and engagement.

Table13. Results from linear regressions showing significant difference in participants who participate in water activities and associated support for cetacean conservation legislation and engagement.

Variable	B	Std. Error	Sig.
Water Activities	.08	.032	.013

In order to determine if questions used to assemble the attitude index contained a reasonably low amount of variance, a Cronbach's Alpha reliability test was conducted. The results showed that there is slightly high level of variance between the questions in the index ($\text{Alpha}=0.582$).

Pearson Correlation

A Pearson correlation test was conducted in order to assess correlation between average attitude, policy and engagement, and knowledge responses. A statistically significant correlation was found between all three variables at the 0.01 level. A higher

average level of knowledge is correlated with more pro-cetacean attitudes and more support for cetacean conservation legislation and engagement.

Table 14. Correlation between average knowledge, attitude, and support levels. Showing positive correlation between knowledge (N=260, $p < .001$), attitude (N=260, $p < .001$), and support for cetacean-focused policy and engagement (N=260, $p < .001$).

	Knowledge	Attitude	Policy & Engagement
Knowledge	1	0.252**	0.311**
Attitude		1	0.502**
Policy & Engagement			1

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed).

CHAPTER 4: DISCUSSION AND CONCLUSION

Discussion

The aim of this study is to provide insight regarding public knowledge of cetaceans, perceptions of these species and their conservation, for residents of the DC metro area. Similar studies have been conducted in countries such as Aruba, the Dominican Republic, Belize, Scotland, the United States (including Northern Virginia), and India, but no published studies have been able to identify the knowledge and perceptions of cetaceans held by such a well-educated, politically-influential section of the public (i.e., Washington DC residents) using in-person interview methods. Demographic variables (age, gender, profession, political leaning, education, participation in water activities, and household size) were analyzed to help identify any relationships with how participants answered knowledge, attitude, and support for cetacean conservation policy and engagement.

This study supported many findings from similar studies including low knowledge of cetaceans (Luksenburg and Parsons 2013, Parsons *et al.* 2008, Scott and Parsons 2004), high levels of support for legislation specific to cetacean conservation (Howard and Parsons 2005, Kellert 1999), and an increase in marine conservation education in schools (Howard and Parsons 2005). The variables that previous studies

have found to significantly influence attitudes are summarized in the table below) and are compared with the findings of this study (Table 15).

Table 15. Variables from similar studies that were found to be associated with significantly more positive attitudes towards cetaceans. Variables that were tested, but found not to be significant, are indicated with “NS.”

Study	Education	Age	Gender
Draheim <i>et al.</i> 2009	More Education	-	Female
Patterson 2010	More Education	-	Female
Denham 2015	More Education	-	Female
Kellert 1999	More Education	Younger	Female
Luksenburg & Parsons 2013	NS	NS	Female
O'Bryhim 2009	-	-	-
Howard & Parsons 2005	-	Older	Female
Donahue 2015	NS	NS	NS

Demographics

The gender representation of survey respondents was relatively equal, with 53% males and 47% females. The age groups with the greatest representation included 19-24. This study also had a large percentage of respondents in the age range of 40-54.

As was expected, a majority (69%) of respondents held a bachelor's degree or higher. This is consistent with data from the United States Census Bureau regarding education levels in the DC Metro area. According to the Census Bureau, 52% of residents age 25+ hold at least a Bachelor's degree in the District of Columbia. Similar, but varied percentages of residents in Northern Virginia hold at least a bachelor's degree including Arlington (72%), Fairfax (59%) and Prince William County (38%).

The percentage of respondents working directly for the government was 17% with a strong possibility of under-representation. In future studies, it might be beneficial to provide a list of professions for participants to select from rather than using an open-ended response, as was used for this study. The number of respondents in professional scientific and technical services also seemed lower than would have been expected considering the composition of the workforce in the Northern Virginia. According to the Virginia Economic Development Partnership about 21% of the workforce is composed of jobs within this category.

A majority (56%) of respondents identified as conservative while 44% identified as liberal. A quarter of respondents did not select a political leaning on the survey. Political party leaning is often not openly discussed and survey participants may not have felt comfortable sharing this information. However, the only options provided were very conservative, moderately conservative, moderately liberal or very liberal. This design could have left out an option for participants who identify with parties such as the independent party, which were not represented.

