

Taking the Plunge: How Aquariums Can Help Build a Public Constituency for the Ocean

by

Noah Chesnin

Dr. Michael Orbach, Advisor
May 2012

Masters project submitted in partial fulfillment of the
requirements for the Master of Environmental Management degree in
the Nicholas School of the Environment of
Duke University

Abstract

It is widely accepted that America's oceans are in crisis. They face a barrage of daily threats including habitat degradation, overfishing, and increased run-off from coastal development. However, progress instituting and implementing conservation solutions has been stymied by a lack of public involvement and pressure for conservation measures. Aquariums are uniquely positioned to help build a broad, nationwide public constituency for marine conservation. With millions of visitors each year, aquariums can leverage their educational, entertainment and authority brand to support conservation education, action and policy. Drawing on case studies of three institutions – the Monterey Bay Aquarium, the New England Aquarium and the Seattle Aquarium – the purpose of this study is to evaluate challenges and opportunities associated with expanding aquarium conservation programs to promote personal and civic oriented actions aimed at protecting marine resources.

The results indicate that while each aquarium has established its conservation niche, other aquariums can follow suit by: 1) focusing their exhibits, education and outreach on a specific biophysical environment; 2) collaborating with a diverse range of academic, scientific and advocacy organizations; 3) formally participating in the governmental process responsible for establishing and implementing State and Federal ocean policy; and 4) recognizing and celebrating the historic legacy of human uses of the marine environment as a way to connect people to and inspire protection of the ocean. These four elements have allowed the Monterey Bay Aquarium, New England Aquarium and the Seattle Aquarium to begin building a public constituency for the ocean. It is time for other aquariums to take the plunge.

Table of Contents:

Introduction.....4
Methods.....5
Limited Constituency for the Ocean.....6
History of Zoos and Aquariums.....8
Measuring the Impact of Aquariums and Zoos.....9
 Economic Impact.....11
Theory Underpinning the Importance of Aquariums.....12
 Why do people visit an Aquarium or Zoo?12
 Free Choice Learning.....14
 The Biophilia Hypothesis.....17
 Conservation Psychology.....18
 Social Capital.....19
 The Activation Point and the Framing Institute.....21
Existing Networks and Organizations.....22
The Seattle Aquarium.....26
 Introduction.....26
 The Transition.....27
 The Conservation Department: Embryonic Stage.....31
 The “Aspirational” Aquarium.....33
 The Current State of Affairs.....34
 Collaborations and Partnerships.....35
 Green Maintenance and Operations.....36
 Staff Leadership.....36
The New England Aquarium.....37
 Introduction.....37
 Conservation and Education Programs.....38
 Communicating about Climate Change.....39
 Teen Programs.....42
Monterey Bay Aquarium.....43
 Introduction.....43
 The Human Relationship to Monterey Bay.....47
 Navigating a Complex Seascape.....50
 An Emphasis on Local and National Partnerships.....51
 Active Participation in Governmental Policy Decision-Making.....53
 Focused on Monterey Bay.....54
Comparative Summary of the Three Aquariums.....55
Lessons Learned.....56
 Aquariums need to Develop and Harness Social Capital.....56
 Find Creative Ways to Measure Impact.....57
 The Importance of Collaboration.....59
 Conservation Advocacy, Lobbying and the IRS.....60
Alternatives and Counter-Arguments.....62
Conclusion.....64
List of Interview Subjects.....66
Acknowledgements.....66

Introduction:

It is widely accepted that America's oceans are in crisis.ⁱ They face a barrage of daily threats including habitat degradation, overfishing, and increased run-off from coastal development to name just a few. Multiple national level reports and policy initiatives have proposed solutions to these challenges.ⁱⁱ However, progress instituting and implementing conservation solutions have been stymied by a lack of public involvement and pressure for conservation measures. As a group of marine scientists argued in 2009, "the constituency committed to ocean conservation remains limited, and there is an urgent need to identify sources of authority across a broader spectrum of society."ⁱⁱⁱ The underlying challenge is not only to connect the broader public to the ocean, but also to motivate them to care about the state of the marine conservation and support specific conservation measures. This imposing goal requires that conservation scientists, educators and advocates "move beyond their comfort zone to build a larger constituency."^{iv}

Aquariums are uniquely positioned to help build a broad, nationwide public constituency for marine conservation. With millions of visitors each year, aquariums can leverage their educational, entertainment and authority brand to support conservation education, action and policy. The purpose of this paper is to illustrate how the Seattle Aquarium, the New England Aquarium ("NEAq") and the Monterey Bay Aquarium ("MBA") have each developed their own approach to conservation action, education and policy. These institutions are actively working to connect their visitors to their local waters such as Puget Sound, the Gulf of Maine and Monterey Bay as well as to the global ocean. Ultimately, they all share the goal of inspiring the public to conserve this important resource. By highlighting how these aquariums have integrated conservation work into different facets of their operation, I seek to explain how the aquariums

across the country can successfully build a public constituency for marine conservation. Other aquariums can follow suit by:

- 1) Focusing their exhibits, education and outreach on a specific biophysical environment;
- 2) Collaborating with a diverse range of academic, scientific and advocacy organizations;
- 3) Formally participating in the governmental process responsible for establishing and implementing State and Federal ocean policy; and
- 4) Recognizing and celebrating the historic legacy of human uses of the marine environment as a way to connect people to and inspire protection of the ocean.

Collectively, these three institutions have more than 100 years of marine education and conservation experience. They were selected as case studies because even as they experiment with new programming, their commitment to conservation remains steadfast.

Methods:

The purpose of my research is to understand how aquariums can educate individuals – including members, visitors and members of the general public – about marine conservation, inspire them to make individual lifestyle choices that promote conservation, and also encourage and empower them to translate that information into civic-oriented actions meant to promote marine conservation law and policy. In order to unpack this complex set of questions, I have prepared three case studies exploring the conservation and education programs at the Seattle Aquarium, NEAq and MBA. For each institution, I have conducted semi-structured interviews of lead staff in their conservation and education departments, and when possible, I have also visited the institutions. I have also conducted semi-structured interviews with staff members from other aquariums as well as with foundation, nonprofit association and government officials who work with aquariums. In total, I have drawn on twenty interviews conducted over the course of one and a quarter years (January 2011 to May 2012). To understand the theoretical and conceptual underpinnings concerning these questions, I have reviewed the literature on zoos and

aquariums, conservation psychology, informal science education and social capital, as well as strategic communications for social change.

