EXPLORING NON-PROFIT PUBLIC OUTREACH AND EDUCATIONAL METHODS USED TO ENHANCE WHALE CONSERVATION

by

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ABSTRACT

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Human activity influences the health and future of whales. All whales are currently threatened by human activity such as ship strikes, pollution, climate change, habitat destruction, boat traffic, noise pollution, entanglement from fishing/crabbing gear and human contributions to climate change. This thesis project aimed to answer the research question, "how can non-profits improve education of the general public on whale conservation?" My research revealed that non-profits currently have highly variable methods and approaches to their education and outreach programs. The most popular methods used are social media, informal/formal education, citizen science, whale-watching and adopt-a-whale programs. My thesis is that non-profits need to create evaluation techniques, overcome data-sharing challenges and broaden their audience base to improve their public education efforts for whale conservation. I conclude with recommendations on how the non-profits can expand their outreach and education and improve how they increase general public involvement in whale conservation.

Table of Contents

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Chapter 1: Introduction

1.1 *Whale conservation*

Whales, a general term for a widely diverse group of marine mammals in the order cetacea, are vital to the health of ocean ecosystems (Smith et al., 2013). Whale populations have a strong, positive influence on ocean functions, global carbon storage, nutrient abundance and fish populations due to their large size and migration patterns (Roman et al., 2014). When whale populations are altered, it changes the structure of ocean systems (Roman et al., 2014). However, human activities currently threaten whales in every ocean on the planet. Commercial whaling, hunting whales for oil, bone, baleen and meat, have severely depleted whale populations between 17^{th}-20^{th} century (Clapham & Baker, 2002). Whaling has decreased since International Whaling Commission passed a moratorium in 1986 to ban commercial whaling, yet still over 1,000 whales a year are hunted and it has left whale populations vulnerable (NRDC, 2016).

Current threats to whales include ship strikes, habitat destruction, boat traffic, noise pollution, captivity, overfishing and entanglement in fishing and crabbing gear. Fishing nets and gear are the single leading cause of death for whales, causing more than 300,000 deaths of whales, dolphins and porpoises (WDC 2015). In 2015, 60 whales have been found entangled in fishing and crabbing gear in the Pacific Ocean alone (WDC 2015). Also in 2015, 337 endangered Sei whales were found stranded on the coast of Chile, marking the largest whale stranding in recorded history (Howard, 2015). Although the exact cause of the stranding has not been finalized, scientists are attributing the cause to water pollution caused by human activity (Howard, 2015).

Even if people do not come into contact with whales or do not live near coasts, human-caused pollution and contributions to climate change affect the whales. Human contribution to climate change impacts the whales, regardless of how close in proximity they are to the whales. For example, a main concern is whale prey distribution changes due to the changing climate and rising water temperatures, especially in the polar regions (Simmonds & Isaac, 2007). For many baleen whales, including the Bowhead Whale (*Balaena mysticetus*), they rely on long migrations for feeding on krill in the polar regions in the summer, but due to the changes in ice pack there is concern over the impacts on the krill population (Simmonds & Isaac, 2007). This change in prey may force the whales to search for prey in alternative waters (Simmonds & Isaac, 2007). It is estimated that by the end of the 21st century, arctic habitat for bowhead whales will be reduced by halve due to change in temperature and productivity changes (Foote et al., 2013). The rising ocean temperatures may also encourage whales to follow their prey closer to shore than historically, which is putting the whales at a higher risk to become entangled in nets, crabbing and lobster gear (WDC 2015). Since climate change induced ice retreat, and temperature increase is a global issue and it is not just caused by those who live near the coasts, education and conservation should be a global effort.

Research demonstrates that marine conservation is important to protect whale species from the current threats they face (Harmes, 2013) (Dedina, 2000). This research study will focus on non-profits working towards marine conservation. Non-profits use a grass roots, hands-on approach towards combating issues and rely heavily on the public and community for support, both physically and financially. Due to this approach, they rely on public outreach and education to gain backing for their conservation goals. My

research will aim to answer the over arching question, "***How can non-profits improve education of the general public on whale conservation?"*** through a series of sub-questions:

1) What are the public outreach and educational programs undertaken by global and local non-profits?

2) ***What are the challenges faced by the non-profits while executing outreach programs?***

3) How do they evaluate the success of their efforts?

Chapter 2: Literature Review

2.1 *Introduction to Public Outreach*

Public outreach is a method to engage with the general public to spark support, interest, curiosity, awareness, knowledge and cooperation about a subject at hand (Brewer, 2000; Schneller & Irizarry, 2014). The scientific community, social movements, politics, and companies use public outreach to involve the public in environmental issues and environmental projects. The focus of this research is examining public outreach in regards to environmental conservation, specifically in marine ecosystems. Since each public outreach program varies on methods, strategies, goals, location, duration, and community, there is no one definition of what public outreach for environmental conservation encompasses. However, a common thread between programs is the attempt to spark the imagination and interest of local communities to become part of conservation efforts, and to build better communication of scientists and policy makers with the general public (Sawchuk et al, 2015; Pearson et al., 2014).

Environmental conservation requires the study of both the natural and social sciences to understand how humans interact with and affect the natural environment. To engage in public outreach for environmental conservation, the methods must incorporate knowledge needed to understand the ecosystem paired with knowledge of social interactions of how individuals engage in the environment.

2.2 Public Outreach in Science Communication Discourse

Public outreach in this context is situated within the science communication literature. Discussed by science communicator Lars Lindberg Christensen in “The Hands-

on Guide for Science Communicators" (2007), science communication is a method seeks to enhance public understanding of scientific achievements and to bring science into the public eye. Expanded upon by Bowater and Yeoman (2013), not only is science communication ensuring the public's knowledge of science, but it is also ensuring that scientists incorporate the public's understanding within their research (Bowater & Yeoman, 2013). Without awareness of science in the general public, the public may lack appreciation for scientific progress (Christensen, 2007). Scientific advances can impact society in health care, space exploration, drug production, transportation technology, communication, food production and other arenas (Burke et al. 1985). Since scientific development can change how people live, communicate, eat, travel and work, it is important for the public to understand the advancements and be educated on what is being developed (Bowater & Yeoman, 2013; Burke et al. 1985). Science communication can increase collaboration among scientists, bring funding for new research and can also introduce new scientists to join the field (Christensen, 2007). Simply, science communication is spreading scientific findings, achievements and projects to the general public to encourage support, understanding and funding of undertakings of scientists. Methods of science communication are multifaceted. They include: outreach, formal education, public relations, marketing, public speaking, public presentations, zoos, aquariums, museums, exhibits and science popularization (Christensen, 2007; Varner, 2014).

Nancy Baron's "Escape From the Ivory Tower: A Guide to Making your Science Matter" (Baron, 2010) highlights the use of science communication for environmental change. Baron describes that scientists, policy makers, environmentalists and the public

are all part of different cultures, and an open dialogue and communication of research will enhance resolving environmental issues. According to Baron (2010), important points that scientists need to address to the public are (1) why their work matters (2) what the common risks related to the issue are (3) propose solutions to the issue (Baron, 2010). Public outreach and public education regarding marine conservation issues are a part of science communication. My research will draw on how public outreach is used amongst conservation biologists, environmental scientists, policy makers and the general public in regards to species conservation. My research will further examine how the methods used for public outreach and education in the literature can be used to enhance conservation.

2.3. Need for Public Outreach in Marine Conservation

Oceans account for over 70% of the earth's surface but there is a larger amount of conservation projects for terrestrial issues than marine (Pearson et al, 2014). Only two percent of the world's oceans are set aside as protected marine reserves (Stone, 2014). Globally, human activity such as, but not limited to, fishing, debris, pollution, oil drilling, shipping, fishing, storm -water runoff, aquatic recreation activities and climate change considerably threaten the marine environment globally. An estimated 14 billion pounds of garbage, mostly plastic, is dumped in the oceans each year and projected to rise (Jambeck et al., 2014). 53% of the world's fisheries are entirely exploited, resulting in the collapse of one in three fish species populations since 1950 due to pollution and overfishing (FAO 2010). However, historically, individuals have been less involved in marine environment conservation than terrestrial conservation (Pearson et al. 2014). Pearson et al. postulated three reasons for this: 1. disinterest in the issues 2. scarcity of public engagement and 3. the impression that because of the vastness of the ocean,

individuals have little influence on its health (2014). Educating the public about the importance of healthy ecosystems, as well as pubic involvement within conservation efforts is key to creating successful marine conservation strategies (Bjorkland & Pringle, 2001; Pearson et al., 2014).

The concept of marine citizenship introduced by McKinley & Fletcher (2012) and discussed by Pearson et al. (2014), encompasses the "rights and responsibilities of an individual towards the marine environment" (pg. 137). Marine citizenship requires the individual to be aware and knowledgeable of the marine ecosystem and its threats, and to support pro-environmental behavior choices (McKinley & Fletcher, 2012). Pearson et al. and Mckinley & Fletcher emphasized that an increase in the adoption of environmental citizenship is needed to further to support marine policy strategies for conservation (2012). Awareness and knowledge are crucial elements of marine citizenship to reduce individual and societal impacts on the marine environment (Pearsons et al., 2014). Education and public outreach can be used to develop marine citizenship to support marine conservation efforts.