Attitude

The threat that the largest proportion of respondents listed as a serious threat to cetaceans was oil spills, with 58% of respondents listing it as such. The second threat most commonly listed as a serious threat was marine litter/debris, with 53% of responses. Commercial whaling followed with 50% of respondents listing this as a serious threat.

Bacteria/viruses from sewage were also high on the list, as 48% of respondents considered this a serious threat.

In previous studies, oil spills, marine litter/pollution, and chemical/sewage pollution were the threats most frequently ranked highest by the public (Luksenburg and Parsons 2013, Howard and Parsons 2005, Scott and Parsons 2004; Table 17). Oil spills and marine litter/pollution are both topics that have been generously covered by the media following the Deepwater Horizon oil spill and highlighting of the of the “Great Pacific garbage patch”. Media coverage may provide some of an explanation as to why the public would think these issues posed a more serious threat to marine wildlife (Luksenburg and Parsons 2013, Howard and Parsons 2006, Scott and Parsons 2005).

Table 17. Highest and lowest-rated threats to cetaceans in similar studies.

Study	Highest Threats	Lowest Threats
Scott & Parsons 2005	Oil spills Reduction of available prey Marine litter	Whale-watching Hunting/commercial whaling
Sheridan (unpublished)	Toxic chemicals Human population trends Bacteria from sewage	Whale-watching
Luksenburg & Parsons 2013	Oil spills, Chemical pollution Litter and sewage	Whale-watching Underwater noise
Howard & Parsons 2006	Oil spills, Chemical/sewage pollution Depletion of prey	Whale-watching

Donahue 2015	Oil spills Marine litter/debris Commercial whaling	Whale-watching
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Commercial whaling was not commonly identified as a serious threat in previous studies (Table 17). The fact that respondents in this study thought that commercial whaling was a serious threat may have been influenced by the fact that although 82% were aware that whaling occurs today, only 22% had heard of the Marine Mammal Protection Act and only 7% were aware that the International Whaling Commission regulates whaling. Due to the significant knowledge gap regarding cetacean conservation legislation, it might be assumed that respondents were also not aware of the moratorium on whaling that went into effect in 1986 and significantly reduced the impact of commercial whaling on cetaceans. However, so called “scientific whaling” by the Japanese Government in the Antarctic (and a recent international court case over this issue) has received a high amount of media attention, which may likely be influencing public perception (Parsons *et al.* 2015).

Entanglement in fishing gear is currently a serious threat to endangered species such as the North Atlantic right whale, as it has been known to cause immediate or delayed mortality in individuals (Reeves *et al.* 2012). In this instance, the public did largely identify this as a serious threat with 38% of respondents classifying it as such.

Ship strikes have recently been considered as a possible explanation for the lack of population recovery in species such as the endangered North Pacific blue whale

(*Balaenoptera musculus*) (Monnahan 2015). Modifications to vessel activities to help reduce the impact on cetaceans have been recorded, but more efforts are needed (Silbert *et al.* 2012). Injury from boat traffic was only considered a minor threat to cetaceans by nearly half (47%) of the respondents, indicating a lack of knowledge regarding the impact of this threat.

Two notable threats that a large proportion of the respondents of this survey identified being serious were in lack of political interest (38%) and climate change (38%). Due to the politically influential nature of this survey population (i.e., Washington DC residents), the fact that they recognize lack of political interest as being a serious threat is notable. Climate change is a serious threat that is expected to cause significant impacts to cetacean populations over time, including particularly vulnerable species such as the North Atlantic right Whale (Greene *et al.* 2004). Climate change is a controversial issue in decision-making efforts, which is why it is important to highlight the high levels of public concern for climate change impacts.

Whale-watching was also considered to be no threat by a large percentage of survey respondents (47%), whereas research has shown significant impacts on whale and dolphin populations from the whale watching industry, which include behavioral changes and boat strikes (Parsons 2012). Previous surveys have similarly found a low level of concern from the public regarding whale-watching activities (Luksenburg and Parsons 2014, Draheim *et al.* 2009, Howard and Parsons 2006, Scott and Parsons 2005, Table 17).