Limited Constituency for the Ocean:

Public opinion polling over the last several decades has shown that there is minimal public awareness concerning environmental or marine conservation issues. For example, in 1998, the National Environmental Education and Training Foundation (“NEETF”) commissioned the market research firm Roper Starch Worldwide to assess what Americans know about the environment. The overarching conclusion was that Americans have a very low knowledge of, but also a high concern for, environmental issues.^v

In a 2003 study of 2,400 adults, the American Association for the Advancement of Science (AAAS) found that almost 80% of Americans felt that “man-made stresses are endangering coastal regions and oceans and this may lead to long-term damage and serious problems.”^{vi} However, only 31% of adults thought that their personal actions would have an influence on the health of the ocean.^{vii}

More recently, during the 3rd and 4th quarters of 2008, the MBA, in collaboration with The Ocean Project and the National Aquarium in Baltimore, conducted a major public opinion survey to assess “the extent to which Americans know about, care about, and value the ocean.”^{viii} Over the course of four months, the researchers used online collection methods controlled with intercepts and random digit dialing to survey 22,000 people across the United States.^{ix} The results, published in the report *America, the Ocean, and Climate Change*, were not reassuring. When asked about the three most important current issues confronting the United States, most Americans were concerned with the economy (40.2%), national security (14.5%) and energy independence (10.9%). Only 3.6% of respondents included climate change and only 2.4% of respondents included protecting the environment. According to the report, this illustrates that the

“environment does not rank as a ‘top-of-mind’ concern to the public.”^x Compared to other environmental challenges, ocean conservation ranks at the bottom of the list behind climate change, sustainable energy and air pollution among other issues.^{xi} The study concluded that “the public is largely uninformed about contemporary ocean issues, and is not able to ascribe any sense of proportional risk to specific threats.”^{xii} Overall, the report illustrates that there is currently only a small U.S. public constituency for marine conservation.^{xiii}

On a positive note, the report shows that the American public strongly believes that “protecting the ocean is important to the health and well-being of the United States.”^{xiv} Further, the report found that two out of three Americans described themselves as “sympathetic to the environmental movement but not active.”^{xv} In this way, while no marine conservation constituency currently exists, with the appropriate message and messenger, it should be possible to build public support and action regarding marine conservation.

Zoos, aquariums and museums (“ZAMs”) are uniquely positioned to develop and disseminate the conservation messages necessary to build a public constituency for marine conservation. According to the *America, the Ocean, and Climate Change* report, zoos, aquariums and museums (“ZAMs”) are considered trusted conservation messengers and authorities on issues concerning the environment.^{xvi} According to The Ocean Project polling data, the scientific and educational reputation of ZAMs allows these institutions to deliver credible conservation messaging: members of the public trust ZAMs to provide a balanced perspective on conservation.^{xvii} For example, the researchers recorded a 61% level of agreement with the statement, “I trust nonprofit agencies such as an aquarium to protect the quality of the ocean” as opposed to a 36% level of agreement with government agency protection.^{xviii}

History of Zoos and Aquariums:

Humans have been collecting and displaying wild animals since urbanized civilizations emerged between the Tigris and Euphrates River approximately 3000 BCE.^{xi} During the Age of Exploration and the Renaissance, European Kings and Queens displayed exotic animals from Africa, Asia and the Americas in luxurious menageries as a sign of wealth, status and power.^{xx}

Some argue that zoos and aquariums present a “dominionistic attitude towards the wild creatures that inhabit the natural world.”^{xxi} However, the underlying purpose of these institutions’ business has changed. “By becoming conservation centres, our institutions are contributing to the very survival of many wild species, while continuing to satisfy, in some measure, the positive interest people have in these animals.”^{xxii}

The modern concept of the zoo and aquarium developed in the 18th and 19th centuries. During the 19th century, especially in Europe, people established zoos and later aquariums as menageries to display the living natural history as a cabinet of curiosities in cages. In 1853, the Zoological Society of London opened the world’s first aquarium as a part of the London Zoo. The first American aquarium opened in Boston in 1859, followed by an aquarium in San Francisco in 1894 and another in New York in 1896.^{xxiii} These organizations were founded, in part, to entertain urban residents with wildlife from distant lands and provide visitors with a chance to recreate with family on a day off from work. The purpose was to represent the taxonomic diversity of the world’s oceans, for example, and discuss adaptations for life. Menageries were not concerned with wildlife or marine conservation. Rather, they promoted species husbandry and propagation as a means of perpetuating their collections.

During the 20th century, the Zoological Park emerged as the model for a living museum. Using dioramas, these institutions sought to instruct visitors about the ecological relationships between wildlife and habitat as well as behavioral biology. Zoological Parks engaged in co-

operative species management internationally. During the 21st century, Rabb and Saunders argue that aquariums and zoos need to serve as environmental resource centers instructing visitors about ecosystems and species survival. They need to engage in holistic conservation by developing green practices to serve as model conservation organizations, actively engaging in wildlife conservation, and become agents for conservation by fostering “caring concerns and caring behavior for animals and nature.”^{xxiv} The authors argue that the primary role and obligation of public zoos and aquariums is to have “a positive effect on the conservation outlook and behavior of visitors and other audiences.”^{xxv} This challenging task requires that aquariums are “able communicators, inspirers, motivators and providers for participation.”^{xxvi}

As zoos and aquariums continue to shift their mission from entertainment to conservation, they will need to consider a wide range of issues concerning institutional, ecologic and human factors that will help their organizations promote conservation. The remainder of this paper seeks to explore this complex issue by first reviewing some general phenomena concerning zoos and aquariums and their impact, and then by evaluating the cases of the Seattle Aquarium, the New England Aquarium and the Monterey Bay Aquarium.

Measuring the Impact of Aquariums and Zoos:

Aquariums are beginning to tackle the demands of this new 21st century conservation-centric institutional model. Today, the Association of Zoos and Aquariums (“AZA”) has accredited 37 aquariums, 142 zoos, 9 institutions that combine zoos and aquariums as well as multiple science centers, aviaries and safari theme parks. While these institutions may have originally been founded with a focus on their collections and research, currently the emphasis has shifted such that they serve as important institutions of public learning.^{xxvii}

All together, the 225 AZA accredited institutions receive about 175 million visitors per year.^{xxviii} However, it is important to note that the AZA membership only represents

approximately 5% of all the zoos and aquariums in the US.^{xxix} According to an AZA analysis, member organizations in the United States generated \$2.62 billion in total direct spending outlays, \$7.607 billion in total economic output and supported 74,332 jobs in 2007.^{xxx} In California, zoos and aquariums accounted for nearly \$475 million in direct spending, \$1.06 billion in total economic output and 11,053 jobs.^{xxxi}