Pearson et al. (2004) and Bjorkland & Pringle (2001) have highlighted ignorance regarding environmental issues, and ecological systems, as a threat to the marine environment and conservation. The ignorance, also coined environmental illiteracy, impairs conservation efforts and pleas for greater environmental education efforts (Bjorkland & Pringle, 2001). An example of environmental illiteracy comes from efforts in the area of conservation of aquatic ecosystems. For over 20 years of rigorous conservation and outreach for riverine ecosystems, but it was discovered that the public's understanding of biodiversity and degradation was limited (Bjorkland & Pringle, 2001).

A national survey within the U.S. demonstrated that 10% of participants considered themselves informed about ocean issues (Pearson et al. 2014). Data from a UK survey of Maritime Museum visitors found that only 3.1% of the participants noted marine litter as a significant threat to the ocean environment (Pearson et al., 2014). Environmental illiteracy prevents effective conservation methods because the general public is not correctly informed about the ecosystem and ecological and societal reactions. Improving environmental education is vital to preventing environment illiteracy and it includes building stronger connections between academia and the public, adding environmental perspectives to core curricula, and improving the relevance and quality of education (Bjorkland & Pringle, 2001). Public outreach and public engagement can improve conservation efforts aiming to protect the marine environment through informing the public about the ecosystem to eradicate environmental illiteracy as well as creating awareness of individual roles (marine citizenship).

However, to date, very little research has been conducted to comprehend the impact of public outreach on public knowledge, perceptions and behavior changes regarding the marine environmental issues and conservation (Pearsons et. al, 2014.) To address this gap in published literature, I explore what methods have been used to increase public knowledge to enhance conservation. I investigate the roots of conservation education, knowledge and why conservation biologists should engage in public outreach. I subsequently focus on the ways in which non-profits use public outreach to increase marine conservation.

2.4. Psychological Framework

Since human behavior threatens the marine environment, the role of psychology is important to understand regarding public outreach. This research draws on the Value-Belief- Norm theory (VBN) of environmentalism, and Environmental Risk Perception theory to understand how support for pro-environmentalism and pro-conservation movements can be enhanced. Although environmental movements are highly variable in their intentions and methods, one constant value throughout is that humans impact and alter the environment, an altered ecosystem can negatively effect humans, and there should be efforts undertaken to avoid this from occurring (Stern et al., 1999).

The Value-Based-Norm theory hypothesizes that personal norms are a driving force behind pro-environmentalism behavior (Stern, 2001). The norms are described as "internalized obligation to act a certain way" (Stern, 2001, p.2). The norms are stimulated when the individual considers that violating the norm would have adverse reactions on the things they value (Stern, 2000). If the individual's values were being threatened, it would result in them taking action. Simply, personal values are pre-cursers to environmental beliefs (Stern, 2000).

It is suggested that awareness of consequences can influence norms, which might lead an individual to support marine conservation (WDC, 2013). If people value the marine environment, they will be more likely to take responsibility to protect it and hold pro-conservation beliefs. Alternatively, when an individual denies personal responsibility, they are less likely to hold pro-conservation believes within the marine environment.

The VBN theory is supported by Whale and Dolphin Conservation, who researched pro-conservation attitudes in whale watchers. The WDC's findings published in "Whale Watching: More than Meets the Eyes" (2013), found that awareness of individual consequences on the marine environment (e.g. pollution) originates from value orientations, as demonstrated by the VBN theory (WDC, 2013). The findings also coincided with the VBN theory that support for marine conservation is effected by moral elements (WDC, 2013).

The VBN theory is important when analyzing conservation behaviors and attitudes during public outreach efforts. According to the VBN theory, individuals who appreciate the marine environment and feel responsible for its future will be most likely to adapt pro-conservation beliefs (Stern 2000). Meaning, outreach efforts to enhance pro-conservation beliefs would be most successful on individuals who value the marine environment and believe they have the ability to reverse the harmful consequences of threats to the environment. The Audubon Society, in its publication titled, "Influencing Conservation Action" also draws upon the VBN theory for conservation. It stated that since individuals are widely diverse in their values, beliefs, attitudes and perceptions, a conservation outreach program has to be more complex than relying on the VBN theory alone (Ardoin et al., 2013). According to the document, the outreach program should be specifically designed to fit the audience and intended outcomes of the program.

2.5. Public outreach in Conservation biology

Public outreach is an essential aspect of conservation biology (Giblin & Pagen, 1998). The leader of Society for Conservation Biologists expressed that conservation biologists

not only have a responsibility to help conserve the ecosystem, but they also need to educate the general public as to why biological concerns need to inform all decisions regarding species and land use (Giblin & Pagen, 1998). Brewer (2002) echoes this and states that scientific researchers should create an open dialogue with the communities surrounding the ecosystems being studied to allow for successful development of conservation strategies. Scientists also gain knowledge from the community and how the community interacts with the ecosystem, which is beneficial for research (Brewer, 2002). If the general public is not involved, challenges may arise for the conservation biologists (Giblin & Pagen, 1998). Challenges faced include public mistrust of the biologists, as well as skepticism of conservation methods and messages (Giblin & Pagen, 1998).

One cause of public mistrust is that most people learn about the natural environment from personal experience and because of this, believe they understand the issue and how it can be solved (Kellert, 1996). Bonds and affection can be created between humans and the natural environment. Humans are drawn to nature's beauty, use it as a refuge and escape, and experience sensations of adventure, wonder and curiosity (Kellert, 1996). In turn, when conservation biologists apply rules and regulations to the land in order to conserve it, people personally feel equipped with the right understanding to critique the biologist's methods (Giblin & Pagen, 1998).

This mistrust of conservation biologists peaks in rural areas where connections between humans and nature are more pronounced than compared to cities, and there is a higher sense of independence (Giblin & Pagen, 1998). People living in rural communities spend more time within natural environment, often using it as their livelihood (farmers, ranchers, foresters, hunters, fisherman, etc.) and often disagree with the conservation

methods (Giblin & Pagen, 1998). This has been considered unfortunate because the rural areas encompass a majority of the critical habitat and areas that can benefit from conservation measures (Giblin & Pagen, 1998). Public outreach and programs that establish a connection between society and the biologists can alleviate the mistrust and educate the public as to why conservation measures are being created (Giblin & Pagen, 1998). Public outreach can also include the general public in the decision-making processes undertaken by the biologists so their personal beliefs can be considered. This aims to improve the general public from feeling alienated from the natural environment, as well as improve the challenges faced by conservation biologists.

Conservation messages are often dire and catastrophic which causes public skepticism surrounding conservation biologists, as well as despair for the environmental future (Giblin & Pagen, 1998). An example demonstrated by Giblin & Pagen (1998) is for years the world has been threatened about the catastrophic consequences of deforestation and wetland destruction, yet when people look outside, they don't see the effects. Conservation biologists are also described as "cry wolves" where the conservation messages are continuously grim, yet the general public does not directly witness what the messages are pertaining to (Ladle, 2004). This could be detrimental to conservation because the public could stop listening to the conservation biologists, and it can benefit the anti-environmentalist movements (Ladle, 2004).

Conservation messages that focus on environmental crises can cause emotions of loss, fear, sadness and anguish, known as the psychology of despair, within society (Kool & Kelsey, 2005) (Bjorkland & Pringle, 2001). Kool & Kelsey (2005) explore the emotional implications of environmental and conservation messages that focus on the

problems instead of solutions within the realm of environmental education. They present that instead of children experiencing a "sense of wonder" within nature, environmental crises focus may alternatively cause fear for the world's future (Kool & Kelsey, 2005). This fear is caused by the teachings of loss seen in the environment, such as destruction of forests, wetlands and species. Kool & Kelsey note that environmental educators teach about the crises and loss, but do not go beyond to discuss the emotions being felt, and how the emotions can be part of solution movements. As suggested by Kool & Kelsey and Bjorkland & Pringle, conservation biologists should focus on solutions to the problems when educating the public to minimize feelings of hopeless and the psychology of despair.

The field of conservation biology has been described as a "cocoon," that separates the science and biologists from the public (Meffe, 1998). The biologists have to share their findings with the public in order to attain public trust and support (Giblin & Pagen, 1998). Public Outreach is a method used to remove the cocoon from conservation biology. Giblin & Pagen (1998) suggested presentations with question-and-answer sessions open to the general public as a method of public outreach. Although this method invites the public to interact with the conservation biologists, this is a limited in nature that it only reaches the people who are physically able to come to the talks. The study is also outdated as it was published in 1998, where todays heavy use of social media as outreach is not explored.

Graduate students are explored as a resource for public outreach (Giblin & Pagen, 1998). Students pursuing conservation biology could present their findings in schools, town meetings and other public outlets. However, a published response by Mallory D.