Knowledge

A lack of foundational knowledge about cetaceans has been well documented in previous studies (Denham 2015, Luksenburg and Parsons 2013, Parsons *et al.* 2010, Scott and Parsons 2004) as has low knowledge about other high-profile species such as sharks and coyote (O'Bryhim *et al.* 2015, Draheim *et al.* 2013). Low general knowledge levels were also found in this study. A vast majority of participants also could not correctly identify the most endangered whale and porpoise species in North America or the world, regardless of the fact that the species (North Atlantic right whale) can occur on the coast located only a short distance from their area of residence.

Nearly 27% of respondents in this study were found to believe that the humpback whale was the most endangered species in North America, whereas the species believed to be most endangered in the world was the blue whale (24%). These results are very similar to a recent study that assessed cetacean knowledge and perception using an online poll. Most respondents (mainly from the US and India) also identified the blue whale (24%) and the humpback whale (22%) as being the most endangered species (Denham 2015). Similarly, the results of a study focusing on Northern Virginia college students also showed that the highest percentage (39%) of respondents thought the humpback whale was the most threatened species (Parsons *et al.* 2010). While the blue whale is considered to be “endangered” internationally, the threat level for the humpback whale was recently been downgraded by the IUCN to “least concern” (IUCN Red List Website).

A majority (82%) of participants did not know that traditional whaling practices are permitted in the United States. However, 47% of respondents stated that they would support legislation to permit traditional whaling practices by Native Americans. This

sentiment was also held by participants in a 1999 study, where 70% of respondents from the United States stated that they would support traditional whaling practices as long as the whales were not exploited for uses beyond the native community's needs and were not conducted on endangered species (Kellert 1999).

Respondent participation in water-borne activities was the factor most strongly associated with higher levels of knowledge about cetaceans. A higher average level of knowledge was also found to be correlated with more pro-cetacean attitudes and support for cetacean conservation legislation and engagement. In other words, the more knowledge about cetaceans participants had, the more likely they were to rate threats to cetaceans as being more serious and say they would support legislation and engagement activities targeted at cetacean conservation. An increase of knowledge being positively correlated with attitude and/or behavior related to species such as cetaceans, sharks, and coyote has been noted in several previous studies (Denham 2015, Draheim *et al.* 2011, O'Bryhim 2009, Kellert 1999).

Policy and Engagement

A slight majority of respondents (53%) indicated that they do not feel there is currently sufficient legal protection for cetaceans in the United States. Respondents were also more likely than not to believe the U.S. should have legislation specifically for commercial whaling (47%). Surveys were conducted internationally and reported similar beliefs in the Aruba, Belize, the Dominican Republic, Scotland, and the United States (Luksenburg and Parsons 2013, Zirbel *et al.* 2011, Patterson 2010, Howard and Parsons

2006, Scott and Parsons 2005, Kellert 1999; Table 17). In each of these cases, a majority of survey respondents were in support of legislation specific to cetacean conservation. This strong support for cetacean conservation measures via legislation is indicative of high societal value, which has been an important focal point of measuring cetacean conservation importance (Parsons *et al.* 2015).

Table 17. Percentage of respondents supporting various cetacean legislation efforts in similar studies.

Study	Support for legal protection
Denham 2015	47% thought marine mammal conservation laws and policies are important
Kellert 1999	90% support fishing legislation if actions result in marine mammal takes
Luksenburg & Parsons 2013	67% resident survey respondents thought cetaceans needed more protection in Aruban waters
Howard & Parsons 2006	80% thought there should cetacean conservation legislation
Scott & Parsons 2005	95% legislation for the protection of cetaceans should be introduced in Scotland
Zirbel <i>et al.</i> 2011	75% believed the Navy should have to abide by marine mammal legislation regulations
Donahue 2015	53% thought there was not sufficient protection for cetaceans in the US

Additionally, nearly half (49%) of respondents indicated that they would view a political candidate more favorably if they were in support of proposing laws specifically

for protected areas for whales. In Scotland, 40% of respondents who participated in a similar survey also stated that they would view a political candidate more favorably due to a specific legislative action in support of cetacean conservation (Howard and Parsons 2006). This indicates that there is a substantial level of support from the voting population in both of these countries for political candidates who encourage cetacean conservation policies and efforts.