The trends in zoo and aquarium attendance reflect broader trends within the museum sector. According to the American Association of Museums, attendance at US museums doubled from 200 million visits in 1965 to nearly 400 million visits in 1984. Currently, the approximately 17,500 museums in the United States receive 850 million visitors per year. Thus, “museum-going is rapidly becoming the single most popular, out-of-home activity in America.”^{xxxii}

While people visit zoos and aquariums based on a wide range of individual motivations, research has found that visits forge a stronger connection to nature and “prompt individuals to reconsider their role in environmental problems and conservation action.”^{xxxiii} Thus, the role of zoos and aquariums has broadened to include more than just entertainment, recreation and education. Rather, zoos and aquariums are important centers of conservation. Worldwide, zoos and aquariums spent approximately \$350 million on wildlife conservation in 2008.^{xxxiv} The Public Research and Evaluation Program of the Wildlife Conservation Society conducted research in 2009 investigating public perceptions of zoos and aquariums. Not surprisingly, they found that “the majority of Americans take it as self-evident that good zoos and aquariums... are committed to a conservation agenda.”^{xxxv} However, the research also concluded that while ZAMs promoted their conservation agenda through scientific and natural history information, this ultimately “has not produced measurable cultural change.”^{xxxvi} Zoos and Aquariums, as well

as other conservation organizations, have not been able to raise the profile of conservation and affect a change in cultural norms.

Economic Impact:

Two studies highlight the economic impact of zoos and aquariums across a range of economic indicators. In 2010, The Center for Regional Analysis at George Mason University's School of Public Policy was commissioned by the AZA to analyze the economic impact of annual operations and construction spending by accredited zoo and aquarium both at the state and the national level.^{xxxvii} According to his analysis, AZA members spent \$2.62 billion on operating and capital outlays in 2007. This contributed a total of \$7.6 billion to the US economy and generated 74,332 jobs across all sectors of the economy.^{xxxviii} Ultimately, Professor Fuller concluded that AZA member institutions have "benefits that far exceed their initial annual operating and capital outlays and constitute an important source of new income and jobs that extend broadly across the effected economies as this initial spending is re-cycled and re-spent by businesses and residents in the host jurisdictions."^{xxxix} In California, AZA member institutions contributed \$32.219 million in direct spending and generated 602 jobs in 2007 for the state economy. In Massachusetts, AZA member institutions contributed \$5.054 million in direct spending and 75 jobs to the state economy. Finally, in Washington State, AZA accredited institutions contributed \$47.564 in direct spending and 894 jobs to the state economy.^{xl}

In the second study, the World Association for Zoos and Aquariums ("WAZA") commissioned Markus Gusset and Dick Gerald, who queried 12 national and regional zoos and aquarium associations around the world, with over 1,000 members. They tabulated the number of visitors the institutions received in 2008 as well as the total dollars spent on wildlife conservation, which they defined as "in situ conservation of wild species and habitats, including related ex situ work."^{xli} More than 700 million people visit zoos and aquariums worldwide.

Further, these organizations spent a combined total of \$350 million on wildlife conservation in 2008.^{xlii} This marks a significant expenditure. To put this dollar figure in context, only two organizations spent more on wildlife conservation: The Nature Conservancy and the World Wildlife Fund Global Network each spent a little over \$400 million.^{xliii}

Theory Underpinning the Importance of Aquariums:

Why do people visit an Aquarium or Zoo?

In their 1999 survey of 447 visitors to Sunset Zoological Park in Manhattan, Kansas, Dr. J. Mark Morgan and Ms. Hodgkinson, a Professor and an undergraduate student at Kansas State University respectively, found that most people indicated that they were motivated to make a visit to the zoo “to allow others in my group to have fun, recreate,” “to have fun, recreate,” “to spend quality time with others in my group,” “to allow others to relax and unwind,” and “to relax and unwind.”^{xliv} Other researchers have found that visitors associate visits to zoos and aquariums with positive feelings including “feelings of relaxation, happiness, and attentive interest in animals.”^{xlv}

Rabb and Saunders have identified five relational roles that people can have with aquariums and zoos. These broad categories provide a useful frame from which aquariums can segment their audience. Rabb and Saunders identify the first role as associating with the aquarium. This includes average visitors, correspondents and vendors. They associate with the institution by coming to the facility, writing about the organization for a news publication or engaging in a contract to sell their products or services to the institution. Next are people that affiliate with the institution. This type of relationship describes the people who join the organization as members or, for example, support the institution by serving as an adopted parent for an aquarium-animal. Rabb and Saunders also identified a separate relational role for people or organizations that support the institution through donations, sponsorships or grants. The final

two categories describe the most active members of the aquarium community. The authors identify people who participate in the aquarium by volunteering, interning, working or serving as members of the governance body. Finally, and critically for this paper, the final category of the aquarium audience includes advocates. This group encompasses people who serve in all or multiple roles and, therefore, advocate for the aquarium and promote its mission within society at large.^{xlvi} While these categories are not mutually exclusive, they offer an important frame from which to segment all the individuals who interface with an aquarium.

Over the course of my interviews for this project, nearly all of the aquarium professionals noted the challenge of communicating about conservation issues. For example, Mark Plunkett, Interim Director of Conservation at the Seattle Aquarium explained that:

Ocean Change is difficult in terms of simply the scientific information. But it is also difficult in terms of it's such a downer for people and nobody paid 15, 20, 25 bucks to come to the aquarium and get depressed. So it is very challenging from a framing perspective, from a communications perspective and trying to break the complicated chemistry to something that is bite size and digestible to the general public.^{xlvii}

As a result, aquariums are actively working to figure out how to communicate these difficult issues in a way that gets visitors to think differently and promote conservation learning and action. Research by The Ocean Project indicates that a person who comes to a zoo or aquarium has some openness to learn about conservation.^{xlviii} Additionally, research by the Climate Literacy in Zoos Education Network (“CLiZEN”) confirms this finding.^{xlix} CLiZEN employed the survey instrument used by the Yale Center on Climate Change Communication for the *Global Warming's Six Americas in May 2011* report to analyze perceptions of global warming at zoos.¹ According to an aquarium professional familiar with the research, “the takeaway from that is, according to the Six Americas segmentation, [visitors to] zoos and aquariums are skewed

heavily towards the concerned and alarmed sets. Heavily. And so our audiences are primed to be interested in this kind of [climate change] messaging.”^{li} As Mr. Plunkett noted, visitors are “not going to stand there and listen to a lecture for 15 minutes” however aquarium visitors do appear open to aquarium staff or volunteers inserting conservation messaging into their discussions “in a smooth way briefly with a little bit of style, maybe a little humor.”^{lii} In this way, the goal is not only to choose the right content, but also the right means of delivery. This is very challenging given the diverse ways that aquariums communicate with visitors and the general public.