McDuff (1999) warned that if graduate students participated in outreach as part of a graduation requirement, the outreach effort might end after graduation. McDuff argued that outreach is more than a class project; it is a process that demands commitment (1999). Since scientific findings and society change rapidly, conservation biologists must keep the public informed and motivated. Not only do conservation biologists and the graduate students have to participate in public outreach, but they have to understand the publics concerns and rationales for outreach to be successful (McDuff, 1999). Giblin & Pagen, McDUff, Meffe, Kool and Kelsey agree that public outreach in the realm of conservation requires improvement.

2.6. Methods of Public Outreach

2. *6.1 Media*

Public involvement around critically threatened and endangered species has been evaluated as a way to improve conservation. Social media and technology are examples of methods used by educational and outreach programs to gain awareness for species conservation and to spike interest in the issue. Types of popular media include television, blogs, twitter, Facebook, Instagram, websites, commercials, Youtube channels and live streaming. Social media use is increasing, especially aimed at younger generations, to spark awareness and reach large numbers of the general population (Obar et al., 2012). In "Advocacy 2.0: An analysis of How Advocacy Groups in the United States Perceive and Use Social Media as Tools for Facilitating Civic Engagement and Collective Actions" Obar et al., conclude the greatest benefits of social media for advocacy are its quick speed and ease to reach mass audiences, as well as its power to connect individuals and groups of people (2012). In turn, the connection increases the accessibility of sharing

information, collaborating and cooperating with others to contribute to a certain goal (2012). This is echoed by the World Wildlife Fund International (WWF), the world's leading conservation organization that uses social media as their main platform to engage new audiences, promote campaigns, and educated about endangered species (Milbrath, 2015).

Negative opinions on the use of social media to reach the public were also concluded in the research. One negative effect of social media usage to gain awareness for an issue is described as "net-delusion" where reality is altered through the display of information on the internet (Obar et al., 2012). This net-delusion is further described as creating a "Cyber-Utopism" where photos, information, and facts are altered to present a better looking image of reality (2012). Also related to net-delusion is that a lazy effort and lack of motivation to an issue can occur. Individuals may think that "liking a photo" on Instagram or Facebook, or clicking a button, is a method of assisting an issue at hand (2012). In reality, a greater involvement needs to be taken for most issue to be a part of a movement. This was described as a disconnect, where a Facebook page could attract one million supports, but fails to bring enough people to the streets to enact tangible change (2012).

In terms of reaching the general public, social media limits those who do not have access to the necessary technology (TV, computer, smartphone) or do not have the skills to use social media or contribute. Since twitter, Instagram, Facebook are new technologies developed in the last 15 years, this particularly affects the older generation who might not be familiar with social media and technology use, or may not be as

familiar with it in their everyday routines compared to the younger generations. Although there are limitations to social media, Obar et. al. (2012), found that social media has a positive impact on reaching the public for advocacy and civic engagement.

Since social media is a powerful tool to rapidly share information and unite diverse individuals across the globe, it is suggested by Obar et al. that social media should be combined with other methods of outreach and advocacy. This would ensure those without access to the necessary technologies can be involved, as well provide alternative ways individuals create tangible change aside from relying on the internet.

Social media is used in marine species conservation as a way to spread awareness and gain support for a conservation effort. This was used in Sea Turtle Restoration Project (STRP) is a non-profit based in San Francisco, CA, that aims to protect critically endangered Pacific Leatherback Turtle populations and habitat that are declining mainly from human activity. Conservation outreach mainly uses public and community efforts to educate beach-goers, raise awareness of the sea turtle locations and is physically involved in the monitoring of beaches and protections (Pincetich, Ong & Steinger, 2012). They also relied on creating a video with United Nations about adopting a device that allows sea turtles to escape trawl nets. This video was spread worldwide and was used to promote uses of this technology to protect the sea turtles from drowning in fishing nets (Pincetich, Ong & Steinger, 2012). This video reached a wide variety of viewers, sparked awareness and was thought to bring give STRP's international attention on the issue of saving of the Bhitar Kanika turtle reserve in India (Pincetich, Ong & Steinger, 2012). STRP presented strong visuals and stories through social media which

spread awareness of the sea turtle conservation efforts internationally.

2. 6.2 Stakeholder Engagement

Stakeholder engagement with the community is another method of outreach used for successful conservation practices. Sawchuk et al. (2014) state that effective conservation requires participation and encouragement from stakeholders in tandem with information from conservation biologists. This is explored in the conservation and recovery of endangered rockfish species in Puget Sound, Washington. The stakeholders in this study are the boat-based rockfish anglers in the region who rely on the rockfish populations and are familiar with the rockfish habitat. The study surveyed 9,226 rockfish anglers to understand their behaviors and motivations about rockfish conservation, as well as economic, social and cultural backgrounds of the anglers to gain insight on successful rockfish recovery plans (2014). The policy makers creating conservation plans used the survey for information to make decisions based on the stakeholder's opinions and observations of the threats to the rockfish. Sawchuk et al. conclude that involving the stakeholders in the decision making process for conservation policy is effective in understanding the threats to rockfish, as well creating successful conservation policies.

Incorporating stakeholder engagement is also valuable in eliminating burdens on a specific stakeholder group that may be affected by conservation methods. This was highlighted by Jeff Mittelstadt, founder of WildSlides, a non-profit that produces documentary films to promote conservation. In Mittelstadt's 2013 documentary about Right Whales, "The Plight of the North Atlantic Right Whale" he used interviews of the stakeholders who are involved in the right whale welfare and habitat threats which

include vessel strikes and fishing and fishing gear. The stakeholders in this case were lobster fisherman, boat captains, conservation biologists and whale and dolphin experts.

In a published article about his documentary, Mittelstadt stated that incorporating stakeholders for conservation efforts adds emotion, first-hand knowledge and perspective of the issue, giving voice to the different views and values of the stakeholders (Rodgers, 2014). Without voicing the stakeholders, conservation efforts could be one-sided and only cater to the biologists and conservation policy makers, creating burdens for the fishermen and boat captains. For example, the conservation biologists wanted to enact strict vessel speed and equipment requirements as part of the right whale conservation plan, and this would negatively impact the fisherman and boat captains livelihoods (Rodgers, 2014). During the interviews of the stakeholders, Mittelshadt found many "often unrealized" similarities between the stakeholders, which lessons the fighting between them during conservation policy making (Rodgers, 2014). It was concluded by Mittelstadt that conservation requires a "whole approach" and that stakeholder engagement is a necessary part of successful conservation (Rodgers, 2014).

2.6.3 Community Engagement

Community engagement is another method of outreach used for species conservation. Similarly to stakeholder engagement, community engagement is described as a "planned process with the specific purpose of working with a community to address issues affecting their well-being" (Department of Sustainability and Environment, 2013). However, one difference between stakeholder and community engagement is the community might not specifically be stakeholders in the issue, but may be individuals

who are connected by identity, geographical location, or special interest in the issue. Community Engagement is used by Manatee Watch, a non-profit program made up of volunteers in Florida aiming to protect the declining and threatened native manatee population. Manatee Watch program uses outreach and education for local boaters to decrease vessel collisions with manatees that accounts for 25-30% of manatee deaths annually (Morris, Jacobson, & Flamm, 2007). Article titled "Lessons from an Evaluation of a Boater Outreach Program for Manatee" evaluates the Manatee Watch program, effects on manatee conservation between 1999-2001(Morris, Jacobson, & Flamm, 2007).

The community engagement used in this outreach effort were volunteers from the area relied on support from the local coast guard, boaters and locals who frequented the manatee habitat. As part of the effort, volunteers approached boaters in manatee habitat and provided an educational briefing about manatee safety and avoidance, and handed out kits equipped with manatee habitat maps, polarized sunglasses, floating key chain as well as fish measuring stickers (2007). All of the items in the kit were useful for the boaters, but were splayed with educational messages aimed to remind the boaters to be cautious of manatees (Morris, Jacobson, & Flamm, 2007).

However, the evaluation of this outreach concluded that there was no change in the boater's attitudes or behaviors of manatees from the outreach program, nor were boater's knowledge of manatees increased (2007). Suggestions to enhance the effectiveness of the outreach program were to increase the duration and variety of outreach, and to target the boater's feelings of empowerment and ownership within messages and slogans (2007). The study found that boater safely precautions in shallow waters such as reducing speed and watching for manatees was increased (2007). Although it does not specify in the

study, the catch phrase distributed by the outreach program: “Go Slow! Manatees Below! Where Sea Grass grow!” could have impacted the boaters attention to safety precautions (Morris, Jacobson, & Flamm, 2007). Since the community engagement effort was short in duration and only focused on a small area of habitat, the article suggests that elongating the duration of the effort could increase success. A study of the effectiveness of slogans and catch phrases could also insure success for future conservation using community engagement.

