OTTER SOCIAL SCIENCE RESEARCH: AN EVALUATION OF THE GENERAL
PUBLIC'S KNOWLEDGE OF OTTER SPECIES

by

Caitlyn Scott
A Thesis
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfillment of
The Requirements for the Degree
of
Master of Science
Environmental Science and Policy

Committee:

_____   Dr. E.M.C. Parsons, Thesis Director

_____   Dr. Larry Rockwood, Committee Member

_____   Dr. Doris Bitler Davis, Committee Member

_____   Dr. Albert Torzilli, Graduate Program
                                     Director

_____   Dr. Robert Jonas, Department Chairperson

_____   Dr. Donna M. Fox, Associate Dean, Office
                                     of Student Affairs & Special Programs,
                                     College of Science

_____   Dr. Peggy Agouris, Dean, College of
                                     Science

Date: _____   Spring Semester 2015
                                     George Mason University
                                     Fairfax, VA

Otter Social Science Research: An Evaluation of the General Public's Knowledge of Otter Species

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at George Mason University

by

Caitlyn Scott
Bachelor of Science
George Mason University, 2010

Director: E.M.C. Parsons, Professor
Department of Environmental Science and Policy

Fall Semester 2015
George Mason University
Fairfax, VA

DEDICATION

This is dedicated to my loving husband John, who has supported and cheered me on throughout this process.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

OTTER SOCIAL SCIENCE RESEARCH: AN EVALUATION OF THE GENERAL PUBLIC'S KNOWLEDGE OF OTTER SPECIES

Caitlyn Scott, M.S.

George Mason University, 2015

Thesis Director: Dr. E.M.C. Parsons

Otters are a charismatic species that are frequently overlooked and have been depleted throughout history by the fur industry, habitat degradation, and conflicts between otters and commercial fisherman, leaving several otter species to be listed as endangered. In order to achieve more conservation to strengthen otter populations, the general public must be informed of the species' population status. The distributed questionnaire was aimed to identify the level of existing knowledge the general public has about otter species, providing information on how to release species conservation information to gain funding and push laws that promote conservation and protection for different species and their ecosystems. The survey was distributed in three different locations: Washington, D.C., Boston, Massachusetts, and Bridgewater, Massachusetts. The questionnaire confirmed in all three locations that the general public knew very little about otter species. The average otter knowledge score received by the participants was a score of 2.13 (Washington, D.C.: 1.89; Boston: 2.14; Bridgewater: 2.37). When asked to identify otters from four images, the participants in Boston, Massachusetts performed the best at

identifying the two otter species amongst the images (Boston: 49% of participants, Washington, D.C.: 45% of participants; Bridgewater: 47% of participants). The second part of the questionnaire focused on marketing, and asked the general public to rank the need to conserve that otter species based solely on the name provided. Participants were more likely to conserve names with a positive connotation over names with negative connotations by 11-13%. When comparing the three names, "hairy nosed otter," "furry nosed otter," and "Southeast Asian otter," the participants favored the "furry nosed otter" name. Based on average response, all three locations would be more likely to conserve a "rainforest otter" (average response 4.1) than the "giant otter" (average response 3.9). The responses of the participants indicate that it may be worth "rebranding" species' common names, with positive marketing in mind, to help promote the conservation of various species.

CHAPTER ONE: INTRODUCTION

Otters are a charismatic mammal species that are not well known by the general

public and few conservation organizations have otters as a "flagship species" or educate

the public about them. Otters are within the class *Mammalian* and order *Carnivora* order

belong to the *Mustelidae* family, along with badgers (*Mellivora sp., Meles sp., Arctonyx*

sp., Taxidea sp., & Melogale sp.), weasels (*Mustela nivalis & Poecilogale albinucha*),

martens (*Martes sp.*), (*Mustela putorius and M. nigripes*), minks (*Mustela lutreola & M.*

vision), and wolverines (*Gulo gulo*),(Burnie & Wilson 2005). Most of the 13 otter species

inhabit freshwater environments. They prefer riparian vegetation in slow moving rivers

and streams (Sepulveda 2007, Carter and Rosas 1997, IUCN Otter Specialist Group

2011). There are, however, two species that inhabit marine environments: the sea otter

(*Enhyrda lutris*) and the marine otter (*Lontra felina*) (Reeves 2008, IUCN Otter

Specialist Group 2011), and there is a marine ecotype of European otters (latin name) in

the northern part of the UK (McAfferty & Parsons 2011). Sea otters are located along the

Pacific Coast of North America, whereas marine otters are found along the Pacific Coast

of South America (IUCN Otter Specialist Group 2011). All species pray mainly on fish

and crustaceans, causing a great deal of conflict between with commercial fisherman

(IUCN Otter Specialist Group 2011). These conflicts, as well as habitat degradation and

historic fur industries, have led to numerous otter species becoming endangered. Of the

thirteen species, five species are on the IUCN Endangered Species List (See Table 1

below, IUCN Otter Specialist Group 2011). Two otter species are considered vulnerable,

five are near threatened, and one is of least concern. Because of their current conservation

status, immediate action is necessary to ensure thriving populations.

Table 1: IUCN Otter Species Status

Common Name:	Scientific Name:	IUCN Status:	Population Trend:
African Clawless Otter	Aonyx capensis	Near Threatened	Decreasing
Asian Small-Clawed Otter	Aonyx cinereus	Vulnerable	Decreasing
Congo Clawless Otter	Aonyx congicus	Near Threatened	Decreasing
Sea Otter	Enhydra lutris	**Endangered**	Decreasing
North American River Otter	Lontra canadensis	Least Concern	Stable
Marine Otter	Lontra felina	**Endangered**	Decreasing
Neotropical Otter	Lontra longicaudis	Near Threatened	Decreasing
South American River Otter	Lontra provocax	**Endangered**	Decreasing
Eurasian Otter	Lutra lutra	Near Threatened	Decreasing
Spotted-Necked Otter	Hydrictis maculicollis	Near Threatened	Decreasing
Hairy-Nosed Otter	Lutra sumatrana	**Endangered**	Decreasing
Smooth-Coated Otter	Lutrogale perspicillata	Vulnerable	Decreasing
Giant Otter	Pternoura brasiliensis	**Endangered**	Decreasing

Conserving and strengthening existing otter populations can aid in regulating and controlling the otter's surrounding ecosystem's biodiversity. This is especially true for keystone species such as sea otters. Keystone species play a vital role in an ecosystem, keeping a balance amongst the species therein (Paine 1969). Within the cold waters of kelp forests of the Aleutian archipelago, sea otters prey upon sea urchins (*Strongylocentrotus spp.*), keeping the urchin population to a manageable level (Estes et al. 2010, Kruuk 2006, Lowry & Pearse 1973). As the local sea urchin population increases, more and more kelp is consumed, reducing the available nurseries and breeding areas for a variety of species, and ultimately reducing the ecosystem's biodiversity (Estes et al. 2010). The more kelp that is consumed, the less stable the ecosystem becomes, resulting in an "urchin barren" (Estes et al. 2010). "Urchin barrens" occur when urchins are the dominant species, with a decline in the overall biodiversity. Therefore, sea otters are the keystone species that keeps the ecosystem in balance.

Otters are a flagship species

Otter species can additionally be used as a flagship species to rally support for the conservation of their local ecosystems. Dietz et al. (1994) and Leader-Williams and Dublin (2000) defines a flagship species as a keystone species that results in the *in situ* conservation of a significant number of other species across a variety of taxonomic groups and also serves as a symbol used to stimulate conservation action and awareness. Since sea otter are typically viewed as a "cute", charismatic species, they could be used as a flagship species. Being highly susceptible to oil, they can help raise the public's attention against oil spills (Owings 1993). Similarly, marine otters could be used by

organizations to gain the public's support to prevent further development along the coastline of the South American continent. The marine otter typically expands their territory onto land, but are prevented from doing so by developments, human population, and the threat of domestic animals (Medina-Vogel 2008). The public's attention can help reduce further development, pollution, and discarded fishing gear that continues to be a severe threat to the species (Medina-Vogel 2008). Another example of a potential flagship otter species is the giant otter (*Pteronura brasiliensis*). They are extremely social individuals that live within a family group, very similar to a human family, with two mating pairs and offspring from one or two litters (Carter and Rosas 1997). This species defends small territories within the Amazon Rainforest, where the "family" group lives (Carter and Rosas 1997). These territories even include a latrine-like area for the family to defecate (Carter and Rosas 1997). Organizations could use the giant otter as the flagship species to motivate the public to help preserve the rainforest and fight against deforestation. The endangered hairy nosed otter species (*Lutra sumatrana*) is another potential flagship species, which could be used to help campaign against the continuing reduction of the forests within its reduced habitat of Southeast Asia (Wright et al. 2008). Deforestation and habitat degradation have become a growing concern throughout Southeast Asia. According to the research by Miettinen et al. (2011) and Wilcove & Koh (2010), the overall annual deforestation rate was determined to be 1.0% between 2000 and 2010, with the majority of the forests changing into oil-palm and other export based plantations. Hairy nosed otters are considered one of five otter species that are of top global concern because their range remains unclear because of limited data (Nguyen et al.

2001). With only a few localities known, conversation organizations can promote the conservation of forested land within insular Southeast Asia to help protect and monitor the small hairy nosed otter population.

For decades, various methods, such as flagship species, have been used by conservationists to gain the general public's support. The general public has helped to gain funding and push for laws that help conserve and protect different species and their ecosystems. With the public's support, endangered otters and their habitats can be protected and preserved. This has already been proven true in California by the Friends of the Sea Otter organization. This organization gathered signatures of the local residents to help keep sea otters as a "threatened species", therefore protecting the local habitat (Owings 1997). In order for the support of the general public to be used most effectively, there has to be an abundance of easily accessible information about otter species available to the general public. O'Bryhim and Parsons (2015) found that the level of knowledge a person has about a specific species can influence their behavior positively towards conservation. In their study (O'Bryhim and Parsons 2015), participants were more likely to favor conservation and protection of shark species when they had a higher level of knowledge about sharks. These participants were more likely to support protective legislation, protected marine areas, and were more willing to donate money encouraging the conservation of sharks (O'Bryhim and Parsons 2015). This study supports the necessity for more information being provided to the general public concerning otters and their need for conservation. The purpose of this study is to assess the general public's level of information about otter species and their conservation, as

well as whether or not the name of a species can influence the desire of the general public to support conservation.

In order to help improve the support and protection of different otter species, the general public must ultimately be involved and engaged. The general public's involvement in conservation relies heavily on their knowledge concerning the species at hand. There are currently several iconic species that the public is frequently informed about, and therefore, provides more conservation support for those specific species. A few examples are pandas, elephants, and whales. The World Wildlife Fund for Nature even has a panda as its iconic logo. The general public needs to be familiar with a specific species, before it can even be interested in its conservation. This concept holds true for otters as well.

As stated above, the general public needs to have a basic level of knowledge concerning otter species to be interested in their conservation. However, there are no quantitative data available determining how much knowledge the general public has about otter species. There has been more recent publicity involving various otter species, specifically the memes (images with funny captions) displayed on social media networks, such as Facebook and Instagram, of two sea otters holding hands while sleeping, see Figure 1.

Figure 1: Sea Otter Meme on Facebook

Though some people would recognize a sea otter image because of those memes, there is still a portion of the general public that does not participate in social media networks and would be unable to identify a sea otter image. A tool needed to be created and analyzed to establish concrete data in order to evaluate the general public's knowledge of various otter species and the current level of conservation established for otters.

What's in a name?

Recent studies have shown that the connotation of a species' name can influence the general public's likelihood to support the conservation of that specific species (Karaffa et al. 2012). In the study performed by Karaffa et al. (2012), college students were surveyed to assess whether or not they would be pro-conservation or anti-conservation when given a list of common and fictitious names for different canid and raptor species. The results concluded that the participating students were twice as likely not to conserve a negative sounding species name than a name with a positive connation associated with it (Karaffa et al., 2012). The study also found that the majority of students responded more strongly to the names that were positive sounding verses the negative

sounding names (Karaffe et al., 2012). An example of which is the species *Orcinus orca*, commonly referred to as the orca or killer-whale. If conservationists and scientists referred to the species using the common name "orca" instead of the more negatively sounding name, "killer-whale," the general public would most likely have a greater positive response, which could result in providing more support for the conservation of the species. When advocating for increased conservation of a species, conservationists and researchers should consider using an alternative name that would entice a stronger positive reaction from the general public. It is possible that such a "rebranding" of otter names might potentially increase public concern and their value as a flagship species.

Project Objective

The aim of this current study is to: (a) evaluate the general public's knowledge about otters and their conservation; and (b) to ascertain whether "rebranding" otters by changing their common names, might help to increase conservation concern in the general public.