A majority of respondents (79%) were also in favor of increasing marine environment education in school curriculum. This is arguably the most significant opportunity to implement policies and programs aimed to increase the public's knowledge of cetaceans and the conservation issues they are facing. This finding was also supported in the aforementioned study in Scotland, where respondents supported increasing cetacean/marine conservation education in school curriculum (Howard and Parsons 2006).

An increase in age was found to be significantly correlated with lower levels of support for cetacean conservation legislation and engagement. This is significant because younger respondents are more likely to support cetacean conservation legislation, yet they are substantially less likely to vote in elections according to the United States Census Bureau. Respondent participation in water-borne activities was the factor most strongly associated with higher levels of support for legislation in support of cetacean conservation initiatives and engagement.

Another effective strategy for increasing support for cetacean conservation initiatives may revolve to a certain extent around the names of the species that are used in

outreach and campaigns (Karaffa *et al.* 2012). In this study, knowledge of the most endangered porpoise (the Gulf of California porpoise, *Phocoena sinus*) was found to be very low, as only 10% of respondents recognized this species as the most endangered porpoise in North America, and only 3% recognized it as the most endangered in the world. However, studies have been conducted which used the species' alternative name Vaquita porpoise alongside the name Gulf of California porpoise, and found that the name Vaquita received a higher response rate when asked which porpoise was the most endangered (Denham 2015).

This suggests that in all outreach, education, and campaigns, it is important to consider the species names that are used. When possible, names with more positive correlations (e.g. sidewinder versus horned rattlesnake) and names that are more commonly recognized by the public, such as the Vaquita porpoise, should be used.

Study Limitations

Study limitations included, but were not limited to low economic and demographic diversity in study sites; only one, female researcher collecting surveys; possible self-selection at two sample sites (VRE station and grocery store); statistical analysis covering a broad range of topics limited capability for more in-depth analysis of variables and relationships. Further statistical analysis including a factor analysis would be helpful in order to better identify and measure relationships between variables. A larger sample size would also help to reduce uncertainty and increase reliability of the findings.

The study sites that were selected were generally in middle-class, affluent neighborhoods, which may have selected for a subset of the DC metro area population specific to this demographic. According to the U.S. Census Bureau, many of the sample sites in this study area have high median incomes including Fairfax, VA (\$110,292), Arlington, VA (\$103,208), and Prince William County, VA (\$98,071) versus the national average (\$53,046) in addition to the aforementioned high levels of education. However, for purposes of this study the fact that respondents may be affluent and middle class (with Government career ties) is not necessarily a hindrance as this is a politically influential sub-population, and the high level of concern with cetaceans and their protection in this sub-population could be useful to environmental and animal NGOs for conservation-oriented lobbying purposes.

A few questions from the survey were not analyzed or reported in this study, including whether or not respondents had visited SeaWorld, the Baltimore Aquarium, or had been whale-watching within the last five years, what they had learned on their visit, and if they would consider visiting in the future if they had not already. It is intended to analyze these questions and investigate correlations between these factors and cetacean knowledge and attitudes at a later date, for publication as a separate research paper.

Future research

More research regarding public perception and knowledge would also be useful in order to better-assess the needs for increased public awareness and education. Because a lack of foundational knowledge about cetaceans has been documented in the United

States and internationally, next steps and identification of ways in which educational programs have successfully incorporated marine conservation studies into curriculum would also be useful.

Additionally, it would be helpful for more studies to target marine conservation professionals and decision-makers. Studies in Scotland (Howard and Parsons 2006) have targeted marine conservation professionals in order to determine how opinions of cetacean threats differed between this group and the public. Researching the gap between scientific expert and general public opinion would highlight gaps in public understanding that need addressing through public outreach.

Recommendations

There are several organizations that could benefit from this research. Federal agencies and program areas, non-governmental organizations, and educational organizations could all apply the findings of this study in different ways.