2. 6.4 Species pride within the Community

Species conservation has been successful by integrating community identity and pride within the conservation efforts. Examples include visual and spiritual methods through festivals, art, crafts and events. In Baja California Sur, Mexico, gray whales have historically been part of the culture and landscape of the region due to the lagoons used yearly as birthing sites (Dedina, 2000). Gray whales were nearly extinct by 1930s but conservation efforts mixed with politics revived the species to their current stable populations (Dedina 2000, pg. 2). The community and individuals of the region were involved in the conservation efforts and the gray whales were symbols of the culture (Dedina 2000, pg. 33). Annually, local fisherman, residents and tourists celebrate the return of the gray whales the Magdalena Bay Gray Whale Festival (Dedina 2000, pg.34). Saving the Gray Whale: People, politics and conservation in Baja California by Serge Dedina, evaluates how the festival is a community event that supports conservation and education of the gray whale species. This festival is a way that incorporates public outreach and education through a celebratory festival and community identity.

Community murals and public art is another method of outreach to spike awareness of species conservation. Also Baja California Sur, Grupo Tortuguero, is a non-governmental conservation organization aiming to protect five species of sea turtles in the region that are currently endangered. Baja California Sur has a history of sea turtle exploitation, which has resulted in a variety of conservation plans. As a method to educate the community and create awareness of the issue, Grupo Tortugeuro organized mural painting within the public areas in Baja California Sur (Schneller & Irizarry, 2014). The murals had many aspects to them to portray a variety of messages. The murals encompassed turtle folklore, which depicted turtles in the history of the region. The murals also aimed to educate on intelligent fishing, and on the threats to the sea turtles, so a variety of the murals included fishing nets, fishing lines and boats endangering the sea turtles. Steps to take to save sea turtles if they become stuck in fishing nets and line were also depicted in the murals.

Grupo Tortugeuro aimed to incorporate the community within their conservation efforts, so the murals were painted and designed painted by school children, teachers, local artists, researchers, fisherman, and fisherfolk in the region (Schneller & Irizarry, 2014) This created a community effort and also aimed to connect the community to the sea turtles and their protection (Schneller & Irizarry, 2014).

Schneller & Irizarry (2014) explored how the murals of the sea turtles changed the public attitude to be pro-environment and pro-conservation. This study relied on interviews, and written surveys and observations of community members to research if the sea turtle murals affected attitudes or awareness of sea turtle endangerment. Although their had been no report that the murals directly impacted fisherman from saving sea

turtles, it was concluded that the murals "teach, inspire, call attention to, motivate, remind and explain to viewers the importance of sea turtle and marine conservation" (pg. 111, 2014). Limitations to the study was that there was no control group, since it is difficult to eliminate other exposure to the sea turtle conservation issue an individual might receive, and that the murals were very diverse in imagery and messages (2014). However, it was found that murals have a great potential to creating awareness on a conservation issue and recommended that murals be used as part of an integrated outreach approach for further success (2014).

2.7 Conclusion

Public outreach is a highly variable method used to educate, spread awareness and promote conservation. For this research, public outreach was explored in the science communication literature to examine the role it plays in conservation efforts and the relationship between conservation biologists and the general public. Public outreach is explored as both an educational tool, but also a way for scientists to share their research, gain trust from the public and learn from the communities.

It can be concluded from the literature that there is a need for education and outreach on the method of conservation so the public is better informed, less skeptical and become a part of conservation efforts. A gap in the literature that remains is how science communication and environmental illiteracy are pursued for marine conservation. It is identified that the public is less involved in marine conservation than terrestrial conservation because the ocean is vast, has many conservation issues and the public feels feeling of helplessness. Increased education and outreach to increase individual's marine citizenship is a way that involvement in marine conservation can be increased. At the

time of this thesis research, there was a limited amount of literature that investigated how the general public was being educated about marine conservation and by what methods were used to communicate it to the general public marine conservation to increase environmental literacy. My own research will be exploring how conservation biology and conservation methods are communicated to the general public as a way to enhance whale conservation.

Chapter 3: Methodology

3.1 *Interview Methodology*

The methodology used for this research was a combination of interviews and textual analysis of both online and print materials. The primary method used for research was interviews and textual analysis was used as a secondary method to supplement the data collected from the interviews. The interviews were conducted with the outreach and educational specialists of non-profits that are involved in marine mammal conservation and ocean conservation. Since I was concerned with public involvement in whale conservation, I chose non-profits as my source of data because non-profits rely on public participation, public funding, and use hands-on involvement for conservation methods.

Interviews were used because each non-profit is unique, and their outreach and educational methods are highly variable. Interviews allowed for flexibility and to obtain details and knowledge that might otherwise not been known or available for the public's viewing. For this research study, interviews explored the use of outreach and education in non-profits through the experiences of the individuals who execute the process of outreach and education as way to understand the non-profit as a whole. The majority of the interviews were conducted via phone, due to the wide spread of locations that the non-profits are located, both internationally and domestically.

The interviews were semi-structured, which means that the interviewer decides the general structure of the interview prepared in advance, but allowing the details and specific design to be formed during the interview (Galleta, 2013). The major questions to be asked were also designed in advance to provide guidance. The majority of the questions were open-ended to allow the participant to narrate their experiences, but each

question was designed to tie into the research topic (Seidman, 2013). This method allows for flexibility, and stimulates data that is not known or anticipated in advance (Seidman, 2013). The semi-structured interview approach was chosen because each non-profit have unique outreach and educational projects, different goals, and a variety of opinions, and interviews allowed to discover many aspects about their endeavor and their personal thoughts. This method obtained details and background stories of how and why some outreach and educational methods were used. For this study, The Evergreen State College Internal Review Board approved the human subjects review application.

3.2 Participants

The participants of this study comprised of six outreach/educational specialists chosen to represent the wide variability of non-profits involved in marine conservation. Non-profits were chosen as the participants of this study because they rely on outside participation for funding, projects, and support and they embrace community involvement. Since non-profits rely on outside support, it benefits their mission and organization to improve their outreach and educational methods.

These six participants were chosen for this research for numerous reasons. The first reason was due to the mission statement of the non-profit. The mission statements were found through initial Internet searching of non-profits that are involved in whale conservation. I contacted the particular non-profits that engage in whale conservation and/or general ocean conservation education and outreach. The second reason these participants were chosen was their geographical location. I aimed to include geographically diverse locations in my research to incorporate the various habitats of

whales, and where whale conservation is occurring. The final reason, and perhaps the most determining factor, was that these six participants agreed to partake in this study. Many of the non-profits that I initially approached about this research never responded, declined to participate, or were too busy and understaffed to partake. Due to the time constraints of this study, I chose to include the first six participants that agreed contribute in this research. The selective sampling of non-profits in this study means that the results are not generalizable to all non-profits, but will provide significant insight on methods and challenges regarding whale outreach and education.

The interviewees were initially invited to participate via email in the first week of January 2016. The interview participants vary in non-profit type, title, location and interest. No non-profit is exactly the same, so the participants all have differing duties and goals, but each is involved in the education and/or public outreach portion of the non-profit that aims to enhance marine mammal conservation. Four of the participants were from non-profits that worked directly and specifically with whale species, and two worked indirectly. The non-profits that worked directly with whales focused their entire mission to whale conservation and their outreach and education was solely based on whale species. The non-profits who indirectly worked with whales had a goal of general ocean conservation, but included whale species within their conservation mission. The reason for this range is that there are not many non-profits that solely worked with whale species conservation that had education and outreach aspects. The majority of the non-profits worked on general marine mammal conservation and incorporated whale conservation as a large part of their outreach and education.

The locations of marine conservation that are represented by the participants in the United States are: Massachusetts, Washington D.C. Washington State, California and Alaska. Outside of the U.S., the locations represented are Australia, Cook Islands and Scotland, Australia and Italy. (note: some participants were based in more than one region).

The interviews were conducted between the months of February and March 2016. The interviews allowed for each participant to share a variety of outreach and educational methods that the non-profit undertakes, as well as experiences on how they reach the public and their evaluation techniques. All of the interviews were audio recorded and lasted between forty minutes to an hour and thirty minutes. After the interview conduction, the interviews were manually transcribed to ensure a word-for-word written record.

3.3 Coding

After hand transcribing the interviews, coding was used as a mechanism to thoroughly analyze the results. Coding is a way to sort, categorize, synthesize and evaluate collected qualitative data to understand the meaning of the text (Clifford & Valentine, 2003). The coding method I chose was to go through all of the transcriptions and highlight trends and major themes directly related to my research question and sub-questions. Each trend and major theme became a code, and I created a list of all the codes found in the transcriptions. Some examples of the codes were, “Budget challenge” “Science-based” “social media” “Citizen Science” “informal education.” The codes were derived from a combination of the research question and literature review. The codes I

chose to create are those that would be directly correlated to answering the research question. In the literature review, I was introduced to methods being used by marine conservation non-profits to outreach to the public, so my own codes aimed to highlight methods currently being used by the participants. Once I created my list, I went through each transcription again and compared where the codes came up in each transcription. I analyzed and described the major codes in my results and discussion section.