CHAPTER TWO: METHODS

The Survey Instrument

The study was conducted via a questionnaire that was read to participants during face-to-face interviews, see Appendix A. The questionnaire was divided into multiple sections. The first section focused on collecting demographic information surround each participant. The second section required the participants to quantify their general knowledge of otter species. In doing so, the participants were asked several questions pertaining to the correct identification of otter species, the number of otter species found within the United States, and the total number of otter species living today. In order to assess if participants could recognize an otter species, they were shown four images and asked to correctly identify the otter species, see Appendix A. Of the four images, two images were of actual otter species: the sea otter (*Enhydra lutra*) and the Asian small-clawed otter (*Aonyx cinereus*). The sea otter (*Enhydra lutris*) was chosen because of their recent popularity on social media memes, California's work to conserve that species, and because sea otters are one of the two species found within the United States. The second otter species, the Asian small-clawed otter (*Aonyx cinereus*), was used because it looks similar to the second species of otter found within the United States, the North American river otter (*Lontra canadensis*). Asian small-clawed otters are also frequently found in zoos and aquariums, such as the Woodland Park Zoo in Seattle, Washington, Sea World in Florida, and the National Zoological Park in Washington, D.C. It was predicted that

the majority of participants would recognize the Asian small-clawed otter since the local zoological park had an exhibit featuring them. Moreover, the Asian small-clawed otter also superficially resembles numerous other otter species, whereas the sea otter does not. Both were included in the images to ensure that if someone had seen an otter before, they would be able to recognize an otter species within the images shown. An additional two images that were included were not of an otter species, but of animals that a participant might mistake for an otter. The third image was of a beaver (*Castor spp.*). A beaver was chosen because it is a species that people are familiar with and it had identifiable features that were distinctly different from an otter species, such as its broad, flat tail and its rounder, thicker body shape. It was predicted that most people would be able to identify that image as a beaver, or at least, that it is not an otter species. The fourth image was of a weasel (*Mustela spp.*). This species image was chosen because the body shape is similar to that of an otter and they are related to otters by being in the Mustelidae family. However, weasels are much smaller and have larger ears than otters have. Because weasels are not as publicized as otters or beavers, it was predicted that the majority of participants would not be able to identify what type of species it was, but would still be able to recognize that it was not an otter. Once the participants identified which images were otter species, they were asked to identify the number of species that are currently living today.

Within the second section, a series of questions was asked to identify if the participants held any knowledge of otter species. These two questions were asked to determine if the general public felt that there are hundreds of different species of otters,

resulting in little conservation being necessary for the species as a whole, or if they knew there are only a few species found throughout the world, requiring more attention and conservation. Both questions were added with the prediction that the general public would be unaware of how many otter species there are in the world and in the United States and would answer incorrectly. Throughout this survey, it was assumed that if participants were exposed to more information about otter species, they would be able to answer the questions correctly on the questionnaire. For comparative purposes, two questions were added asking the participants about elephant species. Elephant species were chosen because of the publicity elephant species have received over the last few decades concerning their conservation status. Most people have knowledge of the illegal ivory trade and the severely declining populations of elephants. Consequently, they should be able to answer the questions concerning elephants correctly.

The third section examines the extent to which participants currently know about various otter species and their conservation status in and outside of the United States. The participants have to identify whether or not otters are found within the survey site area, ascertaining if the participants are aware of their own close proximity to otters. In addition, participants have to indicate if otter species are on the United States Endangered Species List. These data, collected from this question, can also be used to evaluate if the United States Government should be doing more to publicize the various species listed on the United States Endangered Species List, returning to the main concept that the general public has to have adequate species knowledge in order to aid in conservation efforts. Participants were furthermore asked to reflect upon the level of conservation otters

species currently have not only within the United States, but internationally as well. The questionnaire also pushes the participants to consider how the United States government interacts with Native American practices with respect to otters. The question was added with the expectation that the majority of participants will either answer incorrectly or will state that they did not know the answer, but it was included nonetheless to evaluate whether or not the general public knows about the permitted takes by Native Americans. It was hoped to bring about more awareness that the United States Government does not strictly regulate the permitted takes by Native Americans, even for species listed on the United States Endangered Species List.

It is essential to determine where the general public is ascertaining their information concerning different otter species. It can also be used to help direct and redirect species information to where the majority of the public would access it. The options provided to the participants included television programs, conservation groups, books and magazines, zoos and aquariums, marine parks (such as SeaWorld), and an option for "other." The categories were chosen based on common sources most people would use as well as common sources used by conservation groups and non-profit organizations to share information. Television programs were chosen specifically for the abundance of animal, nature, and conservation programs currently available on numerous network channels, such as Animal Planet, the Discovery Channel, and the National Geographic Channel. The "conservation group" category was listed to identify if participants actually read the materials provided by these groups or if they even received information from conservations groups. The "books and magazines" category was listed

to include those participants who do not actively watch television and may miss the information presented in that manner. Also, the popularity of the National Geographic Magazine could prompt participants to answer using this category. It was predicted that the "zoos and aquariums" option would be chosen by the majority of participants, especially if they have children because families often visit zoos and aquariums during family trips. The "marine parks" option was added in case a participant's only exposure to otters was through the marine theme park shows performed in locations such as SeaWorld. Knowing where to the public obtains species information can benefit conservation organizations and researchers advocating for not only otter species, but also all species in need of conservation.

The final portion of the survey was not written with the actual conservation status of otter species in mind, but with the marketing value of those species. When advocating for more conservation surrounding a species, conservationists and researchers could potentially consider using an alternative name that would entice a stronger positive reaction from the general public. The participants were given twelve otter species names, ten of which were fictitious and two were actual otter species. The names were separated into two categories: positive and negative. The positive names were rainforest otter, furry nosed otter, Southeast Asian otter, common otter, Scottish marine otter, and American otter. The negative names were snake otter, hairy nosed otter, fish-eating otter, black otter, sharp clawed otter, and giant otter.

The names listed were selected with the hypothesis that the general public would respond more favorably to the positive sounding names in comparison to the negative

sounding names, as noted in previous studies (Karaffa et al., 2012). The "rainforest otter" name was used because of the recent publicity to conserve and protect the world's rainforests and the species found within them. "Rainforest" is a term the general public has been hearing frequently and consistently in terms on necessary conservation and could elicit a greater reaction to conserve that species. The "furry nosed otter" was chosen because it is a more charismatic sounding name than the actual otter species, the hairy nosed otter (*Lutra sumatrana*). Both of these names were used to see if the general public preferred one name over the other. The Southeast Asian otter name was chosen to compare a more scientific, location-oriented name verses a more charismatic sounding (i.e., the furry nosed otter). The hairy nosed otter is found throughout Southeast Asia, where there is little population data or conservation support (IUCN Otter Specialist Group, 2011). Using a demographic location name in comparison to the actual name (hairy nosed otter) as well as the more charismatic name (furry nosed otter) could help direct conservationists and researchers to a naming system that will elicit the greatest support. The common otter name was included in the list as a more neutral sounding name, meaning there are no real negative or positive connotations associated with the name. However, the name typically refers to something that if frequently found or frequently occurs, which could bring about the reaction of the general public to not be as likely to conserve a species because they might believe not endangered or in danger of decline. The Scottish marine otter was added to the list because the Eurasian otter (*Lutra lutra*) is frequently found in marine ecosystems throughout the United Kingdom (IUCN Otter Specialist Group, 2011; McCafferty and Parsons 2011). It could be a possibility for

researchers to change the species' name to one that is local to provoke a more positive reaction from the public in order to gain more conservation support. The final positive name added to the list was American otter. This name was chosen because previous studies (Karaffa et al., 2012) showed that patriotic-sounding common names for species increases conservation concern, and so this modification was attempted with the American public, using the hypothesis that it would elicit a high level of support. The results collected from the American otter and the Southeast Asian otter could also be compared to determine if using a demographic location name only provokes a greater positive reaction within the country it is named for. This could be useful for conservationists to entice the local community to be more involved by taking pride in the species and its name; however, it could be detrimental when soliciting organizations and countries that are not from the named location. Though some of the positive sounding names could have a negative influence on the general public's likelihood to conserve, the remaining six names were added with the expectation that the public would respond negatively.

In creating the remaining negative otter species names, special consideration was used to stimulate negative emotions from the public. The snake otter was chosen specifically because of the large number of people who are afraid of or dislike snakes in general. The hairy nosed otter was listed as a negative otter name for the comparison reasons mentioned above. The fish-eating otter was created for two purposes. The first was to be informative: most otter species eat fish, along with a varying diet of invertebrates, crustaceans, and amphibians. The second purpose was to rouse a negative

reaction surrounding otters' reputation for consuming economically important fish and crustacean species. Sea otters have been viewed negatively for decades by the fishing industry because they believe that sea otters consume their products, reducing the economic success of the industry (IUCN Otter Specialist Group, 2011). If the general public feels that their food is in danger of being limited by otters, they may be less likely to conserve that species. The black otter name was included in the list to fuel cultural beliefs that "black" animals could be bad luck, which has been the case for black cats dating back centuries. This name was added with the prediction that most people would be less likely to conserve that species. The sharp-clawed otter was added to the list, again, with the hypothesis that the name could elicit fear from the general public. Having an otter with a "scary" name would divert the public from supporting the conservation of said species. The final otter species name with a potential negative connotation was the giant otter. The giant otter is an actual species of otter (*Pteronura brasiliensis*) that resides within the Amazon Rainforest in South America (IUCN Otter Specialist Group, 2011). A portion of the general public could, potentially, perceive the giant otter as a "scary" sounding name, imaging a vicious animal that towers over them like a fairy-tale giant. This name was added to create a comparison of the participants' reactions between the giant otter and the rainforest otter. It was hypothesized that participants will respond more favorably to the rainforest otter name than the giant otter name. If this prediction is true, then conservationists could change the species name and use the already abundant publicity to aid in the conservation of the world's rainforests to promote the protection and conservation of *Pteronura brasiliensis*. Being able to identify which names the

general public responses to more negatively and more positive can contribute to the protection and conservation of various otter species, as well as species overall, with little effort or funding required.

The intention of this questionnaire is to evaluate the current level of knowledge the general public has concerning otter species, as well as whether or not the name affects a participants' likelihood to conserve that species. It was hypothesized that the public would hold very little information about otters in general, let alone the number of otter species or their conservation status. Additionally, it was hypothesized that participants would be more likely to conserve an otter species if it had a positive connotation associated with that species' name.

Survey Modifications

The participants completed the questionnaire in Washington, D.C. with great success and the results yielded useful data to understand the level of knowledge the general public has about otters, as well as their opinion of otter species names. It became clear that the questionnaire needed a few additional questions and clarifications before it could be successfully distributed at the next two survey sites in Massachusetts. The first alteration was to add Question 3, which asked if the participant had children. This question was added to help determine if participants who had children would know more about otter species than participants who did not have children. Also, it could be compared to determine if participants with children obtained their otter species knowledge from a different source, such as zoos and aquariums, than those participants who did not have children. The preceding question, now Question 4, was altered to ask

the participant what state they currently lived in. This question previously asked what state the participant was born in, and was modified to be more relevant. A second question was added into the questionnaire, creating the new Question 5. The updated Question 5 asked the participants what type of area they resided in, giving them the option of urban, suburban, or rural. This question was added to the questionnaire to help give more insight to the participant. The data will be compared to determine which area type knew more about otter species. These data proved to be more useful than using the states that the participants resided in and might help direct conservation organizations to target audiences that need more exposure to species information.

In distributing the questionnaire, it was assumed that if participants were exposed to more information about otter species, they would be able to answer the questions correctly on the questionnaire. For comparative purposes, two questions were added asking the participants about elephant species. Elephant species were chosen because of the publicity elephant species have received over the last few decades concerning their conservation status. Consequently, they should be able to answer the questions concerning elephants correctly. Mimicking Question 10 concerning the number of otter species, the new Question 11 was added to ask the participants how many species of elephants there are in the world. Again, similar to Question 15 about endangered otter species, Question 16 asks the participant what percentage of elephant species are endangered internationally. For both questions, the available response was the same as that used for the questions about otters to keep the results consistent. The remainder of the questionnaire was kept the same, except for the updated Question 19. The only

modification added was the word "neutral" above the "3" column in the response section.

This was done to clarify to participant that there was a clear distinction between least

likely to conserve, most likely to conserve, and neutral based on the name. The

modifications allowed for more reliable comparisons between the participants'

demographic information and their knowledge of otter species and how likely the

participants would be to conserve an otter species based on the name alone.

Survey Sites

The goal of the questionnaire was to obtain an accurate demonstration of the

general public's knowledge and opinion of otter species and their conservation. In order

to achieve that goal, the questionnaire had to be distributed in multiple locations that

featured different demographics of the population. Therefore, three survey sites were

chosen to distribute the questionnaire: Washington, D.C., Boston, Massachusetts, and

Bridgewater, Massachusetts. Each site provided a different demographic of the

population and allowed for more accurate data to be collected and analyzed.

Washington, D.C.