Federal and state agencies and program areas that are actively engaged in education and outreach such as the Department of Natural Resources and the National Oceanic and Atmospheric Administration (NOAA) Education Council might find the results of this study most useful. Implementation of more cetacean-focused education curriculum into future strategic plans could provide an opportunity to increase the public's knowledge about cetaceans. In addition, agencies and program areas can use the results of this study in order to focus and target social media and science communication

topics more strategically based on the threats that the public is most, and least, aware of. Non-governmental organizations could use similar strategies.

Educators are another group that might find the results of this study useful. Teachers in private school systems often have more control over the curriculum they teach, and might be able to integrate marine conservation topics into current curriculum. Public school teachers might find this to be more of a challenge as their curriculum requirements are more rigid and less dynamic. Alternatives to curriculum changes might include utilization of existing environmental education programs that provide information on marine conservation for field trips and classroom visits.

Conclusion

In order to minimize the impacts that human actions and behaviors have on cetaceans, it is important to understand the current level of knowledge and perception of cetacean conservation issues held by the public, policy makers, and managers. The results of this study will provide useful information for management and decision-making communities involved in marine conservation efforts. The low levels of knowledge observed in this study indicate that increased efforts to educate the public about cetaceans, and the conservation issues they are facing, may be needed in order to increase support for more cetacean conservation legislation and initiatives.

APPENDIX I QUESTIONNAIRE

Region:

Date:

Start Time of interview:

Section 1: Public Awareness

Marine conservation is the protection of marine species and ecosystems in oceans and seas. I am now going to ask you some questions about cetacean conservation issues.

- 1) What marine issues do you consider to be the greatest threats to cetacean populations? Please use the following charts to rate each threat by checking the box that represents your answer (e.g., serious threat, moderate threat, minor threat, no threat, or don't know).

Threat	Serious Threat	Moderate Threat	Minor Threat	No Threat	Don't Know
Fishing/Commercial Industry					
Fishery by-catches	☐	☐	☐	☐	☐
Commercial whaling	☐	☐	☐	☐	☐
Hunting by native/indigenous people	☐	☐	☐	☐	☐
Dredging activity	☐	☐	☐	☐	☐
Whales/dolphins taken into captivity	☐	☐	☐	☐	☐
Entanglement in fishing gear	☐	☐	☐	☐	☐
Environmental Pollution & Effects					
Marine litter/debris	☐	☐	☐	☐	☐
Introduction of exotic species	☐	☐	☐	☐	☐
Bacteria/viruses from sewage	☐	☐	☐	☐	☐
Oil spills	☐	☐	☐	☐	☐
Nutrient pollution	☐	☐	☐	☐	☐
Air pollution	☐	☐	☐	☐	☐
Reduction of available prey	☐	☐	☐	☐	☐
Loss of seagrass beds	☐	☐	☐	☐	☐
Loss of coral reefs	☐	☐	☐	☐	☐
Political/Governmental					
Military activities	☐	☐	☐	☐	☐
Lack of conservation funding	☐	☐	☐	☐	☐
Lack of political interest	☐	☐	☐	☐	☐
Other					
Climate change	☐	☐	☐	☐	☐
Whale/dolphin-watching	☐	☐	☐	☐	☐
Injury from boat traffic	☐	☐	☐	☐	☐
Population trends (human)	☐	☐	☐	☐	☐

2) Y/N Does whaling occur today?

If yes: Which countries conduct whaling?

3) Y/N Does US conduct any whaling?

4) What is the most endangered whale in the US? Pick one.

- ☐ Blue whale
- ☐ North Atlantic Right whale
- ☐ Gray whale
- ☐ Humpback whale
- ☐ Polar whale
- ☐ Bryde's whale
- ☐ Black whale
- ☐ Killer whale
- ☐ Southern right whale

5) What is the most endangered whale in the world? Pick one.

- ☐ Blue whale
- ☐ North Atlantic Right whale
- ☐ Gray whale
- ☐ Humpback whale
- ☐ Polar whale
- ☐ Bryde's whale
- ☐ Black whale
- ☐ Killer whale
- ☐ Southern right whale

6) What is the most endangered dolphin or porpoise in North America?

- ☐ Gulf of California porpoise
- ☐ Harbor porpoise
- ☐ Bottlenose dolphin
- ☐ Maui's dolphin
- ☐ Gulf of Mexico porpoise
- ☐ Mississippi river dolphin
- ☐ Tropical dolphin
- ☐ Hawaiian island dolphin

7) What is the most endangered dolphin or porpoise in the world?