Aquariums face other significant constraints. For example, they are limited by the short timeframe that they have to communicate with visitors. As James Covell, Senior Manager of Guest Experience at the MBA described, “one of the most limited resources for us is the visitor’s time and attention. We’re competing with a lot of other stuff. For example, you could sit and talk to me about plastics pollution or you could go over there and watch the hammerhead shark swim around... Well, I loose every time to that!”^{liii} As a result, aquariums need to recognize that “we live in a sound-bite world” and work to winnow the conservation messages into small nuggets that give visitors an understanding of the issue and also show them how to act on that information.^{liv}

Free Choice Learning:

William L. Boyd, President of the Field Museum of Natural History in Chicago, argues in his introduction to Dr. Falk and Dr. Dierking’s book, *The Museum Experience*, that the conditions of museum learning are very different from those of the classroom. For example, museum learning is self-directed rather than orchestrated by the instructor. Exhibits – live animals, and to a lesser degree written text – replace the teacher as the primary means of instruction.^{lv} According to a National Academies Study, *Learning Science in Informal*

Environments: People, Places, and Pursuits “contrary to the pervasive idea that schools are responsible for addressing the scientific knowledge needs of society, the reality is that schools cannot act alone, and society must better understand and draw on a full range of scientific learning experiences to improve science education broadly.^{lvi} Further, the report provides a detailed review of how informal science education is affecting science learning generally. All told, there is conclusive evidence that informal educational institutions, such as aquariums, play an important role in educating people of all ages about science.^{lvii}

For the purposes of this paper, I will adopt Falk and Dierking’s definition of learning: “people make meaning through a constant process of relating past experiences to the present, connect what is happening in the present to what has happened in the past... Learning is a dialogue between the individual and his or her social / cultural and physical environment; learning is a contextually driven effort to make meaning in order to survive and prosper in the world.”^{lviii} As a result, free choice learning is defined as learning that typically occurs outside of school and is characterized by being “free-choice, nonsequential, self-paced, and voluntary.”^{lix} According to Falk, the term also recognizes that learning is socially constructed and depends on the relationship between the individual learner and his or her sociocultural and physical environments.^{lx} Visitors do not employ academic or even conceptual schemes to organize what they see in museums or aquariums. Rather, they “assimilate events and observations in mental categories of personal significance and character, determined by events in their lives before and after the museum visit.”^{lxi}

As a result, Free Choice Learning theory is intimately tied to the visitor experience at an institution. First, one needs to understand why people freely choose to spend leisure time visiting museums. This is tied into the visitor expectations and agenda which may or may not

align with the institutional expectation for the visitor.^{lxii} Dr. Falk and Dr. Dierking have developed an interactive experience model to explain a visitor's experience within a museum, including an aquarium. According to this model, a visitor's experience depends upon three factors: a visitor's personal context, the social context and the physical context.

As Falk and Dierking note, personal context includes one's "personal reservoir of knowledge, attitudes, and experience."^{lxiii} A visitor's personal context also includes his or her expectations or agenda for the visit which is based on prior experience at the aquarium as well as prior knowledge of the topic addressed by the institution. Museums typically provide "predictable and specific experiences."^{lxiv} For example, visitors go to an aquarium with the expectation that they will see living fish in tanks. This "unspoken contract of expectations" is forged over time and based on real world experience with similar institutions.

The social context of the visit relates to whether the visitor comes as an individual or as a group, with kids or adults. People often visit aquariums as a family.^{lxv} As a result, the "the family museum experience is a social one and that social interaction plays a critical role in the experience."^{lxvi} As Dr. Paul Boyle, Senior Vice President for Conservation and Education explained in his interview, "people are coming because of the animals. But it turns out that once they are in the zoo or aquarium, it is much less about the animals and it's much more about the people, meaning it's about the social dialogue that's going on during a family visit that we believe is one of the prime reasons that they come to these institutions."^{lxvii} For example, parents use zoos and aquariums to teach their kids moral values. Dr. Boyle explains that studies have found that "parents are talking to their kids and saying 'oh look at the wild dog pups – see how the parents are taking care of him.'" They have a dialogue about caring for young and what [] that mean[s].^{lxviii} According to this perspective, aquariums need to recognize that people connect

with the marine life at their institutions through social and familial settings and in the context of broader moral values.

Finally the physical context of an aquarium is determined by the architecture, the exhibits and the floor plan, i.e. the specific tangible structures that define the physical space that makes up the institution.^{lxi} According to the interactive experience model, each of these contexts is continuously constructed by the visitor, and the interaction of these creates the visitor's experience. This constructed reality is unique to the individual; no two people ever see the world in quite the same way.^{lxx}

The Biophilia Hypothesis:

Dr. Edward O. Wilson, Museum of Comparative Zoology Faculty Emeritus and Emeritus Pellegrino University Professor at Harvard University, defined biophilia in his seminal work of the same title as “the innate tendency to focus on life and lifelike processes.”^{lxxi} Underlying this hypothesis is an assumption that biophilia is inherent to humanity, inherited evolutionarily and therefore linked to human competitive advantage and genetic fitness, and that it provides a self-interested justification for conservation (i.e. protect the natural world to protect one's own mental health).^{lxxii} Wilson, however, notes that there is more than merely an “urge to affiliate with other forms of life.”^{lxxiii} Wilson notes that by spending a “lifetime in a Magellanic voyage around the trunk of a single tree... humanity is exalted not because we are so far above other living creatures, but because knowing them well elevates the very concept of life.”^{lxxiv} Even in the face of environmental degradation and loss of biodiversity, E.O. Wilson has an optimistic outlook for humanity: “to the degree that we come to understand other organisms, we will place a greater value on them, and on ourselves.”^{lxxv}

The biophilia hypothesis proposes an underlying purpose for visiting an aquarium. Urban residents, disconnected from coastal and marine ecosystems and life can learn about and

connect to these natural resources at their local aquarium. Unfortunately, the scientific evidence that this innate human animal interaction exists is “still woefully scanty.”^{lxxvi} However, it still makes intuitive sense and aquarium professionals reference it in their education and conservation programming.^{lxxvii} As a result, it is difficult to assess to what degree biophilia can be used to “urge moderation in our [unsustainable] behavior.”^{lxxviii}

Conservation Psychology:

According to Susan Clayton and Gene Myers, the goal of conservation psychology is not only to decipher the connections between humans and the natural world, but also to promote a sustainable relationship.^{lxxix} In this way, the field is explicitly value driven and takes a prescriptive stance on how humans should interact with nature. The field, which traces its roots to the 1950’s, is also predicated on the underlying assumption that “environmental problems are a result of human behavioral choices, and addressing those problems will require changes in patterns of behavior.”^{lxxx} Conservation psychologists also assume that human behavior is the result of multiple causes – some rational, others irrational or unconscious – and finally that it is susceptible to change.^{lxxxi} Carol Saunders, a Faculty member at Antioch University New England, has asserted that conservation psychology should address how humans care and behave towards nature.^{lxxxii} Michael B. Mascia, a Senior Social Scientist with the World Wildlife Fund in Washington, DC expanded upon the purpose of conservation psychology by arguing that the discipline includes the study of human-to-human relationships that impact conservation, the interaction between humans and social institutions and, critically, how humans develop beliefs about nature.^{lxxxiii}

Conservation psychologists have conducted research about how urban residents connect to nature. Being exposed to wild animals that urban dwellers don’t see in their day-to-day life, visits to zoos and aquariums have been shown to inspire people to consider their relationship

with and responsibility towards the natural world.^{lxxxiv} In fact, Bruni et al. found that visiting a zoo and an aquarium spurred people to reflect on the connection between self and nature.^{lxxxv} In other words, zoos and aquariums “provide an opportunity to create and nurture a social identity that emphasizes connections to animals.”^{lxxxvi}

Social Capital:

According to Harvard Professor Robert Putnam, the overarching trend is simple: “for the first two-thirds of the twentieth century a powerful tide bore Americans into ever deeper engagement in the life of their communities, but a few decades ago – silently, without warning – the tide reversed and we were overtaken by a treacherous rip current. Without at first noticing, we have been pulled apart from one another and from our communities over the last third of the century.”^{lxxxvii} As outlined in his comprehensive book, *Bowling Alone: The Collapse and Revival of American Community*, Professor Putnam demonstrates that the decrease in civic engagement is widespread and “appears to be an equal opportunity affliction” without any specific geographic or demographic hotspot.^{lxxxviii} Social capital is expressed through “club meetings, visits with friends, committee service, church attendance, philanthropic generosity, card games, and electoral turnout” and reaps multiple dividends for individuals and communities.^{lxxxix} By conducting demographically matched studies, Putnam shows the multiple impacts of social capital. For example, people who vote are more likely to be interested in politics, donate to charitable causes, volunteer in their community, attend town hall meetings and partake in public demonstrations. Further, social capital has measurable impacts on child welfare, education, happiness and even government performance.^{xc} With the decline in social capital, people become disengaged from their community and opportunities for active civic engagement, such as a local or national election, instead become “background noise of everyday life, a fleeting image on a TV screen.”^{xc}

One challenge that Putnam identifies is that “nationalization and professionalization have redefined the role of citizen activists as, increasingly a writer of checks and letters.”^{xcii} He tracks how citizen activists who participate in civic engagement activities have been replaced by a professionalized workforce of environmental, non-governmental organizations. There was an “organizational eruption” between the 1960’s and 1990’s. According to Putnam, this represented a “proliferation of letterheads, not a boom of grassroots participation.”^{xciii}

This boom could have been a powerful force for the creation of social capital. For example, an important characteristic of an organization that promotes social capital is that it includes local chapters in which members can meet with one another. The expectations and benefits of membership are critical to determining the organization’s ability to spur social capital. Does membership mean “moving a pen” and “contributing money to a national office to support a cause” or does it mean contributing time and personal effort to advance the cause?^{xciv} When the expectations for active participation are high, members learn important civic and democratic skills such as how to run meetings, speak in public, write comment letters, engage in debates and express their views.^{xcv}

Driven by direct mail appeals from 1960 to 2000, membership in national environmental organizations exploded from 125,000 to approximately 6.5 million members. While this suggests a huge growth in “participatory environmentalism,” membership in these organizations “is essentially an honorific rhetorical device for fundraising.”^{xcvi} Many conservation organizations, including aquariums and zoos, see membership as a financial contribution. An individual can belong to multiple organizations and yet not be active in any of them. As Putnam explains, “what really matters from the point of view of social capital and civic engagement is not merely normal membership, but active and involved membership.”^{xcvii} Further, “such

organizations provide neither connectedness among members nor direct engagement in a civic give-and-take, and they certainly do not represent ‘participatory democracy.’ Citizenship by proxy is an oxymoron.”^{xcviii}

The Activation Point and the Framing Institute:

Aquariums need to build on the underlying theories of conservation psychology, biophilia, social capital, free choice learning and ocean literacy to use their educational programs to inspire people to act. Translating awareness to action is a complicated proposition. A variety of disciplines, including behavioral psychology, political science and cognitive science, are seeking to understand the connection between awareness and action. According to Kristen Grimm, President of the strategic communications firm Spitfire Strategies, “nonprofit organizations frequently set out to raise awareness of an issue. But it takes more than awareness to move people. Activation requires motivation: The audience must have the will to act.”^{xcix} Organizations need to develop communication strategies that draw on underlying frameworks of how social change is achieved. Merely telling people what the problem is – whether it is ocean acidification or overfishing – is insufficient. According to Spitfire Strategies, organizations such as aquariums need to identify and leverage the “activation points” of their visitors.^c An activation point occurs when “the *right people* at the *right time* are persuaded to *take an action* that *leads to measurable changes for important social issues*.”^{ci}

It is important to note that sometimes it is better to target a smaller audience to achieve an activation point. An organization needs to assess what level of active participation is necessary to spur the necessary social change. Perhaps a larger audience isn’t necessary to achieve the broader goal.^{cii}

Existing Networks and Organizations:

There are a range of existing organizations and networks that are currently working with aquariums to advance marine science and conservation. The purpose of this section is to outline the role of three of these organizations: The Ocean Project, the National Marine Educators Association (“NMEA”) and the AZA. Each of these organizations plays an important role. The purpose of this discussion is to identify existing strengths and weaknesses that impact an individual aquarium’s success in achieving its’ conservation mission.

The mission of The Ocean Project is to “inspire action to protect our world’s ocean.”^{ciii} Led by Bill Mott, the organization has organized a global network of 1,500 partner zoos, aquariums and museums to coordinate the development and dissemination of “cutting-edge research, tools, and related resources that help ZAMs engage their audiences to take personal action to protect our ocean.”^{civ} As Mr. Mott explained, The Ocean Project’s work is “not just education for education’s sake. But really education for action.”^{cv} The goal is to move the needle for conservation awareness and action. According to market research conducted by The Ocean Project, visitors look to aquariums to learn about solutions to the conservation challenges facing the ocean.^{cvi} In particular, The Ocean Project has identified youth and minorities, with an emphasis on English as a second language households, as audiences that have the highest potential “to shift the baseline in conservation participation.”^{cvii} The Ocean Project has developed materials and best management practices for targeting this audience with conservation messages. The Organization seeks to leverage this opportunity by sharing how various institutions are tackling this challenge.