To gain access to participants with a wide range of demographics, the federal

District of Columbia (Washington, D.C.) was the first location site selected. Washington,

D.C. was chosen as a survey site because it was the most diversified location within the

Washington, D.C. Metropolitan area. The District itself is located in the mid-Atlantic

region along the east coast of the United States and is boarded by the state of Maryland

and the state of Virginia (Destination DC, 2015). Washington, D.C. is 68 square miles

that are broken up into four quadrants: Northwest, Southwest, Northeast, and Southeast.

As of the census in 2013, the population of the federal district is 647,000 people (Destination DC, 2015). Washington, D.C. is also home to the federal government, which is its main industry alongside tourism, providing a diverse population of participants that include highly educated locals and numerous tourists from around the country. The questionnaire was intended to be distributed to a wide range of possible participants in order to achieve a realistic sample size of the general public. For this reason, the site location chosen within Washington, D.C. was Union Station. With over a half a million square feet, Union Station is Washington, D.C.'s main transport location (Union Station Washington DC, 2015). Located near the Capital Building on Massachusetts Avenue in the Northeast Quadrant, Union Station services more than 90,000 visits a day with their over a hundred specialty shops, 35 restaurants, and numerous businesses (Union Station Washington DC, 2015). Union Station is Washington, D.C.'s featured transportation station, with services that consist of Amtrak, the Metro Rail, Maryland's MARC Train, Virginia Railway Express, taxi services, car rentals, and major intercity bus companies such as Megabus and Greyhound (Union Station Washington DC, 2015). For Amtrak transit, Union Station is the second busiest station within the United States, second only to Penn Station in New York City (Union Station Washington DC, 2015). The transportation, retail, and restaurant services offered at Union Station made this the most suitable site to encounter a wide range of the general public, including both tourists and local residents.

Multiple locations within the building of Union Station provided sufficient opportunities to interact with the general public. The optimum location to distribute the

questionnaire was determined to be between the Main Hall and the West Hall, facing

Massachusetts Avenue Northeast. This location proved to be the most ideal because it

intersected potential tourist and local resident participants entering the building from the

street, as well as those who were transitioning to the Train and Bus Terminal on the north

facing side of the building. The West Hall housed three popular restaurants: Potbelly

Sandwich Shop, Chipotle, and Chop't, increasing the likelihood of encountering local

residents during their lunch break. Positioning the questionnaire distribution within those

two Halls of Union Station would increasing the likelihood of obtaining a more accurate

representation of the general public's knowledge and opinion of otter species and their

conservation.

Boston, Massachusetts

While Washington, D.C. proved to be an ideal location to distribute

questionnaires to evaluate the general public, it was determined that a second location

should be used to increase the sample population and accurately represent the general

public. The second survey site of Boston, Massachusetts was selected because the city

size and demographic is similar to that of Washington, D.C. The city of Boston has a

slightly smaller population size of around 617,000 residents and contains multiple

institutions of higher education and renowned hospitals (City of Boston, 2014). Similar to

the Washington, D.C. location, Boston is frequently visited by a large tourist population,

attracted by its extensive historical background (City of Boston, 2014). The city of

Boston is described by the Metropolitan Area Planning Council (MAPC) (2008) as a

Metropolitan Inner Core Community. Boston, Massachusetts is a high density inner city

with an urban environment containing a mix of apartment buildings, multifamily houses, and single family houses (Metropolitan Area Planning Council, 2008). The area of Boston, Massachusetts has been completely "built-out" and new growth requires redevelopment, infill, and conversion from industrial uses to residential uses (Metropolitan Area Planning Council, 2008). In the 19th and 20th centuries, the city expanded its city limits by landfill, using rubble and gravel that was shipped in to widen the peninsula that Boston resided on (Amtrak, 2014). The city of Boston also has a large minority and immigrant population and is recovering from urban disinvestment and the suburban flight during the 1960's and 1970's (Metropolitan Area Planning Council, 2008). The key industries within Boston, Massachusetts are life sciences, finance, information technology, manufacturing, tourism, renewable energy, defense, and maritime (Commonwealth of Massachusetts, 2015). The combination of industries allows for a wide range of professional demographics of potential participants, from the upper class to the manual labor working class, yielding a more accurate cross-section of the general public. Within the city of Boston, the survey site chosen needed to be comparable to the site used in Washington, D.C.

Union Station is the major transportation center for the Washington, D.C. area, and therefore fielded numerous tourist and local residence. Within the city of Boston survey site, South Station was the best representation of Union Station available. Considered the second busiest transportation center in New England, South Station services 40 trains a day and houses terminals for the railway, intercity buses, and subway trains. At the heart of the financial district, South Station is a focal point for the area,

attracting both tourists and local residents, in and outside of the city of Boston (Amtrak, 2014). Using a second site location similar to the Washington D.C. site location increased the sample size and thus, hopefully, gaining a more accurate representation of the knowledge and opinion the general public has concerning otter species and their conservation.

Bridgewater, Massachusetts

Though the first two survey sites rendered dependable cross-section of the general public, the sites had limitations. The first two locations were centered in the heart of large, metropolitan urban inner core city communities. Consequently, there is a potential that the data collected neglected to include a sufficient amount of participants from rural and suburban communities not neighboring large metropolitan communities. To remediate this potential limitation, a third survey site location was introduced in the town of Bridgewater, Massachusetts. The town of Bridgewater is classified by the MAPC (2008) as a developing mature New England town, with a well-defined town center, mixed population densities, and vacant or unused land to expand. To be classified as such, the town of Bridgewater has a mixed-use town center that is surrounded by compact neighborhoods with an average of quarter- to half-acre lots, and low-density outlying areas, including a dairy and cattle farm (Metropolitan Area Planning Council, 2008). The town has large amounts of vacant developable land, more than 25% of the town area, and has a rapidly growing residential population (Metropolitan Area Planning Council, 2008). Accordingly, I decided that this developing, mature New England town

would be an ideal location for the third survey site to increase suburban and rural representation.

The town of Bridgewater, Massachusetts has a population of mainly local residents with varying demographic backgrounds. This town was chosen because the potential participants would most likely reside in suburban and rural areas and may have a more diversified educational and professional background. Within the town of Bridgewater, the site location where the questionnaires were distributed was the town center on the 4th of July, 2015. The town center was chosen because there is a large town parade and festival every year celebrating the country's Independence Day. Since there are no main transportation centers where there would be heavy foot traffic, the town center's holiday parade was the most suitable site location. The holiday celebration features a parade through the center of town and the Bridgewater Arts and Music Festival following the parade (Bridgewater Arts and Music Festival, 2015). The town of Bridgewater has been putting on the 4th of July parade for years and it attracts hundreds of people from the surrounding area every year (Bridgewater, MA 4th of July, 2015). The questionnaires were distributed throughout the town center during the day's festivities. The crowd was comprised of local residents and visitors from surrounding towns, with their families and friends. The town of Bridgewater was, thus, an essential location site to gain a greater, more accurate assessment of general public's knowledge and opinion of otter species and their conservation.

Distribution Bias

The distributed questionnaire was designed to evaluate a cross-section of the general public's knowledge and opinion of otter species and their conservation. This has been achieved by using multiple survey sites that provide access to populations with varying demographic backgrounds. It is also essential to use participants that have been approached in an unbiased, random manner. The individual distributing the questionnaire remained the same throughout the distribution period in all three locations. Both the questionnaire and an introduction statement intended to be used when approaching potential participants were approved by the George Mason University human subjects review board, to reduce and clarify any potential benefits and risks that could occur to a participant. This was done to ensure that every potential participant approached received the same introduction of information, as well as consistent instructions on how to complete the questionnaire. The distributor did not prompt or interpret the questionnaire for any of the participants, enabling each participant to complete the questionnaire to the best of their knowledge and understanding. It was found that frequently participants would ask the distributor to provide the correct answers involving a question previously answered before the participant had completed the entire questionnaire. In these situations, the distributor denied any responses to safeguard the integrity of the results as being an accurate representation of the general public's knowledge and opinion of otter species and their conservation.

Another necessary action taken to maintain the validity of the results involved the manner in which potential participants were approached. It is essential to keep a consistent method when approaching individuals to guarantee the desired representation

of the public. Bias can and do occur when human distributors are involved. When a bias occurs, the resulting data could produce a misrepresentation of the general public's knowledge and opinion on otter species and their conservation. A misrepresentation would result in species information being targeted at the wrong demographic areas or populations, producing either an overabundance of previously known information or an insufficient amount of information being publicized. The distributor approached individuals at each location using the same random approach method. As randomly as possible, the distributor approached individuals of varying age, race, and class. Any individual in the vicinity had the potential to be approached. However, the distributor did not approach individuals who were participating in a conversation on their cellphone or who were in the middle of eating. Though the distributor attempted to reduce any bias that may occur, there is no way to ensure a complete random selection of participants when human distributors are involved. One unintended bias that could have occurred involved the distributor approaching individuals that looked, to some degree, friendly and would be more likely to participate in the questionnaire. This could impact the survey by having only participants who might be more interested in conservation than those who appeared to be unfriendly or appeared to be less likely to complete the survey. Another unintended bias that could have occurred might be that the distributor unintentionally favored a specific gender, age, or class of the participants. The demographic questions contained in the questionnaire were created to help identify any bias that may have occurred and could potentially influence the assessment of the general public's knowledge and opinion of otter species and their conservation.

Questionnaire Distribution

The questionnaires were distributed at all three locations on separate days. Union Station in Washington, D.C. was visited first amongst the locations. The distributor approached potential participants between ten o'clock in the morning and five o'clock in the evening, during the months of April and May in 2012. The collection process occurred over a period of eight separate workdays and was completed when the distributor collected over 140 usable surveys, see Appendix B. The term "useable" refers to a survey that was completed by an adult living in the United States and was over the age of 18 years old. A total of 226 individuals were approached and asked to complete the survey. Only 141 of those individuals were willing to complete a usable survey, having in a 62% success rate. The distributor did not begin recording the number of individuals that declined participating in the questionnaire until mid-way through the collection process; consequently, the true number of individuals approached is not accurate. Nevertheless, based on the estimated number of individuals approached and the number of days required to obtain 141 usable questionnaires, the Washington, D.C. location had the lowest number of willing participants to complete the questionnaire.

The second location in Boston, Massachusetts proved to be more successful in willing participants. The distributor only spent three days, February 28, March 7, and March 8th, 2015 at South Station collecting questionnaires. For this location, the distributor only collected surveys on Saturdays and Sundays, increasing the potential of intercepting tourists, but decreasing the potential of intercepting local residents. The distributor approached 235 individuals, collecting a total of 157 surveys at South Station. With a 67% success rate, the distributor was denied equally by both men and women,

though the actual percentage varied from day to day. Throughout the survey collection, the distributor had predicted that more men were denying the questionnaire than women. However, this prediction was only accurate for the last and final survey site location.

The final survey site location yielded the greatest success rate in the shortest amount of time between the three survey sites. The town of Bridgewater, Massachusetts had a success rate of 83% (147 usable surveys) of the 177 individuals approached and was obtained within seven hours on July 4, 2015. The Bridgewater location produced more men declining to complete the questionnaire than women, resulting in a 10% differential. Consequently, this difference could result in a slight bias towards women completing the questionnaire. Regardless, the successful collections at all three locations created an adequate representation of the general public's knowledge and opinion of otter species and their conservation.

Procedure for Analysis

The three sites were analyzed to evaluate the general public's general knowledge concerning otter species and their conservation. The first section of the questionnaire involved collecting demographic information from each participant. The percent of participants' responses for each demographic question was determined and a chi squared goodness-of-fit test was applied.

This test was used to determine if a bias occurred during the face-to-face interviews and to see if the participants were equally represented in each demographic area. For every chi squared goodness-of-fit test performed, the degrees of freedom were calculated and the alpha value remained at the 5% critical value. Once calculated, the chi

squared statistic was compared to the critical chi squared statistic in a reference table. This analysis was additionally applied to determine if the participants' responses deviated from the expected probable response, i.e. the responses for the question asking if otters are found within the survey area, if otters are listed on the Endangered Species List, if Native Americans are allowed to hunt otters, and the likelihood of participants to conserve a species based on the name. Similarly, a chi squared test for independence was applied to determine if the participant'' responses were significantly different for different demographics. The same equations were applied to the test for independence. This test was applied to the participants' responses for their otter knowledge score and the participants' demographics, their otter knowledge score and their elephant knowledge score, and the participants' likelihood to conserve and the participants' demographic background.

In order to evaluate the participants' level of otter knowledge, the scores for each location were determined using a 7 point rubric. This rubric gave one point per correct answer, focusing on the questions specifically asked about otter species and their conservation (Washington, D.C. Questions 7, 8, 9 , 10, 11, 12, and 14; Boston/Bridgewater Questions 9, 10, 12, 13, 14, 15, and 18). The individual scores were also subjected to an ANOVA Analysis of Variance statistical test to determine if there was a significant difference between the three site locations. This statistical analysis was performed using R statistical software.