- ☐ Gulf of California porpoise
- ☐ Harbor porpoise
- ☐ Bottlenose dolphin
- ☐ Maui's dolphin
- ☐ Chinese white dolphin
- ☐ Gulf of Mexico porpoise
- ☐ Amazon river dolphin
- ☐ Yangtze river dolphin
- ☐ Ganges river dolphin
- ☐ Mississippi river dolphin
- ☐ Tropical dolphin
- ☐ Hawaiian island dolphin

8) Y/N Can you find whales off of the Maryland/Virginia coast?

If so what are the most common species _____

9) Y/N Can you go whale watching in Maryland/Virginia?

10) Have you watched any of these:

- ☐ The Blue Planet
- ☐ The Cove
- ☐ Blackfish

11) Y/N Have you ever been to SeaWorld?

Y/N Within the past 5 years

If no: Would you ever go to a marine theme park like SeaWorld?

If yes: can you tell me 3 things you learnt at Seaworld about whales/dolphins:

- (1) _____
- (2) _____
- (3) _____

12) Y/N Have you ever been to the dolphin show at the Baltimore Aquarium?

If yes: Within the past 5 years? Y/N

If no: Would you ever go to dolphin show at the Baltimore Aquarium? Y/N

If yes: Can you tell me 3 things you learnt at the Baltimore Aquarium about whales/dolphins:

- (1) _____
- (2) _____
- (3) _____

13) Y/N Have you ever been whale watching?

If no: Would you ever go whale watching? Y/N

If yes: Within the past 5 years Y/N

If yes: can you tell me 3 things you learned on a whale-watching trip about whales/dolphins:

- (1) _____
- (2) _____
- (3) _____

14) Y/N Are you a member of any animal or environmental groups?

If yes, which ones?

Section 2: Legislation

1) Y/N - In your opinion, is there currently sufficient legal protection for cetaceans in the US?

2) Y/N - Should the US have legislation specifically for commercial whaling?

3) Y/N - Should the US have legislation specifically in support of whaling by Native Americans?

4) Y/N - Would you view a political candidate more favorable if they were in support of proposing laws specifically for protected areas for whales?

5) Y/N - Are you in favor of increasing marine environmental education in school curriculum?

6) Y/N - Have you heard of the Marine Mammal Protection Act?

7) Open answer: What does the marine mammal protection act do:

8) Y/N Do you know who regulates whaling internationally:

If yes, state who:

9) What is your political leaning?

☐ Very conservative

☐ Moderately conservative

☐ Moderately liberal

☐ Very liberal

Section 3: Demographics

I am going to begin with some basic questions that are personal in nature, but nothing that will indicate who you are.

1) Y/N Do you participate in water activities?

If yes, how many and what types?

2) Respondent's gender:

☐ Male

☐ Female

3) What is your profession?

4) What year were you born?

5) What is the highest level of formal education that you completed?

☐ 12th grade or less (no diploma)

☐ High school diploma (or GED)

☐ Some college (no degree)

☐ Associate or technical degree

☐ Bachelor's degree

☐ Graduate degree/professional

6) How many years have you been living in the DC Metro area?

7) How many people are currently living in your household?

☐ 1

☐ 2

☐ 3-5

☐ 6+

10) Do you have any other comments you would like to share with me related to cetacean conservation in the US? Comments can be continued on back of page.

That concludes the interview. Thank you for your time. Please feel free to contact me later if you think of anything else you would like to add. If you are interested in learning about the results of this research, please provide your contact information and I will share the results with you when the research is complete.

End time of interview:

APPENDIX II
INFORMED CONSENT FORM

Public Awareness of Cetacean Conservation Issues in the DC Metropolitan area
INFORMED CONSENT FORM

RESEARCH PROCEDURES

This research is being conducted to acquire insight regarding the public perception of cetaceans and current conservation issues that affect them. If you agree to participate, you will be asked to answer questions on a short survey that should take about 5 minutes of your time.

RISKS

There are no foreseeable risks for participating in this research.