Founded in 1976, the NMEA “brings together those interested in the study and enjoyment of both fresh and salt water and provides a focus for marine and aquatic studies all over the world.”^{cviii} Representing approximately 1,000 members, NMEA has local chapters spread out

across the country. Funded through membership and conference fees, this nonprofit organization is primarily volunteer driven. At the national level, the organization has approximately 20 standing committees on various topical issues as well as a governance committee comprised of three directors, one president, and representatives from each chapter.

In 2002, a wide range of individual experts and institutions, including NMEA members and partners, joined forces to develop a consensus position on ocean science education. According to this group, “ocean literacy is an understanding of the ocean’s influence on you and your influence on the ocean.”^{cxix} Over the course of the subsequent decade, the group expanded upon this basic concept and developed *Ocean Literacy: The Essential Principles of Ocean Sciences K-12* (2004) and the *Ocean Literacy Scope and Sequence for Grades K-12* (2008) which detail the essential information that people need to learn about the ocean and specific recommendations for how to incorporate this information into K-12 education.^{cx} There are seven principles of ocean literacy including “the ocean is a major influence on weather and climate,” “the ocean supports a great diversity of life and ecosystems,” and “the ocean and humans are inextricably interconnected.”^{cxii}

Currently, the national leadership is focused on getting the principles of ocean literacy into the National Science Education Standards that are currently being revised by the National Research Council.^{cxiii} The current standard, established in 1996, presents a vision for and an agenda to achieve a scientifically literate American populous. Dr. Payne noted in her interview that for the last generation and a half, Americans have not learned about the importance of the ocean in their formal elementary, middle and high school science courses.^{cxiiii} James Covell from the MBA also referenced the trend of decreasing scientific literacy in his interview. As he lamented, “the average American doesn’t know what climate is, let alone what climate change

is.^{cxiv} In an effort to rectify this trend, NMEA serves as a critical stakeholder for this process and will be reviewing and commenting on the draft standard in the coming month.

According to Dr. Diana Payne, the current NMEA President, over the course of its more than 35 year history, the organization has made a conscious effort to use partners and to not engage in conservation advocacy.^{cxv} Though NMEA is an independent nonprofit, it maintains close ties with state and federal government entities. The National Oceanic and Atmospheric Administration, Sea Grant and Bureau of Ocean Energy Management all support the work of NMEA. Additionally, some of the active volunteers work for these agencies.^{cxvi}

The Association of Zoos and Aquariums is a national proponent of field conservation and conservation education, and serves as a strong voice for the zoo and aquarium community before Congress and Executive Branch Agencies. The AZA Government Affairs Department is comprised of two full time staff. One works on Legislative issues and the other works on Regulatory issues. The AZA's legislative work is limited to a small number of laws that impact zoos and aquariums including the Endangered Species Act and the Marine Mammal Protection Act. The Government Affairs team also tracks appropriation bills that impact multi-species conservation funds, as well as funding for the Institute for Museum and Library Services and the National Science Foundation. According to Steve Olson, AZA Vice President for Government Affairs, the zoo and aquarium industry is heavily regulated by eight agencies including the US Department of Agriculture, the Fish and Wildlife Service (within the Department of the Interior), Homeland Security, the Centers for Disease Control, the Food and Drug Administration, the Occupational Safety and Health Administration, the National Oceanic and Atmospheric Administration, and the Environmental Protection Agency. While the AZA sets an over-arching five year strategic plan, the Government Affairs team has to remain agile and address issues as

they come up.^{cxvii} The AZA Government Affairs Department is supported by a lobbyist advisory group and an AZA Government Affairs Committee comprised of aquarium and zoo staff. The Department has also developed a legislative action center that members can use to easily submit letters to legislators. Typically, the AZA staff target specific institutions to submit letters in order to reach specific Representatives or Senators from their home districts.^{cxviii}

The Government Affairs Department does not typically lead an advocacy campaign. On occasion, however, member organizations, independent non-profits or non-profits collaborating with member organizations approach the AZA to become involved in a conservation advocacy campaign. For example, the MBA and the Seattle Aquarium were involved in banning shark finning and the National Ocean Policy process. Both institutions approached the AZA to sign-on to letters and add their voice to the campaign. Given the huge investment in resources necessary to run a campaign and the limited staff resources available, the AZA maintains a relatively tight focus on its legislative and regulatory agenda. As Steve Olson remarked, “80% of our job is either finding things for our members, like grant programs that they can get engaged in and making sure that grant money is there, or its’ protecting the ability of our members to do what they do.”^{cxix}

The story of the 2008 economic stimulus package stands out as a cautionary tale for the AZA Government Affairs Department. The thousand page stimulus bill from the House of Representatives included two sentences that restricted ARRA funding from being used by “zoos, aquariums, casinos, golf courses and swimming pools.”^{cxx} The AZA Government Affairs office tried to mobilize their members to remove the language. However, the AZA was ultimately unsuccessful and zoos and aquariums across the country lost access to millions of dollars of economic stimulus. As Steve Olson noted, the AZA learned that “we have good relationships in

Congress where we can either kill a bad bill or support a good one, but something which requires a vote, that requires a member to go to the floor, we were not good at doing that and that is why we changed our whole philosophy.”^{cxxi}

The remainder of this paper reviews how three different aquariums from three coastal states are tackling the challenges of ocean conservation in their own unique way. The institutions have well established reputations and are at different stages of leveraging that public perception to support solutions to complicated marine conservation challenges. By focusing on their human, institutional and biophysical ecologies, I seek to describe how each aquarium is successfully achieving its conservation based mission. These three institutions provide important insights into how to successfully educate and activate their audiences to support conservation.