A brief list of the titles, duties and background of each participant is listed below (names and names of non-profit have been removed):

1. **Title: Project and Outreach Specialist**

   Duties: Informal educator, materials developer, and liaison between formal educators and the non-profit.

   Focus: Ocean Trash

2. **Title: Communications Director**

   Duties: Marketing, speechwriter, writer/creator/editor for online outreach.

   Focus: Grass roots, scientifically powered and local, beach heath and watershed education.

3. **Title: Conservation and Education Manager**

   Duties: Whale watching education, boating safety, informal education

   Focus: eliminating whale strikes by boats

4. **Title: Research Biologist and Outreach coordinator**

Duties: Whale, dolphin, porpoise, marine mammal biologist, intern coordinator, educational and outreach specialist, former formal educator for marine vessel based school.

Focus: Whale watching, photo-identification and matching, youth education

5. **Title: Education and Community Coordinator**

Duties: Informal educator, event coordinator, web content editor.

Focus: Education, web-based lectures, school projects

6. **Title: Communication, Institutional Relations**

Duties: Communications, international workshop organizer

Focus: Mediterranean Sea, conservation outreach, internet-based communication

3.4 Textual Analysis

A secondary method was education and outreach material analysis, both online and print. The non-profits provided me with educational materials such as educational brochures, whale-watching brochures, school programs, surveys, and online materials. These materials are given to school instructors, naturalists, tourists, and concerned citizens by the non-profits, as well as displayed at conferences and events. The online materials are made available to the general public on the non-profit's website, and through their social media outlets. Types of social media outlets observed were Twitter, Facebook, Instagram, and Youtube.

In many of the interviews, the participants drew upon these materials for their responses, so I found it necessary to include the materials in my study. In tandem with the interviews, the materials provided additional details on the educational and outreach methods. For this research, I used the materials to observe the specifics of how the participants shared information, in how much detail, targeted audience, as well as a clarification tool to further understand the participants responses. In other words, I used the materials as supplementary information to support the data documented in the interviews.

4.1 Results

4.1.1 Methods of outreach and education:

What are the public outreach and educational programs undertaken by global and local non-profits?

The methods undertaken by the non-profits in my research were highly variable due the differences in size, location, goals and mission. I chose to describe and analyze the general trends discovered through my research that are used to educate the public about whale conservation. The methods I will discuss in this research are media and marketing, messaging, informal education, formal education, adopt-a-whale programs, whale identification and citizen science.

4.1.2 Media

Use of social media was the leading method used by the non-profits to educate and outreach to the general public on whale conservation. All of the participating non-profits used social media to share information on specific issues, encourage support for their mission, educate on whale biology, health, habitat, current threats and their current projects related to whale conservation. The main media venues were the non-profits website, twitter, Facebook, Instagram, and Youtube. Some non-profits also used documentaries, webinars, as well as Pinterest to create an educational and interactive platform for the general public to be involved in their mission. Only one of non-profits did not rely on social media as a main venue, and the only source of social media they use is Facebook. The main media platform they relied on was their own website. The reasons the non-profit did not heavily conduct their outreach and education on social media was that they have a small staff (the smallest staff of the participants) and the

majority of the staff is marine biologists and whale researchers who spend most of their time in the field. The staff is constantly out of the office in the field either on land or boat, sometimes for months at a time, conducting research on whale tracking, identification or on necropsies of beached whales. Not only is the staff not available to post and update social media sites, but the staff relies on publishing articles for journals for the majority of their data sharing. During the interview, it was also mentioned that the majority of the small staff is above the age of 45, and this could be a contributing factor for the non-profit for not adapting to social media developments. As derived in the literature review, this is a limitation of using media as an outreach tool since it is not as accessible to those of older generations or those who do not have access to computers or phones (Obar et. al 2012). The non-profit also mentioned that they desire to increase their social media presence because they see the value of it to reach a wide audience base. This coincides with what was found in the literature review section of this research, which states that social media is a valuable platform because it can reach mass amounts of people, its instantaneous, free or low cost, easily accessible, waste-free and can easily be updated or changed. Social media is also becoming increasingly popular in daily life so the participants expressed media as a way to make sure they reach people in a timely and effective manner and stay up-to date with the social norms.

The participants used Instagram, Facebook and Twitter by posting a mixture of photographs, images, cartoons, facts, research findings and news stories. The reason the participant's use a mixture is to keep their followers intrigued, interested, aware of current issues regarding whale conservation, and ways they can join and take action. A common trend through all the participants who use this method mentioned that they get

more attention, followers, re-posts and "likes" on post that are A) positive B) upbeat, C) visual or have D) added humor. For example, one participant stated that an image of a "cute" whale calf would always get more attention than a cesspool of ocean pollution. Upbeat examples of conservation posts used by participants on Instagram included a video of a bright sunset on a beach in Santa Monica with the sunset reflecting on the water as two swimmers play in the water posted on July 9th, 2015 with the caption stating, "The ocean needs you. Help Defend the soul of LA." Another photograph of a humpback whale fluke saying, "Hello weekend!" A few other beautiful photographs depicting the ocean bear captions such as, "A coast worth fighting for," "Think about the ocean" "No filter needed," " Almost too gorgeous for words." Voiced by the participants, the goal of these posts are to draw the audience in with a striking image that is *pleasant* to look at, cheery, and incorporating captions that aim to influence the audience to want to protect the ocean habitat and its species.

Humor was also mentioned to be a way that the participants gain recognition and viewers of their posts. Examples of humorous posts on Instagram, Facebook and Twitter by the participants are a photograph of the ocean with the title "BLACK FRIDAY 100% OFF: ALL TRASH ON BEACHES/GET DOWN THERE NOW AND PICK YOURS UP!!!" posted on November 27th, 2015 in the response to Black Friday. Another example was posted on April Fools, 2016, of a humpback whale mid-breach with the caption, "I'm a bird! #Aprilfools." A third example is a photograph of a gray whale with its mouth ajar, as if it was saying the caption, "Hope your weekend went *whale*!" The reason the participants use humor is to bring general happiness in association with whales and again

the intention of wanting their followers and the public to want to become involved in the conservation efforts.

However, all of the participants noted that it is important to show the "ugly truth" of what needs to be addressed in whale conservation and not just show pictures of whales. The "ugly truth" is a term I am using to sum up the participants described as images/stories/facts about ocean pollution, beached or dead whales, whales entangled in fishing gear, ship strikes, or whale stomach contents of marine debris, or anything that demonstrates the need for whale conservation efforts. Although one participant mentioned that they don't want the audience to associate their non-profit with "doom and gloom," they have to post a few of the facts and images that depict the dire need for conservation. This "doom and gloom" was discussed by Giblin & Pagen (1998) in the literature as one of the reasons the public is wary about conservation biologists and environmental conservation. It was found that that environmental conservation messages that display depressing, dire situations creates a feeling of helplessness within the public. These feelings were enhanced in marine conservation because the public felt the ocean was vast and their efforts might not be enough (Kool & Kelsey, 2005). The non-profits noted that they did not want to only express the "ugly truth" for reasons expressed by the literature, such as feeling helpless and not wanting the public to only feel depressed by the subject matter.

Post examples are of a coastline littered with marine debris with the caption, "Syringes in the Sand?" and a post about the sixth year anniversary of the BP Deepwater Horizon Oil Spill disaster in the Gulf of Mexico that harmed the ecosystem and killed many species. There were numerous posts that showed plastic pollution littering

coastlines, blobs of oil on beaches, medical waste trash causing beach closures, images of volunteers cleaning up coasts as well as sea animals, such as whales, trapped in debris. Reasons for these types of posts that encapsulate those issues are very powerful and moving and the participants hope it will jumpstart their followers to become concerned and aware of the issue. They were also described as heart wrenching and disturbing, which carries an emotional element. The reasons the participants voiced were why these types of posts were necessary were to demonstrate *why* whale conservation is necessary. Without posts that show how whales and their habitat are in danger, the public might only think of the beautiful posts of sunsets and cute whale photographs. In contrast to the uplifting posts, the posts that demonstrate the "ugly truth" are the ones that encourage the need for the public support for whale education and how they can join the effort with the non-profit.