BENEFITS

There are no benefits to you as a participant other than to further research in public awareness of cetacean conservation issues. In addition, the benefits to policymakers and conservation and environmental education efforts include gaining a better understanding the perception of marine conservation issues specific to cetaceans.

CONFIDENTIALITY

The data in this study will be confidential. No personal identifiers will be included in this survey and all data will be stored safely according to protocol. This is an anonymous survey, so names and other identifiers will not be placed on surveys or other research data.

PARTICIPATION

Participants must be 18 years or older and a resident of the DC metro area. Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty. There are no costs to you or any other party.

CONTACT

This research is being conducted at George Mason University. For questions or to report a research-related problem, please contact Chris Parsons in the Environmental Science and Policy Department at 703-993-1043. You may contact the George Mason University Office of Research Integrity & Assurance at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT

I have read this form and agree to participate in this study.

APPENDIX III QUESTIONNAIRE

Region:

Date:

Start Time of interview:

Section 1: Public Awareness

Marine conservation is the protection of marine species and ecosystems in oceans and seas. I am now going to ask you some questions about cetacean conservation issues.

- 1) What marine issues do you consider to be the greatest threats to cetacean populations? Please use the following charts to rate each threat by checking the box that represents your answer (e.g., serious threat, moderate threat, minor threat, no threat, or don't know).

Threat	Serious Threat	Moderate Threat	Minor Threat	No Threat	Don't Know
Fishing/Commercial Industry	[]	[]	[]	[]	[]
(v1A) Fishery by-catches	[]	[]	[]	[]	[]
(v2A) Commercial whaling	[]	[]	[]	[]	[]
(v3A) Hunting by native/indigenous people	[]	[]	[]	[]	[]
(v4A) Dredging activity	[]	[]	[]	[]	[]
(v5A) Whales and dolphins in captivity	[]	[]	[]	[]	[]
(v6A) Entanglement in fishing gear	[]	[]	[]	[]	[]
Environmental Pollution & Effects					
(v7A) Marine litter/debris	[]	[]	[]	[]	[]
(v8A) Introduction of exotic species	[]	[]	[]	[]	[]
(v9A) Bacteria/viruses from sewage	[]	[]	[]	[]	[]
(v10A) Oil spills	[]	[]	[]	[]	[]
(v11A) Nutrient pollution	[]	[]	[]	[]	[]
(v12A) Air pollution	[]	[]	[]	[]	[]
(v13A) Reduction of available prey	[]	[]	[]	[]	[]
(v14A) Loss of seagrass beds	[]	[]	[]	[]	[]
(v15A) Loss of coral reefs	[]	[]	[]	[]	[]
Political/Governmental					
(v16A) Military activities	[]	[]	[]	[]	[]
(v17A) Lack of conservation funding	[]	[]	[]	[]	[]
(v18A) Lack of political interest	[]	[]	[]	[]	[]
Other					
(v19A) Climate change	[]	[]	[]	[]	[]
(v20A) Whale/dolphin watching	[]	[]	[]	[]	[]
(v21A) Injury from boat traffic	[]	[]	[]	[]	[]
(v22A) Population trends (human)	[]	[]	[]	[]	[]

(v23K) 2) Y/N Does whaling occur today?

If yes: Which countries conduct whaling?

(v24K) 3) Y/N Does US conduct any whaling?

(v25K) 4) What is the most endangered whale in the US? Pick one.

- ☐ Blue whale
- ☐ North Atlantic Right whale
- ☐ Gray whale
- ☐ Humpback whale
- ☐ Polar whale
- ☐ Bryde's whale
- ☐ Black whale
- ☐ Killer whale
- ☐ Southern right whale

(v26K) 5) What is the most endangered whale in the world? Pick one.

- ☐ Blue whale
- ☐ North Atlantic Right whale
- ☐ Gray whale
- ☐ Humpback whale
- ☐ Polar whale
- ☐ Bryde's whale
- ☐ Black whale
- ☐ Killer whale
- ☐ Southern right whale

(v27K) 6) What is the most endangered dolphin or porpoise in North America?