The Seattle Aquarium:

Introduction:

Initially funded by a \$5.7 million King County Forward Thrust Bond, The Seattle Aquarium opened its doors to the public in 1977.^{cxxii} In 2005, the Aquarium adopted the new mission of “inspiring conservation of our marine environment.”^{cxxiii} With 92 people on staff, the aquarium generated \$13.2 million in revenue and attracted 791,842 visitors in 2010.^{cxxiv} Of the nearly eight hundred thousand visitors, 357,000 purchased standard tickets and 151,000 had membership. Just over forty-six thousand students visited the facility as a part of a school group of which 14,327 attended formal aquarium classes and 31,888 had self-guided tours.^{cxxv} The aquarium has also had a long standing program to distribute tickets for free admission to low income and underserved communities across the Seattle metropolitan area. In 2010, they distributed nearly 18,910 such tickets. The student and underserved programs are critical to diversifying the audience that can experience the aquarium. This is particularly important given

that the Morey Aquarium Attendance and Pricing Survey found that the Seattle Aquarium ranks 8th in overall attendance but 20th in terms of ticket prices.^{cxxvi} Given this disparity, the Aquarium is evaluating a two dollar admissions fee increase.^{cxxvii}

The Transition:

Historically, federal, state and local funding has had a tremendous impact on aquarium budgets. Many zoos and aquariums were founded as part of the City or State Park or Natural Resource Department. In North Carolina, for example, the state Department of Environment and Natural Resources still owns and manages the three aquariums at Roanoke Island, Pine Knoll Shores and Fort Fisher.^{cxxviii} The overarching trend, beginning with the last decade of the twentieth century, has been for government policymakers to either reduce their funding obligations or privatize aquariums.^{cxxix} The Seattle Aquarium's experience is emblematic of the evolving management structure and conservation agenda of aquariums across the country as they transition from government to nonprofit ownership and management. The management transition itself offers insights into how aquariums can successfully organize their institutions to tackle the challenge of marine conservation.

Robert W. Davidson, currently the CEO of the nonprofit Seattle Aquarium noted that “from the early days of the Seattle Aquarium, there was a recognition that aquariums and zoos around the country were shifting from public ownership and management to public ownership and nonprofit management.” Prior to the aquarium transition from a government to a nonprofit managed institution, Mr. Davidson had served as the CEO of the Seattle Aquarium Society, the nonprofit institution of the Aquarium when it was run by the city. He had overseen the transition of Seattle's Woodland Park Zoo from a government management regime to its nonprofit status in 2002. By all accounts, his experience and leadership along with that of several aquarium board

members and officials from the Seattle Department of Parks and Recreation, was critical to ensuring the successful navigation of the transition process.^{cxxx}

The idea of transitioning the Seattle Aquarium to nonprofit management has been floated in public settings since 1994 when Robert W. Davidson, then the President and Executive Director of the Woodland Zoological Society, proposed in an editorial that the aquarium and zoo be combined under a single nonprofit entity. The editorial noted multiple benefits of having a zoo and aquarium make the transition. For example, Mr. Davidson argued that the City needed to focus its energy on more pressing social problems, the increasing costs of public safety and insufficient public transit systems instead of the demands of owning and operating a public aquarium. Further, he noted that zoos and aquariums are experiencing rising costs because they have become complex institutions in order to respond to “sharply different cultural requirements” regarding higher animal husbandry standards, wildlife stewardship and expectations for the visitor experience. Davidson also argued that nonprofits would be successful at listening and responding to their visitors and would generate donor confidence in order to expand the funding base necessary to meet the challenges listed above. Another critical argument that Mr. Davison made in 1994 relates directly to the opportunities to freely explore its programming free from the bureaucratic shackles of government. He noted “another important advantage of the shift from city to nonprofit management is in efficiency. Governments do many things well, and some things can only be appropriately done by government. But a major zoo today needs relief from the bureaucratic processes, time horizons and rigidity that are in the nature of government.”^{cxxxix}

Further, Mark Plunkett, the Interim Director of Conservation and Education at the Seattle Aquarium stated the clear conservation benefits of making the transition: when the aquarium was

part of the City of Seattle’s Parks and Recreation Department, it was “simply not allowed to take advocacy positions – not appropriate for city employees to be doing that.”^{cxxxii} At that time, the aquarium would work with its non-profit membership arm, the Seattle Aquarium Society (“SEAS”). Freed, to inform its’ members and encourage a little participation but the institution was severely limited (Personal Communication, Mark Plunkett, Seattle Aquarium, January 12, 2012). By shedding these restrictions and this bureaucratic rigidity, zoos and aquariums can explore new educational programming, innovate technologically, and devise more aggressive conservation programs to meet the challenges facing the marine environment.

Though Mr. Davidson publicly proposed the transition in 1994, it would take more than a decade and a half to be accomplished. In 1994, the City of Seattle Central Waterfront Citizens Advisory Committee recommended that the City transfer management and control of the Aquarium to an independent nonprofit organization which would then raise \$150 million and replace the existing Aquarium with a new state-of-the-art facility.^{cxxxiii} In 2000, the Seattle City Council acknowledged that the Seattle Aquarium had “not kept up with developments in aquarium technology and presentation” when it was managed by the City Department of Parks and Recreation.^{cxxxiv}

In 2005, the Seattle Aquarium Society launched the New Currents capital campaign to raise money to pay for an 18,000 square foot expansion of the Seattle Aquarium.^{cxxxv} SEAS agreed to raise \$13.7 million in private funds to support the development.^{cxxxvi} According to Davidson, this “was the first time the Society had gone to the community. It gave the Society a full challenge and opportunity to prove itself.”^{cxxxvii} The Capital Campaign was successful and the expansion was completed on time and under budget. The new facility, including the 120,000 gallon Window on Washington Waters exhibit, opened to the public on June 22, 2007.^{cxxxviii}

Attendance rose 24%, earned revenue rose 47% and the Aquarium generated \$1 million in net revenue from events and sales at the café. These successes “opened the door with the City of Seattle to assume management and operation of the Seattle Aquarium.”^{cxviii}

On July 1, 2010, SEAS entered into an agreement with the City of Seattle to take over operation and management of the Seattle Aquarium. The purpose of the Management and Operations Agreement (“MOA”) is to “provide the greatest opportunity for success of the Aquarium in fulfilling its mission in education, conservation and recreation, providing benefits to the citizens of Seattle, and developing the Aquarium as an important civic asset, cultural resource and attraction.”^{cxix} With a 20 year time horizon, the agreement maintains City ownership of and maintenance responsibilities for the Pier and facilities, and a near term fiscal commitment from the City of \$8 million from 2010 to 2016.^{cx} This is particularly important given that the City’s Department of Parks and Recreation deferred “a substantial amount of Capital Maintenance,” such as for the pier pilings and saltwater pump.^{cxii} SEAS is required to invest \$5 million by June 30, 2020 and “use its best efforts” to raise a minimum of \$15 million by June of 2030.^{cxiii} Further, SEAS is required to develop a strategic and master plan for the future Aquarium.^{cxiv}

Further, the MOA establishes clear requirements for the composition and qualifications of the non-profit Aquarium’s Board of Directors. For example, the MOA grants the Mayor of Seattle, Chair of the City Council and the Superintendent of the Department of Parks and Recreation the authority to each appoint one person to the Aquarium’s Board of Directors.^{cxv} The MOA also stipulates that the Board must include individuals with expertise in accounting, architecture, business, education, management, law, marine biology and oceanography.^{cxvi} As a result, the Seattle Aquarium has a relatively large Board of Directors comprised of 45 individuals.^{cxvii} Additionally, the MOA requires that, to the extent practicable, the Board of

Directors should operate in compliance with the Washington State Open Public Meetings Act. In other words, as an accountability measure, the meetings of the non-profit's governing body shall be open to open to the general public and voting shall not be by closed ballot.^{cxlviii} In this way, the City, and by extension the residents of Seattle, maintain a mechanism for public input and review of the Aquarium's activities. This establishes an important institutional and civic arrangement between the non-profit and government.