The final question on the questionnaire no longer focused on the general public's knowledge of otters and their conservation, but on the general public's opinion and

likelihood to conserve a specific species. A 5-point Likert Scale was created for participants to indicate their likelihood to conserve that specific otter species based solely on the name. The participants could select a response of one (they are the least likely to conserve that species), a two, (they are less likely to conserve that species), a three (they are neutral to conserving that species), a four (they are more likely to conserve that species), or a five (they are the most likely to conserve that species). The average response was taken for each name in each location to compare the results. A chi squared contingency test was performed on the participants' responses to identify if a significant different occurred, distinguishing if a specific location preferred one of the three focus names (i.e. "furry nosed otter," "hairy nosed otter," or "Southeast Asian otter"). The same chi squared contingency test was applied to the names "rainforest otter" and "giant otter" to ascertain if each location preferred one name over the other. The participants' data will be subjected to this statistical analysis by way of using R statistical software. The analysis of these results will help accurately identify where researchers and organizations need to target their efforts to promote species information and conservation, as well as gain more support for the marketing aspect within species conservation.

CHAPTER THREE: RESULTS

Demographic Information

The questionnaire was distributed to three location sites: Washington, D.C., Boston, MA, and Bridgewater, MA, with the intention of obtaining a representation of the general public. Washington, D.C. was chosen for its central location, providing exposure to local residents and the heavy tourist population, as well as a varied demographic background of participants. The city of Boston was chosen for its similarities to Washington, D.C.'s demographics. Bridgewater, Massachusetts was selected, however, for its exposure to local rural and suburban residential population that was not represented by the inner city locations.

Of the three site locations, the demographic distributions resulted in similar distributions across the data, see Appendix B. The Washington, D.C. and Bridgewater site locations had an equal number of men and women participants represented. Washington, D.C. had 48% of its participants as male (67 participants), with 52% of participants as females (73 participants). The Bridgewater location had similar data, with 59% male participants (93 participants) and 41% female participants (65 participants). A chi square statistic was applied to both survey sites to determine if there was a significant deviation from the 50:50 ratios of men to women. For both Washington, D.C. ($x^2 = 0.257$) and Bridgewater ($x^2 = 1.527$), there was not a significant deviation from the ratio. Conversely, the Boston site did have a significant deviation from the ratio of men to

women ($x^2 = 4.962$), resulting in 45% of participants being male (66 participants) and 55% of participants being female (81 participants). Though there was little bias noted in two of the survey sites, a bias could have occurred in the Boston location, resulting in the significant deviation from the hypothesized ratio.

When comparing the age ranges of the three survey sites, the age ranges were neither equally distributed, nor consistent from site to site. In the Washington, D.C. site location, the majority of participants were older than 51 years old (41% of participants), with the second largest group being between the ages of 31-50 years old (33%), resulting in a modal age of 45 years old. Only 26% of the participants were under the age of 30 years old. The City of Boston location provided the opposite demographic for age range, with 49% of the participants being 30 years old or younger. Additionally, 29% of the participants were 31-50 years old and 22% of the participants were older than 51 years old. The Bridgewater site represented the age ranges that were not strongly represented in the other two site locations. The majority of participants were between the ages of 31 and 50 years old (45%), with only 37% of participants being over the age of 51 years old and 19% of participants being younger than 30 years old. The increase in percentage of participants within the ages of 31 and 50 years of age could be due to the family oriented event occurring at the site location on the day the questionnaires were distributed. A chi-squared goodness of fit test was conducted on all three locations (Washington, D.C. $x^2 = 68.818$; Boston $x^2 = 195.2$; Bridgewater $x^2 = 58.833$), resulting in an unequal representation of age ranges. The possibility of a bias occurring should be noted within

the survey sites. Nonetheless, each of the age ranges were represented between all of the site locations.

Washington, D.C. held the greatest representation of residents throughout the United States. The participants surveyed in the Washington, D.C. site were from 40 states, with the majority of participants from Pennsylvania and New York. The Boston survey site's participants represented only 23 states, with the majority of participants being from Massachusetts. It was hypothesized that Washington, D.C. would have a higher tourist rate, as well as more residents that have moved into the area from other states. As expected, the Bridgewater survey site had the least number of states represented (15 states), with the majority of participants residing in Massachusetts. The survey site locations were chosen to represent all area types, not necessarily every state within the United States. The results collected may vary if the participants were surveyed in more locations.

The participants were asked to indicate their level of education. This was asked to identify any bias that may have occurred, as well as to compare education backgrounds to determine if participants with a certain educational background knew more about otters than other backgrounds. The majority of participants surveyed at the Washington, D.C. site location had a graduate or post graduate degree (45%) or had a college degree (38%). Only 11% of participants had some college and only 6% of participants had just a high school diploma. Similarly, the majority of participants (32%) from the Boston site location had a college degree. Unlike the participants in Washington, D.C., the participants' second most common educational background was attending some college

without obtaining a degree (31% of participants), and only 23% of participants obtained a graduate or post graduate degree. The Boston survey site had the largest number of participants (13%) who only received their high school diploma. The Bridgewater site location yielded results similar to both of the previous locations. The majority of participants had received college degrees (39%), with the participants obtaining a graduate or post graduate degree (29%) as the second most common background. Only 22% of participants attended some college, and only 10% of participants had received a high school diploma. Though little bias occurred, the data shows that participants who only have a high school diploma or attended some college were under represented in this survey. This could be a result of current jobs requiring more education, causing the general public to pursue higher education.

It was hypothesized that the majority of the general public would not belong to an environmental or conservation organization. This is true for each of the three site locations. In Washington, D.C. and Bridgewater, 83% of the participants did not belong to such organizations, with only 17% of the participants who did belong. Out of the Boston participants, 82% did not belong to an environmental or conservation organization, with 16% of participants who did belong to such organizations and 2% of participants not answering the question. With such a small target population, environmental and conservation organizations need to project their species and conservation information to a wider demographic of the public, and not limit it to their members.

Only Boston and Bridgewater participants were asked to disclose if they had children. This information was collected to identify if there is a connection between the level of knowledge participants hold and whether or not they have children. Within the Boston location, the majority of participants (68%) did not have children. These results are mostly likely due to the large portion of participants falling within a younger age range. The Bridgewater location had the opposite result, with the majority of participants (70%) having children, most likely a consequence of the family oriented event taking place at that location.

Since only the Boston and Bridgewater location participants were asked what area type they resided in, it was hypothesized that the majority of Boston participants resided in urban or suburban areas, whereas the Bridgewater participants reside in more rural or suburban areas. These predictions were correct. The Boston location had 49% of participants residing within an urban area and 42% of participants residing within a suburban area. Only 9% of Boston's participants resided within a rural area. The opposite was true for the Bridgewater location; 62% of the participants resided in a suburban area and 26% of participants resided in a rural area, whereas only 12% of participants resided in an urban area. The large percentage of suburban residents found within the Bridgewater location could be due to the misconception people have about what towns qualify as rural and suburban. Nevertheless, the participants represented the general public residing in each of the three area types.

The demographic information collected by the participants at all three locations is a sample of the general public's demographic. Though some bias may have occurred; there was very little bias that would have drastically impacted this study.

Otter Species Knowledge

Throughout the questionnaire, the participants were asked to respond to various questions aimed to evaluate their current knowledge level of otter species and their conservation status. To reference the raw data concerning the participants' knowledge level of otter species and their conservation status, see Appendix C. The first question within this section of the questionnaire required the participants to identify otter species from four images. For all three location, almost half of the participants correctly identified Image A (sea otter) and Image C (Asian small-clawed otter) as otter species. The two survey sites within the state of Massachusetts had the highest number of participants correctly identifying the otter species out of the four images. The Boston location had the highest percentage of participants (49%) who answered correctly, stating that Image A and Image C were both otter species. The survey site in Bridgewater had approximately 47% of the participants answer correctly, whereas in the Washington, D.C. location, only 45% of the participants (63 out of 140) were able to correctly identify the otter species images, see Table 2.

Table 2: Participants Identifying Otter Species from Images

Locations	Participants Selected Images A & C	Participants Selected Only Image C (Asian Small	Participants Selected Only Image A (Sea Otter)

		Clawed Otter)	
Washington, D.C.	45%	17%	13%
Boston, MA	49%	13%	10%
Bridgewater, MA	47%	14%	5%

When comparing the number of participants who selected only Image A (sea otter) or only Image C (Asian small-clawed otter), more participants, at all three survey sites, were able to identify Image C as an otter species. In doing so, more participants were able to correctly determine that Images B and D were not otter species, but were unable to correctly identify Image A as an otter. When comparing the number of participants who correctly identified one of the two species of otters, but not both species, it was concluded that more participants recognized the Asian small-clawed otter as an otter species more frequently than the sea otter. Of the Washington, D.C. location participants, 17% of the participants (24 participants) correctly identified Image C as an otter and that Images B and D were not otter species, but also stated that Image A (sea otter) was not an otter. Only 14% of participants in Bridgewater and 13% of participants in Boston identified only Image C (Asian small clawed otter) as an otter species. Only 13% of the participants from the Washington, D.C. location, 10% of the participants from the Boston location, and 5% of the participants from the Bridgewater location were able to successfully identify the sea otter (Image A) as an otter species, with identifying Images B and D as not otter species, but incorrectly identified Image C (Asian small-clawed otter) as not an otter. The data showing that participants recognized the Asian

small-clawed otter first was surprising because sea otters are typically publicized more often than river otters. However, the North American river otter is commonly found throughout the United States river ecosystem, as well as in many zoos and aquariums; thus, participants may have been exposed to river otter species more frequently.

When the participants were asked to quantify the number of otter species found throughout the world, most participants struggled to answer the question. The majority of participants in each location responded with either "I don't know" or simply writing a question mark. The participants in Washington, D.C. had the largest number of "I don't know" responses (59% of participants), followed by 42% of participants in Boston and 21% of participants in Bridgewater. Nevertheless, out of the remaining responses, 8% of the participants in Washington, D.C. thought there were between ten and sixteen species of otters found throughout the world. This percentage held true for the other locations. Only 11% of Boston's participants thought there were between ten and sixteen different otter species, whereas 18% of the Bridgewater participants thought there were between ten and sixteen types. Even though it was hypothesized that the participants may respond with otter species numbering in the hundreds, this was not the case. Very few participants (less than five) at each survey site responded with a species count of a hundred or greater. It was also hypothesized that the participants who responded with over a hundred otter species would also assume otter are not in danger of extinction. This was found to not be the case. Of the few participants who responded so in both the Boston and Bridgewater locations, two of the participants believed that only a few otter species (21-40%) were considered endangered internationally. The other participants with similar answers for the

number of otter species responded with at least 41% of all otter being endangered internationally. Therefore, the general public's view of the number of otter species found throughout the world does not reflect their view of how endangered otters are. This question was rather difficult for most participants to respond to and may have had more success if provided a numerical range of possible species of otters found throughout the world.

Similarly to the previous question, participants struggled to answer the question involving the number of otter species found throughout the United States. Once again, the majority of the Washington, D.C. participants (61%) responded with "I don't know" or wrote a question mark, whereas 38% of the Boston participants and 35% of the Bridgewater participants responding in the same way. Still, some of the Boston and Bridgewater participants responded with an answer that was close to the correct response of two species. In the Boston survey site, 35% of the participants responded within the range of one to four species of otters found within the United States, along with 36% of the participants from the Bridgewater survey site and 18% of the participants from the Washington, D.C. survey site responding within the same range. The difficulty in answering this question could be based in the fact that the number of species associated with different organisms can vary greatly.

Throughout the three survey sites, the majority of the participants knew otters were found within their state or region. In Washington, D.C., 55% of participants stated that otters were found throughout the Washington, D.C., Maryland, and Virginia area. The same percentage of participants in Boston stated that they knew otters were found

within the state of Massachusetts. More participants in Bridgewater (76%), however, knew that otters were found within the state of Massachusetts, possibly due to the fact that Bridgewater was in a more rural and suburban setting. A chi squared goodness of fit test was conducted to determine the probability of the participants selecting their answer, and the results showed that the participants either knew otters were found in their area or they guessed correctly (Washington, D.C. $x^2 = 28.72$; Boston $x^2 = 34.458$; Bridgewater $x^2 = 110.228$). The opposite result occurred for the following question, asking if the participants knew if otters were on the United States Endangered Species List. The majority for all three locations stated that they did not know (Washington, D.C. 54%; Boston 46%; Bridgewater 53%). Although some participants did know that otters were listed (Washington, D.C. 33%; Boston 43%; Bridgewater 37%), the results from a chi squared goodness of fit test showed that the participants either answered no or stated that they did not know (Washington, D.C. $x^2 = 0$; Boston $x^2 = 0.767$; Bridgewater $x^2 = 5.969$). Similar results occurred when the participants were asked if the United States allowed Native Americans to hunt otters. The majority of participants at the three survey sites states that they did not believe they did or that they did not know (Washington, D.C. 72%; Boston 76%; Bridgewater 67%). A chi squared goodness of fit test was conducted to determine if the probability of the participants answers. The chi squared was rejected for two of the three locations (Washington, D.C. $x^2 = 2.25$; Boston $x^2 = 6.846$; Bridgewater $x^2 = 0.003$[failed to reject]), therefore the participants either did not know the answer or they were wrong in thinking that the United States does not allow Native Americans to hunt otters, except in the Bridgewater survey site.