- ☐ Gulf of California porpoise
- ☐ Harbor porpoise
- ☐ Bottlenose dolphin
- ☐ Maui's dolphin
- ☐ Gulf of Mexico porpoise
- ☐ Mississippi river dolphin
- ☐ Tropical dolphin
- ☐ Hawaiian island dolphin

(v28K) 7) What is the most endangered dolphin or porpoise in the world?

- ☐ Gulf of California porpoise
- ☐ Harbor porpoise
- ☐ Bottlenose dolphin
- ☐ Maui's dolphin
- ☐ Chinese white dolphin
- ☐ Gulf of Mexico porpoise
- ☐ Amazon river dolphin
- ☐ Yangtze river dolphin
- ☐ Ganges river dolphin
- ☐ Mississippi river dolphin
- ☐ Tropical dolphin
- ☐ Hawaiian island dolphin

(v29K) 8) Y/N Can you find whales off of the Maryland/Virginia coast?

If so what are the most common species _____

(v30K) 9) Y/N Can you go whale watching in Maryland/Virginia?

10) Have you watched any of these:

(BluPlanet) ☐ The Blue Planet

(TheCove) ☐ The Cove

(Blackfish) ☐ Blackfish

(SeaWorld) 11) Y/N Have you ever been to SeaWorld?

Y/N Within the past 5 years

If no: Would you ever go to a marine theme park like SeaWorld?

If yes: can you tell me 3 things you learnt at Seaworld about whales/dolphins:

(1) _____

(2) _____

(3) _____

(Aquarium) 12) Y/N Have you ever been to the dolphin show at the Baltimore Aquarium?

If yes: Within the past 5 years? Y/N

If no: Would you ever go to dolphin show at the Baltimore Aquarium? Y/N

If yes: Can you tell me 3 things you learnt at the Baltimore Aquarium about whales/dolphins:

(1) _____

(2) _____

(3) _____

(WhaleWatching) 13) Y/N Have you ever been whale watching?

If no: Would you ever go whale watching? Y/N

If yes: Within the past 5 years Y/N

If yes: can you tell me 3 things you learned on a whale-watching trip about whales/dolphins:

(1) _____

(2) _____

(3) _____

(vb1) 14) Y/N Are you a member of any animal or environmental groups?

If yes, which ones?

Section 2: Legislation

(vb2) 1) Y/N - In your opinion, is there currently sufficient legal protection for cetaceans in the US?

(vb3) 2) Y/N - Should the US have legislation specifically for commercial whaling?

(vb4) 3) Y/N - Should the US have legislation specifically in support of whaling by Native Americans?

(vb5) 4) Y/N - Would you view a political candidate more favorable if they were in support of proposing laws specifically for protected areas for whales?

(vb6) 5) Y/N - Are you in favor of increasing marine environmental education in school curriculum?

(v43K) 6) Y/N - Have you heard of the Marine Mammal Protection Act?

7) Open answer: What does the marine mammal protection act do:

(v44K) 8) Y/N Do you know who regulates whaling internationally:

If yes, state who:

(Party) 9) What is your political leaning?

☐ Very conservative

☐ Moderately conservative

☐ Moderately liberal

☐ Very liberal

Section 3: Demographics

I am going to begin with some basic questions that are personal in nature, but nothing that will indicate who you are.

(Participation) 1) Y/N Do you participate in water activities?

If yes, how many and what types?

(Gender) 2) Respondent's gender:

☐ Male

☐ Female

(Profession) 3) What is your profession?

(Age) 4) What year were you born?

(Education) 5) What is the highest level of formal education that you completed?

☐ 12th grade or less (no diploma)

☐ High school diploma (or GED)

☐ Some college (no degree)

☐ Associate or technical degree

☐ Bachelor's degree

☐ Graduate degree/professional

(Resident) 6) How many years have you been living in the DC Metro area?

(Household) 7) How many people are currently living in your household?

☐ 1

☐ 2

☐ 3-5

☐ 6+

10) Do you have any other comments you would like to share with me related to cetacean conservation in the US? Comments can be continued on back of page.

That concludes the interview. Thank you for your time. Please feel free to contact me later if you think of anything else you would like to add. If you are interested in learning about the results of this research, please provide your contact information and I will share the results with you when the research is complete.

End time of interview:

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BIOGRAPHY

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