Major themes used in social media:

Major themes used in social media used for outreach and education by participants: (Ranked in order of most used by the participants)

A) Photographs of whales: identifying markers
B) Photographs of whale habitat and the marine environment
C) Factual posts such as #didyouknow or #WhaleWednesday #HumpbackHumpday
D) Photographs of ocean degradation/ocean trash
E) Marketing and advertising for the non-profit seeking support, such as participant recruitment or asking for donations

4.1.3 Informal Education

Informal education was a method used by the participants as a form of outreach and education. Informal education in this case refers to education outside of a school setting where learning is conducted through cultivation of knowledge and experience (Chazen, 2002). Informal contrasts with formal education, which is knowledge obtained and shared through in a school setting. Informal education was mostly distributed to the audience in the form of facts, or "Did you know?" Specifically for whale species, the informal education included whale species biology; size, lifespan, habitat, migration patterns and identification markers. These facts and informal education came in the form of media posts (see section 4.1.2), brochures, lectures and presentations, as well as at booths at events. Other forms of informal education were presented during gatherings organized by the non-profits for whale sighting walks, whale- watching tours, or at beach cleanups in the form of an educational talk. One of the participant's most informal education of whale conservation occurs at their event, "Whale of a Weekend" in Santa Monica, California one the first week of April. This event starts during the northbound return of the gray whale migration, and incorporates an educational weekend of lectures, displays, face painting, arts and crafts, whale sightings and documentaries. Of the non-profits that relied on annual or monthly beach cleanups for education and outreach, these events were the largest events put on by the non-profits and had the most partakers. At the beginning of each beach cleanup, a group of volunteers is given their beach cleaning materials (gloves, trash bags) and assigned a leader. The leader is a member of the non-profit who then gives their group an educational talk about the importance of beach cleanups, facts about the particular environment, and how ocean debris is affecting marine mammals,

such as whales in the particular location. One participant said they give the group statistics of how many animals are effected by plastic pollution a year and how many pounds are found washed up on the coast a year. Through these leader-run educational talks, the non-profit is able to educate a large amount of people about both conservation and their non-profit's mission on conservation issues. The audience then has the opportunity to ask questions to receive the specific information they are curious in regarding whale conservation.

For all participants who use informal education, the intended audience is a "general" audience, which means the facts are basic so people can understand who do not have an extensive knowledge on the subject. Especially for the beach cleanups, the audience of the participants is often a mix of families with children, school groups, beach-goers, people who are familiar with marine issues and some who are not familiar with the conservation issues. Since the audience is a mix, the informal education has to be basic facts to ensure everyone's knowledge level is accounted for and that everyone in the group has a chance to learn.

Lectures and talks that are organized around an issue that the non-profit participates in are less likely to be intended for a general audience. For instance, the non-profits that rely on published scientific articles regarding a whale conservation subject matter are pinpointed to a more specific audience. As a form of outreach and education to the public, the non-profits would present these articles and findings open to the community. However, the audience group was often fellow marine scientists, conservation biologists, other members of the non-profits or concerned citizens who had

extensive knowledge on the subject. Although the intention was to share the findings of the non-profit to educate the community, this is often limited to the scientific circle.

4.1.4 *Formal Education*

Derived from this research, the most widely used formal education for whale conservation by the non-profits was school-based lessons, activities or presentations. The general format for the school visitations was that the educators for the non-profit were invited by the teacher. The educators conduct presentations, usually one with general whale biology information followed by a more detailed presentation on how they are threatened, what needs to be done, what the non-profit is doing, and how the students can become involved. These presentations are based on what the students grade-level is, and what they are currently learning so it can be tied into their lesson-plan. The formal educators based their presentations between kindergarten to middle school aged levels, with flexibility built in to adapt to all grade levels. In tandem with the presentations, the educators would bring in materials and activities for the students to engage in to further learn about whales. One participant based in Massachusetts brings in an actual sized blow-up of a Right Whale to the school. The goal of this is to grab the student's attention, show how large they are, point out their body parts, and to teach the students about how Right Whales are extremely endangered in their region. Other participants bring in pieces of baleen, whale bones, photographs and whale teeth for the students to touch, draw and examine. The participants also bring in pieces of pollution, such as plastic micro-beads, plastic bags and tar to demonstrate how ocean trash is affecting whale species. The participant that is based in D.C., their formal education is mostly based on ocean trash, specifically plastic pollution. This participant brings in many plastic samples, including

micro-beads, and also has activities where the students can practice arithmetic, drawing and writing on the facts of ocean pollution.

However, not all of the participants engaged in formal education. Only half of the participants of this research had the resources and funding to engage in school visits where they engage in a lesson for the classroom. A small travel radius limits the non-profits that are engaging in school visitations. This limits the education to schools that are near-by the non-profit, which are near the coast. In turn, this eliminates the students who are further inland to learn about whales and whale conservation through the non-profits school visitations. These students are often time the ones who know less about whales to begin with since they are further away from the natural habitats of whales and may not see them in their daily lives.

To combat the shortage of staff and budget to travel to schools, two of the non-profits are using webinars as a way to complete lessons over the Internet and live stream into the classroom. This method has been extremely rewarding since the non-profit is able to provide the lessons from their office, and can reach schools that are around the world. This also allows students who are far away from the coast learn about how they can help whales and their habitat, and learn more about the ocean that they may not see often. These webinar lessons are interactive, meaning the educators hold up different whale bones, photographs and pollution, and the students have the ability to engage in the presentation and ask questions.

4.1.5 Adopt-a-Whale Programs

All participants except for one had an Adopt-a-Whale Program as a method to increase education, outreach and awareness of whale conservation. Adopt-a-Whale Programs are where an individual or a family can metaphorically "adopt" a certain whale individual that the non-profit has been tracking, researching and cataloguing. To adopt the whale means that the individual pays a fee, considered a donation to support the non-profit, and in return they are given specific information about it and are able to track it. Each whale available for adoption has a name, and the individual can read its story on the website of the non-profit to choose a whale. The adoptions are often in packages, where the individual receives a certificate of adoption, a sticker and brochure along with the whale biological information (age, gender, what it eats, where its been spotted, how it got its name). The information is usually sent out weekly or monthly in a form of an update that educates the adopter if their whale has been spotted or where it is migrating. The more expensive the whale adoption, the more information received to the adopter and the longer the adoption is.

Adopt-a-whale programs have two main goals: 1) Support for the non-profit both financial and participation, 2) as a way for people to become educated and connected with a whale species. As an educational tool, adopt-the whale programs supply a lot of information about a particular whale species. Through the whale adoption, the adoptee can become attached to the whale and want to protect it in its ocean. In turn, adopt-a-whale programs are a great platform for the non-profit to create conservation participation since the adoptee becomes involved with the species. As part of the program, the non-profit sends information on how the adoptee can contribute to

conservation efforts and how to protect whales from endangerments like fishing nets, ship-strikes, overfishing and ocean pollution.

4.1.6 *Whale Identification*

Whale identification was a trend in how the non-profits educate and outreach to the general public. Whale identification refers to identifying an individual whale by its fluke, dorsal fin, scars, marks, patterns, and clusters of whale lice and barnacles. The whale is then photographed, given a number or a name, and its photo is placed in a catalogue where the non-profits collect identified whales. The location coordinates of the whale are documented, as weather, what the whale seemed to be doing (feeding, breaching, diving) and other notes on the health of the whale and if it was solo or in a pod. Whale identification gives a story to an individual whale, which attracts the attention of the general public. According to the participants, it is much easier to grab the attention of the public if the whale has a name, estimated age, and how long the non-profit has seen it as opposed to just saying, "there is a gray whale." Whale identification also creates a connection to the public and the whale, where the public becomes interested in the individual and wants to protect it. To education on the conservation of the whales, the non-profits often rely on telling the public about certain individuals that they have catalogues and their stories to create a concern. One participant points out the individual whales that have propeller scars from being stuck by a boat to encourage people to become aware of this issue and follow boating precautions.

4.1.7 *Citizen Science*

Citizen science, the movement of volunteers participating in scientific research, is a method used by the participants to engage the public in whale conservation by encouraging them to join in data collection and whale identification (Dickinson et al., 2010). In tandem with whale identification, citizen science is a way that the public can help the non-profits identify whales by photographing them and track where they were spotted. When someone spots a whale, either while whale watching by boat or on land, the non-profits encourage them to photograph the whale, write down the coordinates and note any behaviors of the whale. This data can be sent to the non-profit to cross-check with their catalogue to see if the whale has been identified or not. If the whale has been catalogued before, the non-profit can send information out to the citizen if they want to learn more about the whale. If the whale has not been identified before, this supplies the non-profit with valuable information on a whale and their migration patterns. This relationship between the public and the non-profit developed through citizen science opens the door for the public to become interested and involved about the non-profits whale conservation efforts.

4.2. 1 Challenges:

What are the challenges faced by the non-profits while executing outreach programs?

4.2.2 Budget:

The most common challenge expressed among the participants was budget and funding limitations. Since non-profits are not for profits, they rely on. All participants articulated that their public outreach and educational methods were chosen by, and limited by their

budget. For instance, if funding for their projects were unlimited, then their outreach and educational endeavors could be more detailed, designed to reach a broader audience, and implement additional evaluation techniques.

The budget limitation for outreach was described as relating to overhead costs of the non-profit. Overhead costs are rent for the office of building space, staff salaries, management costs, water and electricity bills, materials, telephone, marketing, etc. The overhead cost is usually a fixed cost and is to be paid monthly. Before any money can be used for programs, or special projects, the overhead cost must be paid first. It is also viewed as a "break even" cost. Non-profits have an interest in keeping overhead costs as low as possible, and this in turn looks better for the donors. The donors want their donations to be going to projects, where things are being done, not to be part of the overhead. If the overhead cost is too high, then it looks as if most of the donations are not going to be allocated to the projects.