When asked at each location, the majority of participants did not know to what extent otters are considered endangered. At the Washington, D.C. location, only 23% of participants answered correctly, stating that between 21% and 40% of otter species are currently endangered internationally. However, the majority of participants (40%) at that survey site location believed that more than 40% of otter species are currently endangered, with only 16% of participants stating that less than 20% of otter species are endangered. Likewise, 31% of the participants from Boston stated that 21-40% of otters are endangered internationally, with 46% of participants believing that more than 40% of otter species are endangered. The participants in the Bridgewater location responded with parallel results, with 28% of participants answering the correct range and the majority of participants (63%) believe that more than 40% of otter species are endangered. The Boston and Bridgewater participants had an extra question added onto their survey, asking the participants to identify the range of which elephant species are endangered internationally. The results at both locations yielded comparable results to the responses involving otter species. Both Boston (69%) and Bridgewater (55%) had the majority of participants believing that elephant species are more endangered than they actually are. Only 10% of Boston's participants and 18% of Bridgewater's participants selected the correct range of elephant species (41-60%). The parallel results could be due to the assumption that because someone was out asking the general public questions about those species, the public was led to believe otters and elephants must be endangered. Multiple participants made comments supporting that conclusion, for example "if you're out here, they must be in trouble." Therefore, the data collected could not confirm or deny that the

amount of exposure of species information to the general public increases or decreases the level the knowledge the public holds.

In order to quantify and categorize the level of which the participants knew about otter species and their conservation, a rubric was created and applied to the completed surveys. The best possible score a participant could receive is a 7 out of 7 points, with one point given for each correct answer. None of the participants in the Washington, D.C., Boston, or Bridgewater locations received a score of neither 6 nor 7 out of 7 on their questionnaire. Less than 1% of the participants in Washington, D.C. scored a knowledge score of 5 out of 7 (1 participant), and only 13% of participants (18) scored a 4 out of 7 on the knowledge scale. The Boston and Bridgewater locations scored slightly better, with 3% of Boston's participants and 5% of Bridgewater's participants scoring 5 out of 7. Nevertheless, fewer participants (9%) in Boston scored 4 out of 7, whereas Bridgewater had a similar number of participants (13%) as Washington, D.C. This indicates that the majority of participants scored less than 50% on the knowledge scale (87% of participants from Washington, D.C.; 88% of participants from Boston; 82% of participants from Bridgewater). The average score received by a participant in Washington, D.C. was 1.97, with a modal score of 1; whereas the average score for Boston was 2.15, with a modal score of 2. Interestingly, the average score for the Bridgewater location was the highest, scoring 2.40, with a modal score of 2. This could be a result of more possible wildlife and otter encounters in rural and suburban locations that are not experienced in urban cities. The scores received on the knowledge rubric

imply that the majority of the participants, and therefore the general public, know little about otters.

A chi squared test for independence was performed to evaluate whether the knowledge scores received by the participants were influenced by the participants' demographic background. For the three survey site locations, it was determined that the gender was independent to the participants' knowledge score (Washington, D.C. x^2 = 5.846; Boston x^2 = 0.321; Bridgewater x^2 = 4.581). Similar results were calculated for the relationship between the participant's knowledge score and their education background (Washington, D.C. x^2 = 11.335; Boston x^2 = 18.212; Bridgewater x^2 9.884). Likewise, in both Boston and Bridgewater locations, whether or not the participants belonged to an environmental or conservation organization was found to be independent of their knowledge score (Boston x^2 = 5.056; Bridgewater x^2 = 4.552). Conversely, whether the participants from the Washington, D.C. location belonged to an environmental or conservation organization was not independent from the knowledge score (Washington, D.C. x^2 = 11.335). Thus, those participants who belonged to environmental or conservation organizations, in the Washington D.C. location, seemed to perform better on the knowledge score than those participants who did not belong to environmental or conservation organizations. Within the Boston and Bridgewater survey sites, the participants were asked additional demographic information not included in the Washington, D.C. survey. It was determined that for both Boston and Bridgewater locations, whether or not the participant had children was independent of their knowledge score (Boston x^2 = 2.812; Bridgewater x^2 = 3.809). For the Boston survey site, the

participants' knowledge was proven not to be independent of the area they resided in (x^2 = 21.691). Consequently, the participants from an urban area type performed better on the knowledge score than the other area types. In Bridgewater, the participants' knowledge score was independent of their current residential area type (x^2 = 14.686). Additionally, the participants were evaluated to determine the level of knowledge they had concerning highly publicized elephant species, using a similar rubric to determine the participants' elephant knowledge score. This score was compared to the participants' otter knowledge score for both Boston and Bridgewater participants. In both survey sites, the participants' elephant knowledge score was independent of their otter knowledge score (Boston x^2 = 14.143; Bridgewater x^2 = 4.435). The results obtained from the chi squared test for independence was expected, considering that most people know only a little about otter species. Nevertheless, it was still surprising to note that in some locations, the educational background and the area type did have an impact on the participants' ability to score better when evaluating their level of otter knowledge. In assessing if the participants scored significantly different in one survey location versus the other locations, an ANOVA statistical test was applied. Of the three locations, there was only found to be a significant difference between the Washington, D.C. location and the Bridgewater location. The participants scored significantly better in Bridgewater than the participants in Washington, D.C, see Appendix C.

One of the questions asked on the survey was to assess where the participants gained their information about otter species. This was asked to evaluate the distribution of current species information, as well as where researchers and conservationists should

channel their information. The participants at each of the three locations stated that they

received the majority of their information from zoos and aquariums, see Table 3.

Table 3: Participants Sources of Species Information

Information Sources	Washington, D.C.	Boston, MA	Bridgewater, MA
Television Programs	39%	32%	34%
Conservation Groups	4%	3%	3%
Books and Magazines	24%	15%	11%
Zoos and Aquariums	43%	33%	35%
Marine Theme Parks	8%	5%	6%
Other	24%	13%	11%
Other – No Information	12/34 - 35%	11/31 – 35%	6/23 - 26%
Other – Internet	N/A	11/31 – 35%	6/23 - 26%
Other - Kids	N/A	N/A	2/23 - 9%

More Washington, D.C. participants (43%) said that gained their information

from zoos and aquariums than any of the other site participants. This could be a result of

the abundantly available free zoos and museums found throughout the Washington, D.C.

area. The three sites had also had similar results for the number of participants who

gained their information from television programs (Washington, D.C. 39%; Boston 32%,

Bridgewater 34%). The two sources by which the fewest participants received their

species information were the conservation groups and the marine theme parks. The third

most common response by participants was a source that was not listed (aka "other")

(Washington, D.C. 24%; Boston 13%, Bridgewater 11%). Most of the participants who responded with this source did not include where they actually received their information. However, some of the participants stated that they received their information from the internet (Boston 35%; Bridgewater 26%). In hindsight, the internet should have been included as a source option since it is used so frequently by the public today. This category also includes social media sites, like Facebook, which a participant cited on their survey. Two of the twenty-three participants, who responded with "other" in the Bridgewater survey, stated that they received their information from their children. Based on this, researchers and conservationists could target children as a main focus to convey species information, since children have the potential of influencing their parents. Although a large percent of participants did state that they do not receive any information on otter species and their conservation (Washington, D.C. 7%; Boston 5%; Bridgewater 3%). This is a major concern since a portion of this survey was designed to address the need for otter conservation information to be distributed to the public.

Likelihood to Conserve

The final focus of the questionnaire was to evaluate the likelihood of participants to support the conservation of a species based solely on the name. Overall, the participants in all three survey site locations were either neutral towards the name of more pro-conservation, see Table 4.

Table 4: Majority of Participants' Responses

Locations	Pro-Conservation	Neutral	Anti-Conservation
Washington,	51%	31%	14%

D.C.			
Boston, MA	59%	29%	10%
Bridgewater, MA	54%	29%	14%

The term "pro-conservation" is intended to include positive responses from participants that selected either a four or a five on the 5-category Likert scale, i.e. "likely to conserve" and "most likely to conserve." Similarly, the term "anti-conservation" is intended to include negative responses from participants that selected either a one or a two on the 5 category Likert scale, i.e. "less likely to conserve" or "least likely to conserve." A chi squared goodness-of-fit statistical test was applied to each name to determine if the response were based on probability or on the participants' opinions. The analysis determined that none of the participants' responses reflected the expected responses based on probability, see Appendix D. A chi squared test for independence was performed to determine if there was a relationship between the participants' likelihood to conserve and the participants' gender, educational background, whether they had children, and the area they resided in. The resulting chi squares showed that the participants' demographic information was independent of their likelihood to want to conserve a species based on the given names, see Table 5.

Table 5: Demographic Chi Squared Test for Independence

Location	Gender vs Likelihood to Conserve	Educational Background vs Likelihood to Conserve	Area Type vs Likelihood to Conserve	Participant has Children vs Likelihood to Conserve
Washington,	$x^2 = 4.642$	$x^2 = 19.411$	N/A	N/A

D.C.				
Boston, MA	x^2 =2.492	x^2 = 8.170	x^2 = 9.735	x^2 = 5.577
Bridgewater, MA	x^2 = 7.338	x^2 = 18.142	x^2 = 4.152	x^2 = 6.525

The data collected from the three survey site locations indicated that having a negative sounding name does not deter participants from being likely to want to conserve that species. However, having a positive sounding name could encourage people to support the conservation of that species, see Table 6.

Table 6: Participants are More Likely to Conserve Positive Sounding Names

Locations	**Difference Between Positive and Negative Soundings Names Receiving a Score of 5 (Most Likely to Conserve)**	**Difference Between Positive and Negative Soundings Names Receiving a Score of 1 (Least Likely to Conserve)**
Washington, D.C.	13%	32%
Boston, MA	10%	27%
Bridgewater, MA	13%	49%

Overall, participants, at the three locations, were more likely to conserve a species with a positive sounding name. In Washington, D.C. and in Bridgewater, there was a 13% difference between the participants' being more likely to want to conserve a positive sounding name, such as American otter and rainforest otter, than they were to conserve a negative sounding name, like fish eating otter and snake otter. There was an 10% difference between the participants being more likely to want to conserve a positive

sounding name versus a negative sounding name in the Boston survey. Correspondingly, more participants stated that they were less likely to conserve a species that had a negative sounding name, such as snake otter and sharp clawed otter. Of the participants' responses in Washington, D.C., there was a difference of 32% between negative sounding names receiving a score of one ("least likely to conserve") compared to the positive sounding names. Similarly, there was a 27% difference between the names given a score of one in Boston, and a 49% difference in Bridgewater. Across the survey locations, the species names that had a positive connotation associated with it received a modal score of five ("most likely to conserve"), whereas the names with a negative connotation received a modal score of three ("neutral"). On average, the positive sounding names received a better score, resulting in the participants being more likely to want to conserve that species, see Table 7.

Table 7: Average Response for Positive and Negative Names

Locations	Average Response for Positive Sounding Names	Average Response for Negative Sounding Names
Washington, D.C.	3.9	3.5
Boston, MA	4.0	3.7
Bridgewater, MA	3.9	3.5
Average Response	3.9	3.6

In Washington, D.C., the average response from participants for a positive sounding name was a score of 3.9, whereas the negative sounding names received a 3.5

average score. Similar results occurring in Boston and Bridgewater, with the average response from participants, in Boston, for a positive sounding name was a score of 4.0, whereas the negative sounding names received a score of 3.7, and the average response from participants, in Bridgewater, for a positive sounding name was a score of 3.9, whereas the negative sounding names received a score of 3.5. The results confirm the hypothesis that participants are more likely to want to conserve a species with a positive sounding name.

Out of the twelve species names, the participants seemed to favor or dislike certain names more than others. The American otter was the highest scoring species name, receiving an average score of 4.2, closely followed by the rainforest otter with a score of 4.1. This high score could be correlated with the fact that the participants have a high level of pride in their country, where the survey was distributed. Also, the Bridgewater location survey (providing the highest score out of the three locations), was distributed on July 4th, which is considered to be the United States of America's birthday, possibly contributing to the higher level of patriotic pride. On the contrary, the snake otter was the least liked name of the twelve species names, scoring the lowest average score of 3.1. The participants still responded positively to the name, being more neutral to its conservation status than neglecting its need for conservation.

Several names were included in the list as a ways to compare if the general public preferred one name over the other. One such comparison involved the otter species, hairy nosed otter, and two fictitious names, furry nosed otter and Southeast Asian otter. Overall, the furry nosed otter received better scores than the hairy nosed otter and the

Southeast Asian otter, resulting in the participants, at all three survey site locations, being more likely to conserve the furry nosed otter. However, when comparing the participants' reacting to the Southeast Asian otter and the hairy nosed otter, the participants were more likely to conserve the Southeast Asian otter, see Table 8.

Table 8: Comparing Furry Nosed Otter, Southeast Asian Otter, and Hairy Nosed Otter Names

Locations	Furry Nosed Otter		Southeast Asian Otter		Hairy Nosed Otter	
	Average	*Modal*	*Average*	*Modal*	*Average*	*Modal*
Washington, D.C.	3.9	5	3.7	3	3.4	3
Boston, MA	4.0	5	3.9	5	3.7	3
Bridgewater, MA	3.9	5	3.6	3	3.4	3
Average Response	3.9		3.7		3.5	

The average score given by participants' at all three locations was a score of 3.9 for the furry nosed otter, a score of 3.7 for Southeast Asian otter, and the hairy nosed otter received a score of 3.5. Using a chi squared contingency analysis, it was found that the participants in the Washington, D.C. and Boston locations favored the "furry nosed otter" name over both the "Southeast Asian otter" and the "hairy nosed otter," scoring the "hairy nosed otter" lower than the first two names. It was also found that there was not a significant difference between the participants' scoring in the Bridgewater location. However, it should be noted that even though there was not a significant difference, the expected responses were similar to the assumed responses, see Appendix D. It may be more beneficial to rename the hairy nosed otter as the furry nosed otter or a locational

name where the otter is currently found in Southeast Asian. Similar results were noticed

when comparing the otter species, giant otter, with the fictitious species, rainforest otter.

Participants at all three site locations gave both names a modal score of 5 ("most likely to

conserve"). In spite of this, the average response for all three locations towards rainforest

otter was a score of 4.1, whereas the giant otter name received an average score of 3.9,

see Table 9. Participants, in both Washington, D.C. and in Bridgewater, gave an average

score of 3.9 to the name giant otter, while Boston participants gave an average score of

4.0 for the name giant otter. Again, Boston participants gave the name rainforest otter a

higher average score of 4.2, whereas Washington, D.C. and Bridgewater participants

gave an average score of 4.1 and 4.0. In general, there was a 7% difference in participants

being more likely to want to conserve the rainforest otter than the giant otter. When

performing the chi squared contingency test to compare the "rainforest otter" and the

"giant otter," it was found that only the participants in the Washington, D.C. survey site

location significantly preferred the "rainforest otter" over the "giant otter." Although no

significant difference was found between the names in the other two locations, the

participants' responses did follow the assumed hypothesis, stating that participants'

would prefer the "rainforest otter" over the "giant otter," see Appendix D.

Table 9: Comparing Rainforest Otter to Giant Otter

Locations	Rainforest Otter		Giant Otter	
	Average	*Modal*	*Average*	*Model*
Washington, D.C.	4.1	5	3.9	5
Boston, MA	4.2	5	4.0	5

Bridgewater, MA	4.0	5	3.9	5
Average Response	4.1		3.9	

The participants' preference towards rainforest otter could be due to the highly publicized need for conservation throughout the world's rainforests and the general public's familiarity to that term.

CHAPTER FOUR: CONCLUSION

The purpose of creating this questionnaire was for it to be used as a tool to assess the general public's knowledge and opinion of otter species and their conservation status. This was achieved with little bias at three different location sites. The first location, Washington, D.C., yielded an abundant amount of information from participants who were mainly between the ages of 18 and 51 and represented participants from some forty states, giving an illustration of how knowledgeable the general public is across the United States. The Washington, D.C. location also had a large percentage of participants representing the general public who had undergone some level of higher education. Boston had a high proportion of participants who had had some (albeit often incomplete) college education. Bridgewater and Boston both represented a larger portion of the general public whose formal education terminated with high school diploma. For the most part, each survey location denoted one aspect of the public's demographics; where one site lacked, another site represented that demographic. Thus, the distributed questionnaire obtained a reasonable representation of the general public within the United States, resulting in a general depiction of the general publics' knowledge level concerning otter species and conservation.

The surveys provided evidence supporting the hypothesis that the general public does not have a high level knowledge about otter species or their conservation status.

This was demonstrated at all three location sites. When asked to identify otter species out of a series of images, about half of the participants at all three locations could do so correctly. However, the participants from the Washington, D.C. survey performed better when being able to identify the sea otter or the river otter. These results proved to be intriguing since it was predicted that the general public would recognize the sea otter more often than a river otter species. This could be because sea otters are limited to one location, whereas river otter species are frequently found through the United States in riparian ecosystems as well as in numerous zoos and aquariums. The majority of the participants in each location did not know the number of species of otters, but the participants at the Bridgewater survey site performed better stating there were between 10-16 otter species. This could be a result of the higher number of rural and suburban participants, who may have had more experience with wildlife and otter species. Even though the majority of participants couldn't correctly identify otter species, each site had an abundance of participants' claiming that they knew of otter species within the area of their site location. In addition to the participants knowing very little about otter species, as shown by the survey results, the participants also knew very little about the conservation status of otter species, both in and outside of the United States. The majority of participants, at all three site locations, did not know or answered "no" in response to the question asking whether otter species were listed on the United States' list of Endangered Species; if Native Americans were allowed to hunt otter species; or to what extent otter species were endangered throughout the world. This information is concerning since it shows that the general public does not know the degree in which otter

species are in danger of going extinct, which may impact the conservation and protection of these species. Moreover, it shows that the general public does not have a solid understanding of how the United States Government handles species conservation. This predicament could be remediated by the United States Government and other environmental and conservation organizations exerting more effort to publicize threatened and endangered species. The general public cannot help support conservation if the information is not presented to them on a consistent basis. Otters are also considered a charismatic species; therefore, if public knowledge is low for these animals, the public knowledge of less charismatic species is likely to be much lower.

For the most part, none of the participants' demographic information influenced their knowledge of otter species and conservation. However, in the Washington, D.C. survey, participants who belonged to an environmental or conservation group did perform better in terms of otter knowledge. It was also determined that participants in the Boston survey site location performed better on their otter knowledge score if they resided in an urban area. These results were not consistent with the other survey sites, but require some consideration that those participants who reside in other areas, and who do not belong to environmental or conservation organizations, are in greater need of wildlife and conservation information.

For the last two survey sites, questions were added to gain a deeper understanding of why the general public had little to no knowledge of otter species and their conservation. The questions added attempted to evaluate if the general public was not being presented with information concerning otter species or if they are just not retaining

the information that is presented. In order to achieve this, two questions asked the participants to identify the number of living elephant species, as well as to what extent elephant species are endangered. The scores were then distributed into a knowledge score, with the best possible score of two. The majority of participants received a score of zero, but 39% of participants scored either a one or a two. When reviewing the questionnaires, the majority of participants stated that elephants were highly endangered internationally. This false belief could be a result of over-publicized species information. The general public was more consistent in knowing that elephants were extremely endangered than they did the actual number of elephant species. Consequently, the general public does retain a limited amount of knowledge concerning species that are publicized frequently. More environmental and conservation organizations need to distribute otter species and conservation information on a greater level in order to gain the general public's support in protecting and conserving otter species.

An essential aspect to distributing species and conservation information to the public is to present the information using the correct method. The distributed questionnaire assessed where the participants gained their information, if anywhere. The results were consistent across the three survey site locations. The majority of the participants received their information either from television programs or from zoos and aquariums. This was the expected result, since there are a variety of available television programs and networks generated about different species and conservation efforts. The sources from which fewest participants received their information were, somewhat unexpectedly, conservation groups and (more expectedly) marine theme parks, like

SeaWorld. The limited number of participants gaining their information from conservation groups could be a result of the limited number of participants who belong to environmental and conservation groups, since the majority of participants who said they gained their information through this method typically belonged to an environmental or conservation organization. The limited number of participants gaining information from marine theme parks is also not unexpected, since these facilities have been criticized for providing little in the way of science or conservation-oriented education and because the popularity of such parks has declined in recent years due to negative publicity surrounding animal husbandry and trainer safety (Parsons 2012; Wright et al. 2015). A quarter of the participants also indicated that they received their information from the internet, another under-utilized resource for conservationists. One participant even indicated that they received their information directly from Facebook. From the data collected, it is clear that environmental and conservation organizations should be directing their efforts to publicize more information via television programs, zoos and aquariums, and through internet resources, such as social media, to help remediate the lack of available information on otter species and their conservation.

The final aspect of the questionnaire focused on marketing and how likely the general public would be to conserve a species based solely on their name. This concept has gained recent attention as simply "re-branding" a species might gain important support for a species' conservation. Interestingly enough, the general consensus for all three sites was either "neutral" or "most likely to conserve" for the species. It was anticipated that the general public would have more varied responses. Most of the names

with negative connotations were scored higher than expected, except for the snake otter, which scored the worst with participants, especially from the Bridgewater location. However, participants did favor more conservation for species names that had a positive connotation over names with a negative connotation. As expected and confirming the results of Karaffa et al. (2012), the common name of a species does affect how the general public perceives a species and thus how likely they are to want to conserve that species to a certain extent. The "hairy nosed otter" and the "furry nosed otter" were perfect examples of this phenomenon. The general public preferred the name "furry nosed" otter over the "hairy nosed" otter name because it sounded, as one participant stated, "cuter." Another comparison between "hairy nosed" otter and the "Southeast Asian" otter showed that the general public preferred the latter location-oriented name over the original name. Nevertheless, the participants still preferred the "furry nosed otter" name over the "Southeast Asian otter". It should also be noted that a species named after something that is already highly publicized as in danger of extinction, or degradation, would receive more attention and conservation concern than a species that is not. For example, the general public responded more positively to the "rainforest otter" than the "giant otter."

In conclusion, a key finding of this study is that researchers and conservationists should consider the benefits of renaming existing otter (and other) species to promote conservation concern. Moreover, when naming newly discovered species that may be at risk of extinction, care should be given to selecting a common name that promotes public

concern. Such re-branding is a cheap, simple action that could actually have conservation

substantive benefits.

APPENDIX A

Figure 2: Questionnaire Distributed in Washington, D.C.

Otter Social Science Research Questionnaire

1. Gender: □ Male □ Female 2. Birth Year: _____
3. What state were you born in? _____
4. Profession: _____
5. Educational Background:
   □ High School   □ Some College   □ College Degree   □ Graduate/Post Graduate
6. Do you belong to any environmental/conservation organizations? □ Yes   □ No
7. Which pictures represent an otter species? Select all that apply. □ A □ B □ C □ D
8. How many species of otters are there? _____
9. How many species of otters are found in the United States? _____
10. Are otters found in VA/MD/DC area? □ Yes □ No □ I don't know
11. Are otters on the U.S. Endangered Species List? □ Yes □ No □ I don't know
12. What percentage of otter species are considered to be endangered internationally?
    □ 0-20%   □ 21-40%   □ 41-60%   □ 61-80%   □ 81-100%
13. Where did you get most of your information about otters?
    □ Television Programs   □ Zoos and Aquariums
    □ Conservation Groups   □ Marine Parks (e.g. Sea World)
    □ Books and Magazines   □ Other: _____
14. Does the United States allow Native Americans to hunt otters?
    □ Yes   □ No   □ I don't know
15. Which species of otter would you be more likely to conserve based on the name?

Species Name:	Least Likely		Neutral		More Likely
a) Snake Otter	1	2	3	4	5
b) Hairy Nosed Otter	1	2	3	4	5
c) Fish Eating Otter	1	2	3	4	5
d) Rainforest Otter	1	2	3	4	5
e) Furry Nosed Otter	1	2	3	4	5
f) Southeast Asian Otter	1	2	3	4	5
g) Common Otter	1	2	3	4	5
h) Black Otter	1	2	3	4	5
i) Sharp Clawed Otter	1	2	3	4	5
j) Scottish Marine Otter	1	2	3	4	5
k) Giant Otter	1	2	3	4	5
l) American Otter	1	2	3	4	5

Figure 3: Questionnaire Distributed in Boston, MA and Bridgewater, MA Locations

Otter Social Science Research Questionnaire

1. Gender: □ Male □ Female 2. **Birth Year:** _____
3. Do you have children? □ Yes   □ No
4. What state do you currently live in? _____
4. What type of area do you live in?   □ Urban □ Suburban □ Rural
5. Profession: _____
6. Educational Background:
   □ High School   □ Some College   □ College Degree   □ Graduate/Post Graduate
7. Do you belong to any environmental/conservation organizations? □ Yes   □ No
8. Which pictures represent an otter species? Select all that apply. □ A □ B □ C □ D
9. How many species of otters are there? _____
10. How many species of elephants are there? _____
11. How many species of otters are found in the United States? _____
12. Are otters found in Massachusetts? □ Yes □ No □ I don't know
13. Are otters on the U.S. Endangered Species List? □ Yes □ No □ I don't know
14. What percentage of otter species are considered to be endangered internationally?
    □ 0-20%   □ 21-40%   □ 41-60%   □ 61-80%   □ 81-100%
15. What percentage of elephant species are considered to be endangered internationally?
    □ 0-20%   □ 21-40%   □ 41-60%   □ 61-80%   □ 81-100%
16. Where did you get most of your information about otters?
    □ Television Programs   □ Zoos and Aquariums
    □ Conservation Groups   □ Marine Parks (e.g. Sea World)
    □ Books and Magazines   □ Other: _____
17. Does the United States allow Native Americans to hunt otters?
    □ Yes □ No   □ I don't know
18. Which species of otter would you be more likely to conserve based on the name?