Some participants mentioned that even though their department work is involved with education and outreach, such as blog creation and other forms of social media, their duties also include fundraising and management. This causes their budget to fall under overhead cost. Since their budget is considered overhead cost, then this keeps their budget small in means of keeping overhead cost low. A participant described their outreach budget as enough dollars to "sprinkle" here and there, but most of it goes towards staff salaries.

Budget is also related to the size of the department involved in the outreach. Of the participants, the size of the departments ranged, from two to five paid staff,

depending on overall size of the non-profit. Most of the participants relied on one or two paid staff members who are dedicated to areas of the outreach and education, and the work was often dispersed among other departments. Since the departments were small, the number of people to work on outreach and education was also small. Often sheer lack of people was the main reason for choosing certain methods over another. For example, three participants noted that they limit their formal education based on size of the department. The three non-profit give school visitations to elementary and middle school and give presentations about, whale species and their biology, whale conservation, ocean health, as well as ways the kids can become involved in the conservation. Since the department is small with not enough staff to visit more schools, this limits the presentations to schools that are local and near the non-profit. Since the non-profits are near the oceans, this isn't reaching the students who are farther removed from the ocean, and maybe less aware of the issues. As noted above in the research, whales and their habitat are impacted by human activity even far removed from the coast. It was recommended that the formal education aspect of the non-profits can be improved if the department was able to educate in schools reaching broader areas, not only those near the oceans.

To succeed with a small budget, the participants relied on interns, as well as volunteers to be representatives of the non-profit and execute education techniques and outreach to the public. Examples of use of interns was involved in whale identification, whale-watching, educational booth operating at events, informal education through schools, beach cleanup leaders and the creation of education and outreach materials. Volunteers were also involved in the above outreach and education methods, although it

was stated that the interns usually hold more leadership roles, such as coordinators. This was because since interns closely work with the non-profit, it is easier to become dependent on them. The volunteers were used for large scale, participatory roles such as beach cleanups.

Two of the participants use interns in whale watching tours for both whale identification as well as educational tools. Both participants consider whale watching a respectable alternative for the public to view whale in their natural habitat as opposed to viewing them in captivity or approaching them on their own in non-trained whale watching vessels. The interns ride whale -watching tours to identify whales using photo-identification, as well as to ensure educational requirements are being followed on the tour. In one occasion, the interns on a whale- watching excursion witnessed a ship strike of a humpback whale with a motorboat and was able to take the necessary procedures to call in the strike to the authorities. The interns on the boat were considered a vital part of demonstrating how to approach situations where whales are injured by ships, and this was witnessed by the spectators on board. Both participants also relied on interns for their whale identification catalogues. The interns were trained to photograph whales on whale watching vessels and to mark the correct location coordinates, and to take photographs of the whales that are seen on whale watching

One participant's method of keeping under the budget was to make all educational materials by hand and "in house." For example, the educational packet that is distributed to classrooms for education was printed, laminated and bound without sending it out to a print shop. This was a method to keep within the budget and not use the non-profits grant money to expensive printing for the materials as opposed to the actual execution of the

outreach. The in-house technique could be shared upon multiple staff members and interns to accelerate the amount of work.

4.2.3 Science-based challenges:

The non-profits that identify as "Science-based" expressed that they run into the challenge of data sharing. The non-profits that described themselves as science- based are driven by scientific inquiry, scientific data collection and relied on scientists (mainly biologists) for the information they share with the public and for their cause. Three of the participants in this study identified themselves as "science-based" in their whale and marine conservation mission. These non-profits desire to share their collected data and findings with the general public; however, methods of data sharing are limited. One challenge faced by a participant was that since they collect and publish their own data sets and findings, they want to be in control of where the data is distributed.

For example, all three participants create whale identification catalogues, which is a database of confirmed whales identified by their unique markings, patterns, scars, barnacle clusters, whale lice, dorsal fin or fluke. The catalogue relies on photographs in combination with geographical data (coordinates) to describe the location of the whale siting, characteristics of the whale, and any health concerns. The catalogues are analyzed by marine biologists and experts, are enormous projects and may be on-going for years. The data sharing apprehension is that if the dataset is made exposed to the general public, they risk losing control over both the reliability and accuracy of the data, as well as control over their own data collection and research efforts. The non-profits expressed that they want their data to be available to the public, but they also need to be able to

track their unique data sets to ensure accuracy. One participant during the interview mentioned that their identification catalogues are a sizeable and significant part of their efforts at the non-profit and also adds to what makes them unique conservation and research non-profit. If they weren't to have control over that data then it could have an effect on what makes their organization stand out from other similar organizations. To combat this problem faced in data sharing whale catalogues, one of the non-profits is exploring ways to make some of their data accessible through mobile applications (apps) that plot data points of where whales have been located and tracked. Some apps that have been explored are Whale Alert and Whale Spotter.

Another data- sharing challenge faced by these science-based non-profits is that they share research data and findings through published articles and lectures. Since the articles are strictly scientific research articles, the articles are not generally lay-person friendly. The articles are also not accessible to the general public because they are frequently published in peer-reviewed journals that are targeted for marine biologists, marine conservation and marine research. These publications are also not easily accessible to people without knowledge of the publications and they might cost a fee to access. This limits the audience to scientists, or those with an understanding or background in the subject. An expressed way to alleviate this disconnect is to find venues where the non-profits can share their findings in a lay-person friendly fashion to the public. Instead of only relying on publications, the non-profits could hold community lectures, visit schools and use media to broaden their audience for their whale conservation research.

4.3 Evaluation

How do the non-profits evaluate the success of their outreach and education?

How the non-profits evaluate the success of their outreach and educational methods was limited and highly variable. None of the non-profits had a current, overall evaluation method that could measure if their efforts were increasing the public's involvement with whale conservation. For example, none of the participants had a before or after studies when engaging in an outreach or educational event to track change. One of the participants stated, "Non-profits are really stretched from a budget point of view, and so it is just enough to get the work done sometimes, rather than thinking it all the way through about if the work was effective or not." The only evaluation techniques to measure success that are being used are raw-number tracking and surveys, on a small-scale basis. Raw-number tracking is used is track how many people were following the non-profit on social media and online sources. The non-profit is able to gauge increases of followers, likes, shares, reposts and comments that they receive on their social media posts. These "numbers" can be recorded and increases or decreases can help determine what method or post was successful. The non-profit can also track raw-numbers through their website, where they can see who and how many people are clicking through each of the different pages. Again, they can evaluate change in numbers as a way of an evaluation process. When the non-profit hosts events, beach-cleanups, whale watching tours, lectures and festivities, they can track the amount of people who come, which can also be used to evaluate success.

However, there are limitations to raw-number tracking. The main limitation is they can't always tell the "who" behind the raw-number. The number does not tell them details about the person, if they have any previous experience with whale conservation or if their knowledge increased after the outreach program. A similar limitation is that is doesn't tell the non-profit the "why" behind increase or decrease of numbers. Some questions that arise are: "Are more people following them on Instagram because of an increase in concern for whales or because more people found their page?" "Does an increase in numbers mean that more people are becoming involved in the non-profits mission of increasing whale conservation?" With raw-numbers the non-profits can only get a general sense of the amount of participants but this leaves out the back story as to who is involved and why.

One of the non-profits relied on survey distribution while conducting formal education in classrooms and another participant handed out surveys on whale watching tours. The surveys asked the students in the classroom questions about what they learned, what they didn't know before, what they were most interested by and if they would like to become more involved as a volunteer for the non-profit. The non-profits are then able to see how the students reacted to their formal education and could see if they needed to make adjustments to their presentations to further their success. It was noted by the participant that these surveys were best given to the older age groups, and that it was sometimes hard to get the surveys back if they left them for the teacher. Overall, the surveys in the classroom did supply the educators with valuable knowledge as to how they were reaching the kids and if they sparked anyone's interested in furthering their commitment to whale conservation.

The participant that relied on surveys on whale-watching tours aimed to track who was on the tour, what they saw, what they learned, what they wished they learned and any other information regarding the education of the whales that they saw. This particular non-profit started the surveys as part of a thesis project, where they were investigating if whale-watching was a valuable conservation tool. Interns and volunteers of the non-profit distribute the surveys after the whale-watching journey is on its route back. This method was seen as a valuable way to track the number of people went on the whale watching journey, as well as how many the non-profit was outreaching to. It was expressed that surveys, especially distributed before public outreach and educational programs, would be a beneficial evaluation tool for the non-profits to calculate who was attending the programs, their demographics, and what their previous knowledge was on the subject compared to what they learned after they were involved in the outreach. However, the participants in this study stated they did not have the financial clout, staff, or proper system in place to use surveys as an evaluation tool for all of their education and outreaching programs. Using surveys could increase ways in which the non-profits could gauge the success of their outreach and education, as well as learn if their efforts are increasing public concern and involvement in whale conservation.

5.1 Discussion

How can non-profits enhance their public education efforts for whale conservation?

Concluded from the results, the main ways that non-profits can enhance their public education efforts are by: developing evaluation techniques for both their education and outreach methods; broadening audience; and overcoming ways to data-share. A key theme that emerged from this research was that outreach and education efforts were significantly limited by small staff numbers and limited budget, so improvements on outreach and education will have to be cost effective and rely on online sources. Of the participating non-profits in this research, all of them stated that they did not have a thoroughly developed evaluation system for their conservation projects that involved outreach or education to the public. Specifically, none of the non-profits had a system to track whom they outreached too, the details of the audience (location, demographics) what the audience gained from the outreach/educational experience or if the audience became more involved in whale conservation afterwards. This is a limitation because the non-profit is left without knowing who they are reaching, what people are being inspired by their outreach/education and becoming involved in whale conservation. Due to this limitation, they can't evaluate all their techniques as being successful/unsuccessful. Thus, the non-profit overall can't improve their outreach and educational methods without knowing which methods were most successful. Expanding evaluation methods is significant in improving how the general public is educating on whale conservation and gaining more interest in the issue.

Two key themes emerged from the research: Budget constraints and limited geographic outreach. Since the non-profits relied on a small budget, it was a challenge for

the non-profits to send staff to travel far for their education and outreach programs. As a result of this, the majority of the general public that the non-profits were reaching were people who lived nearby, were "local," had access to the coast, and were already familiar with whales. Since most of the outreach and education was completed around the coastal location of the coasts, the majority of the public they reached was nearby as well. It was mentioned that the people that did live nearby were both familiar with whales and whale habitat conservation and the non-profit organizations. This eliminates the areas that are further inland, or landlocked areas where seeing the coast or experiencing whale sightings is not a common occurrence. Expanding their outreach locations is important because as discussed in the background of this research, whales are affected humans who aren't in close proximity to them through climate change contributions, trash, plastic debris as well as water contamination. To further improve education about whale conservation to the general public, non-profits should use educational webinars for educational lessons in schools far away, as shown in the results, as well as using the Internet and social media as a way to easily, and cost effectively reach people around the world.

Data sharing was demonstrated as a challenge for non-profits that rely on published scientific research as their main way of sharing their findings and information of specific whale conservation issues. The non-profits that relied on this method struggled with how to share information to the general public without losing control of their data. The scientific articles that they publish and their data are not lay-person friendly and they are aimed to address a scientific community. This has obvious limitations as it does not reach the general public, and does not supply people who are not

in the scientific community with their valuable findings. To improve this issue, the non-profits that focus on scientific articles as a way of data-sharing, they should also incorporate ways to share the data in a different fashion. For instance, they can distribute overviews of their findings to the public that are more lay-person friendly. At presentations where the scientists present their work, they could also host presentations open to the general public and present their findings so the community can become involved. Improve data-sharing is a way non-profits can better education the general public on whale conservation and increase knowledge on the issue.

An additional trend that was identified through this research is that there is a lack of collaboration between the non-profits about how they are engaging in outreach and education in regards to whale conservation. Although it was not identified exactly as to why theses non-profits don't collaborate, some of the reasons were that the each non-profit desires to be unique with its own niche, and they want to maintain in control of their data. The lack of collaboration, however, makes it difficult for the non-profits to know what the other non-profits are educating the public about and whom they are reaching. In other words, there is no overall effort by all of the non-profits to better educate the general public of whale conservation. If there was collaboration, it may make it easier to reach more people and have a streamlined method in how they are educating and on what subject matter. Collaboration between non-profits could improve the general public's knowledge on whale conservation and may have more abilities to further about the subject.

6.1 Conclusion

6.1.1 *Summary*

Concluded from this research, non-profits can better educate the public on whale conservation through creating evaluation techniques, overcoming ways to data share, and broadening their audience base. Through their outreach and educational programs, non-profits can increase environmental literacy in regards to marine conservation, extend science communication and enhance marine citizenship. As discussed in the literature, environmental literacy is a term that measures knowledge and understanding that the public holds about environmental systems, issues, and relationships between humans and the natural environment. Environmental literacy improves conservation efforts because the public is aware of the underlying systems and understands the changes that need to occur to solve the issue. In this study, through informal and formal education, the non-profits give the public basic knowledge of whales, the need for conservation and opportunities for public can join the effort. When the public is made aware of impacts to whales, such as entanglement in fishing gear, they then can make more informed decisions on what they can do. For example, the public can choose to support "whale safe" fishing practices, such as non-dredging practices and support marine protection areas in the ocean where no fishing is allowed. The non-profits are improving the literacy of the public by supplying them with information so they can make informed decisions and choices when it comes to whale conservation.

Public outreach in the terms of science communication discourse was also discussed in the literature review. Science communication is a method to build a relationship between the scientists and the general public to share research projects and

findings. The non-profits in this study are engaging in science communication by opening a dialogue of what research is being conducted on whales, what the findings are and how the general public can be involved in whale conservation. However, one of the limitations found in this research is that science-based non-profits are struggling with how to communicate their research to the public in a lay-person, easily accessible manner without loosing control of their data-sets. To enhance their whale conservation outreach, the non-profits need to improve their science communication by finding alternative ways to share their data and create a dialogue between the scientists and the general public. Examples that are explored in this research to increase the communication is through community talks where the researcher can present his findings to a general audience, and interactive data-sharing apps where the public can view whale citing data by plugging in coordinates.

To encourage the public's involvement in whale conservation, the non-profits aimed to increase the public's relationship with whales and whale habitat through photography, facts, events, and interactive programs. Since whales are rarely seen and the majority of the population does not sight or interact with whales on a daily basis, a goal of the non-profits is to introduce whales and their conservation to the public. This relationship building between the public and understanding whale species is vital for increasing marine citizenship. Marine citizenship, a term introduced by McKinley & Fletcher (2012) encompasses an individual's role and responsibility towards the marine environment. This study demonstrated that non-profits are attempting to increase the general public's marine citizenship to promote pro-conservation behaviors.

The Value-Belief-Norm (VBM) theory aims to understand what drives the public's pro-conservation behaviors. According to the theory, individual's internal values influence how they react towards environmental issues. For example, if an individual feels that their values are being threatened by whale populations declining, the theory states that they will be more likely to react and join the whale conservation effort. When the non-profits engage in public outreach and education to introduce the public to whale conservation, they are increasing the likelihood that an individual will have personal values in the subject. According to the VBM theory, the relationships created by the non-profits could enhance individual's pro-whale conservation beliefs.

Since a narrow budget and small staff restrict non-profits, I suggest they increase their social media campaigns as a main tool for outreach and education. Since social media is cheap, quick, easy and can reach a wide range of people instantaneously, it would be a beneficial platform for them to increase their efforts. The social media platforms already being used are Facebook, Instagram, Twitter, YouTube, Pinterest, as well as websites. As explored in this research, a mixture of photography and facts on whales, their habitat and conservation approaches is seen as a way to grab the public's attention while educating them at the same time. It is also advised to mix up the type of messaging used, such as not to focus their media campaigns on negatives, such as beached or injured whales, or ocean pollution. The most popular social media posts, which are those that generated the most "likes" "comments" and "re-posts" were ones that included humor, beautiful photography, and uplifting messaging. Another suggestion for the use of media is incorporating media with formal education. For example, since many of the non-profits did not have the resources to travel to schools to educate students

about whale conservation, I suggest that non-profits rely on on-line webinars where they can virtually tune into classrooms and teach the lessons. This allows students who are not located near the coast to be educated by the non-profit, and does not require the non-profit to travel if they have limited staff, time and/or financial resources.

Evaluation of outreach and education campaigns needs to be implemented for the non-profit to gauge whom they are educating and if their efforts are increasing the public's interest in whale conservation. Two ways that are being used as evaluation techniques are raw-number tracking and surveys. A suggestion is to further implement surveys, both before and after education and outreach programs to ensure they track who is attending and what the visitors knowledge is on whale biology and whale conservation prior to attending compared to what knowledge was gained during the program. Follow-ups on who attended their events could also be used to see if the non-profit inspired them to become involved in whale conservation.

A result of the limitations non-profits face, it was found that the non-profits focus the majority of their outreach and education on areas that are located near the non-profit. Since all of the non-profits in this study were located on the coast, they were reaching people who were located on the coast, or visiting. It was suggested that the people who live near the coast would already be somewhat familiar with the habitat and the whales that reside in the region. The non-profits are not outreaching to people who are not located near the coast, such as in landlocked states in North America. Since whales are being impacted by a slew of human activities, such as contributions to climate change, I suggest that non-profits expand their audience base to increase whale conservation.

6.1.2 Recommendations for future Research:

For future research, I recommend non-profits explore new technological ways that they can engage in citizen science for outreach and education. As part of this study, it was found that one of the non-profits was experimenting with apps, or "applications" for mobile devices that can input whale citing data and link it to historical and biological data given by the non-profit. It was not thoroughly explored in this research since it is a new technology, but it could be a valuable tool to engage a variety of people, and allow citizens to assist in whale tracking and identification in areas. This application could educate and engage the public at the same time as tracking data points that are beneficial for the non-profit that relies on whale identification information.

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