Species Name:	Least Likely		Neutral		More Likely
a) Snake Otter	1	2	3	4	5
b) Hairy Nosed Otter	1	2	3	4	5
c) Fish Eating Otter	1	2	3	4	5
d) Rainforest Otter	1	2	3	4	5
e) Furry Nosed Otter	1	2	3	4	5
f) Southeast Asian Otter	1	2	3	4	5
g) Common Otter	1	2	3	4	5
h) Black Otter	1	2	3	4	5
i) Sharp Clawed Otter	1	2	3	4	5
j) Scottish Marine Otter	1	2	3	4	5
k) Giant Otter	1	2	3	4	5
l) American Otter	1	2	3	4	5

Figure 4: Four Images Shown to Participants
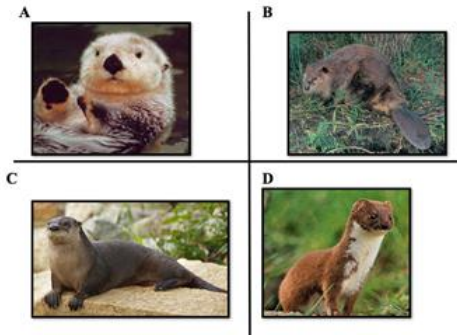
Table 10: Success Rate

Location	Total People Approached	Total Usable Surveys	Success Rate
Washington, D.C.	226	141	62%
Boston, MA	235	157	67%
Bridgewater, MA	177	147	83%

Table 11: Gender Distribution

Location	Males		Females		x^2 Statistic
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	
Washington, D.C.	67	48%	73	52%	0.257
Boston, MA	66	45%	81	55%	4.962
Bridgewater, MA	93	59%	65	41%	1.527

Table 12: Age Distribution

Location	Participants Younger than 30 years of Age		Participants between the ages of 31 and 50 years of age		Participants old than 50 years of age		x^2 Statistic
	Number of	Percentage of	Number of	Percentage of	Number of	Percentage of	

	Participants	Participants	Participants	Participants	Participants	Participants	
Washington, D.C.	37	26%	46	33%	57	41%	68.818
Boston, MA	73	49%	44	29%	33	22%	195.2
Bridgewater, MA	26	19%	63	45%	52	37%	58.833

Table 13: States Represented

Locations	Number of States Represented	Most Common State Participants Resided In
Washington, D.C.	40	Pennsylvania and New York
Boston, MA	23	Massachusetts
Bridgewater, MA	15	Massachusetts

Table 14: Education distribution

Location	High School Diploma		Some College		College Degree		Graduate/Post Graduate	
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants
Washington, D.C.	9	6%	15	11%	53	38%	64	45%
Boston, MA	21	13%	49	31%	52	32%	36	23%
Bridgewater, MA	14	10%	33	22%	58	39%	43	29%

Table 15: Participants Belonging to an Environmental/Conservation Organization

Location	Belonged to an Environmental/Conservation Organization		Did Not Belonged to an Environmental/Conservation Organization	
	Number of	Percentage	Number of	Percentage

	Participants	of Participants	Participants	of Participants
Washington, D.C.	24	17%	116	83%
Boston, MA	25	16%	131	82%
Bridgewater, MA	25	17%	121	83%

Table 16: Participants' Children

Location	Participants who have children		Participants who do not have children	
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants
Boston, MA	50	32%	108	68%
Bridgewater, MA	104	30%	42	70%

Table 17: Participants' Area Type

Location	Participants from Urban Area		Participants from Suburban Area		Participants from Rural Area	
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants
Boston, MA	78	49%	66	42%	14	9%
Bridgewater, MA	18	12%	91	62%	38	26%

APPENDIX C

Table 18: Participants' Ability to Identify Otters from Four Images

Locations	Participants Selected Images A & C		Participants Selected Only Image C (Asian Small Clawed Otter)		Participants Selected Only Image A (Sea Otter)	
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants
Washington, D.C.	63	45%	24	17%	18	13%
Boston, MA	78	49%	20	13%	15	10%
Bridgewater, MA	69	47%	20	14%	8	5%

Table 19: Participants' Response to the Number of Otter Species

Locations	Participants said between 10-16 otter species		Participants said "I Don't Know"	
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants
Washington, D.C.	11	8%	83	59%
Boston, MA	17	11%	65	42%
Bridgewater, MA	26	18%	62	21%

Table 20: Participants' Response to the Number of Otter Species within the U.S.

Locations	Participants said between 1-4 otter species	Participants said "I Don't Know"

	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants
Washington, D.C.	26	18%	86	61%
Boston, MA	56	35%	57	38%
Bridgewater, MA	53	36%	52	35%

Table 21: Are Otters Found within the Survey Site?

Locations	Participants said otters found within survey site		Participants said otters are not found within survey site		Participants said "I Don't Know"		x^2 Statistic
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	
Washington, D.C.	77	55%	4	3%	60	43%	28.72
Boston, MA	87	55%	9	6%	61	39%	34.458
Bridgewater, MA	109	76%	3	2%	78	24%	110.228

Table 22: Are Otters on the U.S. Endangered Species List?

Locations	Participants said otters are on the U.S. Endangered Species List		Participants said otters are not on the U.S. Endangered Species List		Participants said they "didn't know" if otters are on the U.S. Endangered Species List		x^2 Statistic
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	
Washington, D.C.	47	33%	18	13%	76	54%	0
Boston, MA	66	43%	16	11%	71	46%	0.767
Bridgewater, MA	54	37%	15	10%	76	53%	5.969

Table 23: Does the U.S. Allow Native Americans to Hunt Otters?

Locations	Participants said the U.S. allows Native Americans to hunt otters		Participants said the U.S. does not allows Native Americans to hunt otters		Participants said they "didn't know" if the U.S. allows Native Americans to hunt otters		x^2 Statistic
	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	Number of Participants	Percentage of Participants	
Washington, D.C.	38	27%	17	12%	84	60%	2.248
Boston, MA	37	24%	25	16%	94	60%	6.846
Bridgewater, MA	48	33%	23	16%	74	51%	0.003

Table 24: Participants' Responses for the Rate at which Otters are Endangered

Locations	0-20%	21-40%	41-60%	61-80%	81-100%	I Don't Know
Washington, D.C.	22	32	32	11	6	30
Boston, MA	16	49	39	26	8	13
Bridgewater, MA	16	41	43	25	11	7

Table 25: Percentage of Participants' Responses for the Rate at which Otters are Endangered

Locations	0-20%	21-40%	41-60%	61-80%	81-100%	I Don't Know
Washington, D.C.	16%	23%	23%	11%	6%	30%
Boston, MA	10%	31%	25%	16%	5%	8%
Bridgewater, MA	11%	28%	29%	17%	17%	7%

Table 26: Participants' Responses for the Rate at which Elephant Species are Endangered

Locations	0-20%		21-40%		41-60%		61-80%		81-100%		I Don't Know	
	Response	Percentage	Response	Percentage	Response	Percentage	Response	Percentage	Response	Percentage	Response	Percentage
Boston, MA	7	5%	15	10%	15	10%	47	32%	55	37%	2	1%
Bridgewater, MA	9	6%	14	9%	29	18%	44	28%	42	27%	10	6%

Table 27: Participants' Otter Knowledge Score

Locations	Score of 0	Score of 1	Score of 2	Score of 3	Score of 4	Score of 5	Score of 6	Score of 7
Washington, D.C.	22	37	36	27	18	1	0	0
Boston, MA	13	36	50	39	15	5	0	0
Bridgewater, MA	15	15	51	41	19	7	0	0

Table 28: Participants' Otter Knowledge Score Percentage

Locations	Score of 0	Score of 1	Score of 2	Score of 3	Score of 4	Score of 5	Score of 6	Score of 7
Washington, D.C.	16%	26%	26%	19%	13%	1%	0%	0%
Boston, MA	8%	23%	32%	25%	9%	3%	0%	0%
Bridgewater, MA	10%	10%	34%	28%	13%	5%	0%	0%

Table 29: Elephant Knowledge Score

Locations	Score of 0		Score of 1		Score of 2	
	Response	Percentage	Response	Percentage	Response	Percentage
Boston, MA	103	65%	48	30%	7	5%
Bridgewater, MA	90	61%	52	35%	6	4%

Table 30: Average and Modal Otter Knowledge Score

Location	Average Otter Knowledge Score	Modal Otter Knowledge Score
Washington, D.C.	1.97	1
Boston, MA	2.15	2
Bridgewater, MA	2.40	2

Table 31: Demographics Independent of Otter Knowledge Score

Demographics	Washington, D.C.	Boston, MA	Bridgewater, MA
Gender	5.846	0.321	4.581
Education Background	11.335	18.212	9.884
Belonging to an Environmental/ Conservation Organization	11.335	5.056	4.552
Children	N/A	2.812	3.809
Area Type	N/A	21.691	14.686
Elephant Knowledge	N/A	14.143	4.435

Table 32: Otter Knowledge Score ANOVA

H_0 = All locations received equal otter knowledge scores	H_A = The locations did not received equal otter knowledge scores
F-Value	p-value
4.304	0.0141

Table 33: Otter Knowledge Score ANOVA Comparison

Location Comparisons	Difference	Lower	Upper	P Adjusted
Bridgewater-Boston	0.2443	-0.0914	0.5800	0.2020
Washington, D.C. – Boston	-0.1810	-0.5155	0.1536	0.4117
Washington, D.C. –	-0.4253	-0.7674	-0.0832	0.0101

Bridgewater				

Table 34: Participants' Information Sources

Information Sources	Washington, D.C.		Boston, MA		Bridgewater, MA	
	Participant Response	Percentage	Participant Response	Percentage	Participant Response	Percentage
Television Programs	54	39%	78	32%	73	34%
Conservation Groups	6	4%	7	3%	7	3%
Books and Magazines	34	24%	37	15%	23	11%
Zoos and Aquariums	32	43%	80	33%	74	35%
Marine Theme Parks	11	8%	13	5%	12	6%
Other	34	24%	31	13%	23	11%
Other – No Information	12/34	35%	11/31	35%	6/23	26%
Other – Internet	N/A	N/A	11/31	35%	6/23	26%
Other - Kids	N/A	N/A	N/A	N/A	2/23	9%

Table 35: Participants' Conservation Responses

Locations	Pro-Conservation		Neutral		Anti-Conservation		Didn't Answer	
	Average Response	Percentage	Average Response	Percentage	Average Response	Percentage	Average Response	Percentage
Washington, D.C.	856	51%	529	31%	243	14%	64	4%
Boston, MA	184	59%	553	29%	39	10%	39	2%
Bridgewater, MA	956	54%	521	29%	250	14%	52	3%

Table 36: Differences Between Positive and Negative Names Receiving a Score of 5

Locations	Difference Between Positive and Negative Soundings Names Receiving a Score of 5 (Most Likely to Conserve)				
	Response for Positive Names	Percentage of Responses for Positive Names	Response for Positive Names	Percentage of Responses for Negative Names	Percentage Difference
Washington, D.C.	325	57%	248	43%	13%
Boston, MA	393	55%	316	45%	10%
Bridgewater, MA	355	57%	271	43%	13%

Table 37: Differences Between Positive and Negative Names Receiving a Score of 1

Locations	Difference Between Positive and Negative Soundings Names Receiving a Score of 1 (Least Likely to Conserve)

	Response for Positive Names	Percentage of Responses for Positive Names	Response for Positive Names	Percentage of Responses for Negative Names	Percentage Difference
Washington, D.C.	50	34%	97	66%	32%
Boston, MA	25	37%	43	63%	27%
Bridgewater, MA	34	25%	100	75%	49%

Table 38: Participants' Responses to Species Names

Otter Species Name	Average/Modal Response & x^2 Statistic	Washington, D.C.	Boston, MA	Bridgewater, MA
Snake Otter	Average	3.0	3.4	2.8
	Modal	3	3	1
	x^2 Statistic	22.045	63.744	29.549
Hairy Nosed Otter	Average	3.4	3.7	3.4
	Modal	3	3	3
	x^2 Statistic	31.157	43.724	33.608
Fish Eating Otter	Average	3.3	3.7	3.5
	Modal	3	3	3
	x^2 Statistic	50.956	66.993	36.241
Rainforest Otter	Average	4.1	4.2	4.0
	Modal	5	5	5
	x^2 Statistic	136.0	156.000	144.000
Furry Nosed Otter	Average	3.9	4.0	3.9
	Modal	5	5	5
	x^2 Statistic	65.336	99.830	74.489
Southeast Asian Otter	Average	3.7	3.9	3.6
	Modal	3	5	3
	x^2 Statistic	67.045	76.567	61.468
Common Otter	Average	3.7	3.7	3.8
	Modal	5	5	5
	x^2 Statistic	54.537	73.447	61.723
Black Otter	Average	3.9	4.0	3.9
	Modal	5	5	5
	x^2 Statistic	76.828	98.227	66.121

Sharp Clawed Otter	Average	3.3	3.6	3.3
	Modal	3	5	3
	x^2 Statistic	49.559	45.574	35.837
Scottish Marine Otter	Average	3.7	4.0	3.8
	Modal	3	5	3
	x^2 Statistic	57.418	86.121	58.043
Giant Otter	Average	3.9	4.0	3.9
	Modal	5	5	5
	x^2 Statistic	60.627	105.007	87.823
American Otter	Average	4.1	4.1	4.3
	Modal	5	5	5
	x^2 Statistic	100.612	115.191	161.433
Average Response per Location		3.6	3.8	3.7

Table 39: Average Response to Positive and Negative Names

Locations	Washington, D.C.		Boston, MA		Bridgewater, MA	
Otter Species Names	Average Positive Name Responses	Average Negative Name Responses	Average Positive Name Responses	Average Negative Name Responses	Average Positive Name Responses	Average Negative Name Responses
Snake Otter	---	3.0	---	3.4	---	2.8
Hairy Nosed Otter	---	3.4	---	3.7	---	3.4
Fish Eating Otter	---	3.3	---	3.7	---	3.5
Rainforest Otter	4.1	---	4.2	---	4.0	---
Furry Nosed Otter	3.9	---	4.0	---	3.9	---
Southeast Asian Otter	3.7	---	3.9	---	3.6	---
Common Otter	3.7	---	3.7	---	3.8	---
Black Otter	---	3.9	---	4.0	---	3.9
Sharp	---	3.3	---	3.6	---	3.3

Clawed Otter						
Scottish Marine Otter	3.7	---	4.0	---	3.8	---
Giant Otter	---	3.9	---	4.0	---	3.9
American Otter	4.1	---	4.1	---	4.3	---
Average Response	3.9	3.5	4.0	3.7	3.9	3.5

Table 40: Washington, D.C. Response to Furry Nosed Otter, Hairy Nosed Otter, and Southeast Asian Otter Names

H_0 = Proportion of scores is equal across all names	H_A = Proportion of scores is not equal across all names
x^2 = 19.142	p-value = 0.01412
Degrees of freedom = 8	x^2_C = 15.507
$x^2 > x^2_C$	Reject H_0
$H_A = p(hat)_1 > p(hat)_3 > p(hat)_2$	$p(hat)_1$= Furry Nosed Otter
Results = $p(hat)_1 > p(hat)_3 > p(hat)_2$	$p(hat)_2$ = Hairy Nosed Otter
$p(hat)_1$= 59/151 = 0.3907	$p(hat)_3$ = Southeast Asian Otter
$p(hat)_2$ = 40/152 = 0.2632	$p(hat)_3$ = 49/148 = 0.3311

Table 41: Boston Responses to Furry Nosed Otter, Hairy Nosed Otter, and Southeast Asian Otter Names

H_0 = Proportion of scores is equal across all names	H_A = Proportion of scores is not equal across all names
x^2 = 195.74	p-value = 2.2e-16
Degrees of freedom = 8	x^2_C = 15.507
$x^2 > x^2_C$	Reject H_0
$H_A = p(hat)_1 > p(hat)_3 > p(hat)_2$	$p(hat)_1$= Furry Nosed Otter
Results = $p(hat)_1 > p(hat)_3 > p(hat)_2$	$p(hat)_2$ = Hairy Nosed Otter
$p(hat)_1$= 64/157 = 0.4076	$p(hat)_3$ = Southeast Asian Otter
$p(hat)_2$ = 48/158 = 0.3077	$p(hat)_3$ = 54/158 = 0.3418

Table 42: Bridgewater Responses to Furry Nosed Otter, Hairy Nosed Otter, and Southeast Asian Otter Names

H_0 = Proportion of scores is equal across all names	H_A = Proportion of scores is not equal across all names

$x^2 = 14.136$	p-value = 0.0783
Degrees of freedom = 8	$x^2_C = 15.507$
$x^2 < x^2_C$	Failed to Reject H_0
$H_A = p(hat)_1 > p(hat)_3 > p(hat)_2$	$p(hat)_1$= Furry Nosed Otter
Results = $p(hat)_1 > p(hat)_3 > p(hat)_2$	$p(hat)_2$ = Hairy Nosed Otter
$p(hat)_1$= 58/153 = 0.3791	$p(hat)_3$ = Southeast Asian Otter
$p(hat)_2$ = 41/153 = 0.2867	$p(hat)_3$ = 51/152 = 0.3355

Table 43: Washington, D.C. Responses to Rainforest Otter and Giant Otter Names

H_0 = Proportion of scores is equal across all names	H_A = Proportion of scores is not equal across all names
$x^2 = 11.465$	p-value = 0.02181
Degrees of freedom = 4	$x^2_C = 9.488$
$x^2 > x^2_C$	Reject H_0
$H_A = p(hat)_1 > p(hat)_2$	$p(hat)_1$= Rainforest Otter
Results = $p(hat)_1 > p(hat)_2$	$p(hat)_2$ = Giant Otter
$p(hat)_1$= 58/153 = 0.3791	$p(hat)_2$ = 41/143 = 0.2867

Table 44: Boston Responses to Rainforest Otter and Giant Otter Names

H_0 = Proportion of scores is equal across all names	H_A = Proportion of scores is not equal across all names
$x^2 = 4.6927$	p-value = 0.3203
Degrees of freedom = 4	$x^2_C = 9.488$
$x^2 < x^2_C$	Failed to Reject H_0
$H_A = p(hat)_1 > p(hat)_2$	$p(hat)_1$= Rainforest Otter
Results = $p(hat)_1 > p(hat)_2$	$p(hat)_2$ = Giant Otter
$p(hat)_1$= 89/159 = 0.5597	$p(hat)_2$ = 73/157 = 0.4650

Table 45: Bridgewater Responses to Rainforest Otter and Giant Otter Names

H_0 = Proportion of scores is equal across all names	H_A = Proportion of scores is not equal across all names
$x^2 = 5.1831$	p-value = 0.269
Degrees of freedom = 4	$x^2_C = 9.488$
$x^2 < x^2_C$	Failed to Reject H_0
$H_A = p(hat)_1 > p(hat)_2$	$p(hat)_1$= Rainforest Otter
Results = $p(hat)_1 > p(hat)_2$	$p(hat)_2$ = Giant Otter
$p(hat)_1$= 75/153 = 0.4902	$p(hat)_2$ = 59/143 = 0.4126

REFERENCES

Amtrak. 2014. Great American Stations: Boston-South Station, MA (BOS). Date visited: January 2015. Site Visited: http://www.greatamericanstations.com/Stations/BOS.

Bridgewater Arts and Music Festival. 2015. Date visited: January 2015. Site visited: http://www.bridgewater4th.com.

Bridgewater, MA 4th of July. 2015. Bridgewater, MA 4th of July Parade and Fireworks. Date visited: January 2015. Site Visited:

Burnie, D. & D.E. Wilson. 2005. Animal. DK Publishing: New York. 196-203.

Carter, S.K. and F.C.W. Rosas. 1997. Biology and conservation of the giant otter (*Pternura brasiliensis*). *Mammal Review* 27: 1-26.

City of Boston. 2014. Visitors: about boston. Date Visited January 2015. Site Visited: http://www.cityofboston.gov/visitors/about.

Commonwealth of Massachusetts. 2015. Housing and economic eevelopment: key industries. Date visited: January 2015. Site visited:

Destination DC. 2015. Washington, D.C. quick facts for kids. Date visited: January 2015. Site Visited: http://washington.org/DC-information/washington-dc-quick-facts-kids.

Dietz, J.M., L.A. Dietz, and E.Y. Nagagata. 1994. The effective use of flagship species for conservation of biodiversity: the example of lion tamarins in Brazil. *Creative Conservation*: 32-49.

Estes, J.A., M.T. Tinker, and J.L. Bodkin. 2010. Using ecological function to develop recovery criteria for depleted species: sea otters and kelp forests in the Aleutian archipelago. *Conservation Biology* 24(3): 852-860.

IUCN Otter Specialist Group. 2011. The 13 species of otter. Date Visited: November 2015. Site Visited: http://www.otterspecialistgroup.org/Species.html.

Karaffa, P.T., M.M. Draheim, and E.C.M. Parsons. 2012. What's in a name? Do species' names impact student support for conservation? *Human Dimensions of Wildlife* 17: 308-310.

Kruuk, H. 2006. Otters: Ecology, Behavior, and Conservation. New York: Oxford.

Leader-Williams, N. and H.T. Dublin. 2000. Charismatic megafauna as 'flagship.' In Entwistle, A. and N. Dunstone. *Priorities for the Conservation of Mammalian Diversity: Has the Panda had its Day?* Cambridge: Cambridge University Press. pp. 53-81.

Lowry, L. and J. Pearse. 1973. Abalones and sea urchins in an area inhabited by sea otters. *Marine Biology.* 23: 213–219

McCafferty, D., and E.C.M. Parsons. 2011. Marine mammal ecotypes: implications for otter conservation and management. Aquatic Mammals **37:**205-207.

Medina-Vogel, G., L.O. Merino, R. Monsalve Alarcon, and J. de A. Vianna. 2008. Coastal-marine discontinuities, critical patch size, and isolation: implications for marine otter conservation. *Animal Conservation* 11:57-64.

Metropolitan Area Planning Council (MAPC). 2008. Massachusetts community types. Date visited: January 2015. Site visited: http://www.mapc.org/sites/default/files/Massachusetts_Community_Types_-_July_2008.pdf.

Miettinen, J., C. Shi, and S.C. Liew. 2011. Deforestation rates in insular Southeast Asia between 2000 and 2010. *Global Change Biology*. 17: 2261-2270.

Nguyen, X.D., Pham, T.A., and Le, H.T. 2001. New information about the hairy nosed otter (*Lutra sumatrana*) in Vietnam. *IUCN Otter Specialist Group Bulletin* 18(2): 64-75.

O'Bryhim, J.R. and E.C.M. Parsons. 2015. Increased knowledge about sharks increases public concern about their conservation. *Marine Policy* 56: 43-47.

Owings, M. 1993. The story of the southern sea otter. *Update on Law-Related Education* 17(3): 37-43.

Paine, R.T. 1969. A note on trophic complexity and community stability. *The American Naturalist.* 103: 91-93.

Parsons, E.C.M., A. Bauer, D. McCafferty, M.P. Simmonds, and A.J. Wright. 2012. *An Introduction to Marine Mammal Biology and Conservation.* Jones & Bartlett Publishing, Sudbury, MA and London, England.

Reeves, R.R., B.S. Stewart, P.J. Chalham, and J.A. Powell. 2008. *National Audubon Society Guide to Marine Mammals of the World.* New York: Alfred A. Knopf.

Sepulveda, M.A., J.L. Bartheld, R. Monslave, V. Gomez, and G. Medina-Vogel. 2008. Habitat use and spatial behavior of the endangered souther sea otter (*Lontra provocax*) in riparian habitats of Chile: conservation implications. *Biological Conservation* 140: 329-338.

Wilcove, D.S. & L.P. Koh. 2010. Addressing the threats to biodiversity from oil-palm agriculture. *Biodiversity Conservation.* 19: 999-1007.

Wright, L.C., A. Olsson, and B. Kanchanasaka. 2008. A working review of the hairy-nosed otter (*Lutra sumatrana*). IUCN Otter Specialist Group Bulletin **25:**38- 59.

Wright, A.J., Veríssimo, D., Pilfold, K., Parsons, E.C.M., Ventre, K., Cousins, J., Jefferson, R., Koldewey, H., Llewellyn, F. and McKinley, E. in press. 2015. Competitive outreach in the 21st Century: why we need conservation marketing. *Ocean and Coastal Management*: in press.

Union Station Washington D.C. 2015. Tourism: History. Date Visited: January 2015. Site Visited: http://www.unionstationDC.com/info/tourismhistory.

BIOGRAPHY

Caitlyn Scott graduated from the Academy of the Holy Cross, Kensington, Maryland, in 2005. She received her Bachelor of Science from George Mason University in 2010. Her concentration was focused on marine and freshwater ecosystems. She has been employed as a teacher in Fall River Public Schools in the state of Massachusetts for the past two years. Caitlyn and her family are currently residing on the South Shore of Massachusetts.