The MOA also required the nonprofit managers to develop a strategic plan within 18 months of the transition. Therefore, with support from the Bill and Melinda Gates Foundation and the Norcliffe Foundation, the Seattle Aquarium developed a new strategic plan that identified eight overarching goals and 52 objectives designed to help guide the institution through the year 2030. For example, the Seattle Aquarium strives to be the "region's premier platform for marine conservation education" and "connect people to the life-sustaining oceans through a focus on Puget Sound and the Pacific Ocean."^{cxlix} Additionally, the strategic plan outlines the Aquarium's intent to "build our role as an authentic and uniquely Seattle aquarium at the center of the City's great new Waterfront, serving the entire Puget Sound region."^{cl} The latter strategic goal explains why the Aquarium has been actively involved and promoted visitor participation in the Elliott Bay Seawall and Central Waterfront development planning process.

The Conservation Department: Embryonic Stage

The Seattle Aquarium has a small but devoted Conservation Department staff of two people. Through the leadership of the Interim Director of Conservation and Education / the Conservation Curator, Mark Plunkett, the program has evolved and expanded to meet new challenges. Mr. Plunkett has worked at the Seattle Aquarium for 27 years.^{cli} As he noted in his interview, he works inter-departmentally and seeks to bridge the education, research, conservation, facilities and operations departments around the common theme of conservation.

After the Seattle Aquarium adopted its new conservation mission in 2005, he observed that “it became clear to me that there wasn’t one particular job at the aquarium that was focused on really advancing as much conservation as we could possibly do, so I asked to have my position reworked so that I could help accomplish this new strategy, this new mission.”^{clii} As a result, he relinquished most of his traditional education program activities – teaching art classes, working with teachers, writing content for exhibits – and took on the challenge of working on Aquarium policy, facilities and operations, research and marketing to coordinate the conservation agenda across the Aquarium.^{cliii}

Mark Plunkett explained that the Aquarium’s position on conservation is still evolving since the transition in 2010:

At this point, as I am speaking to you in January of 2012 we are discovering what it means to have the freedom to be more active with our visitors and membership around advocating marine policy issues...it’s embryonic at this point, but when we see an issue that seemingly would call for a response from the Seattle Aquarium, then I’ll work with a small nucleus of folks here and we’ll development something.^{cliv}

For example, prior to his interview Mr. Plunkett was reviewing the National Ocean Council’s Draft National Ocean Policy Implementation Plan and preparing a comment letter for review by a group of Board Members as well as by the CEO. This type of conservation work occurs behind the scenes and is restricted due to limited staff capacity. However, after the CEO and Board Members are comfortable with the language of the letter, he will solicit feedback from The Center for the Future of the Oceans at the MBA as well as from the Conservation and Government Affairs Departments at the AZA.^{clv} When it comes to its public face, the Aquarium is taking a “softer tone” on marine conservation policy issues because, as Mr. Plunkett described, “we don’t know if we yet have that permission from our visitors.”^{clvi} People expect organizations

like People for Puget Sound to do advocacy, however the Seattle Aquarium needs to build trust and develop a relationship with its visitors and members before it can take on aggressive advocacy stances.^{clvii}

The Seattle Aquarium's "softer tone" is reflected in its Internal Revenue Service tax submissions.^{clviii} In 2009, the Seattle Aquarium spent \$1,500 on lobbying to influence a legislative body (i.e. direct lobbying to elected officials). According to the IRS regulations, given their other exempt expenditures, the Seattle Aquarium could have devoted \$345,405 lobbying. Further, the Aquarium could have spent \$86,351 on grass roots lobbying in 2009. In reality, they didn't spend any money on grassroots lobbying.^{clix}

The "Aspirational" Aquarium:

On July 1, 2010, the Seattle Aquarium hosted an official ceremony to mark the transition from government to nonprofit management. The newly inaugurated CEO, Robert W. Davidson declared that "The Seattle Aquarium aspires through its example to help define the role of a great Aquarium in the 21st century as a catalyst for public engagement in the wonder, science and future vitality of the oceans and Puget Sound."^{clx} To achieve this goal, he noted that the Aquarium strives to be a leader in the life sciences, interpretive exhibits, research, public policy and economic impact, as they relate to marine science and conservation.^{clxi}

This long-term vision for the Aquarium helps staff prioritize their actions. As Mr. Plunkett explained, sometimes Robert Davidson will tell him that he has a good idea for the Conservation Department but, given staffing constraints or other factors, the Aquarium is not ready to take on the new work. "Some things are just not going to happen now. It doesn't mean kill them. But it has to be measured and in the right time. In the fullness of time, [conservation work] will have more capacity."^{clxii} As a result, the Seattle Aquarium must build towards its aspirational goals by taking several intermediate steps.

In order to measure progress and improve its success at achieving its conservation mission, the Seattle Aquarium has worked with the University of California, Berkeley's Lawrence Hall of Science's Marine Activities, Resources and Education Department on their Reflecting on Practice professional development project.^{clxiii} Through trainings where educators video record themselves and then critique their presentations, the goal of this collaboration is to learn the best practices for communicating science. The Seattle Aquarium has sent multiple staff to these trainings and has brought experts from the Bay Area to Seattle to advise the Aquarium on how it can insert these practices and develop new ways of framing and delivering educational messages.^{clxiv}

The Current State of Affairs:

William D. Ruckelshaus, Seattle Aquarium Board of Directors member, past member of the U.S. Commission on Ocean Policy and former co-chair of the Puget Sound Partnership noted that "The U.S. Commission on Ocean Policy cited aquariums as a key focal point to increase ocean awareness and action. The Seattle Aquarium is stepping up to its responsibility in exemplary fashion. The Puget Sound need is urgent."^{clxv}

The Seattle Aquarium has a multifaceted conservation program that emphasizes local ecosystems. This is in part driven by the MOA which requires that SEAS "pay particular attention to exhibits and conservation education focusing on Puget Sound, the Salish Sea, and the waters of the Pacific Northwest."^{clxvi} This is reflected in the Aquarium's exhibits, which are primarily devoted to the marine ecosystems of the Puget Sound and Pacific Northwest. According to Mr. Plunkett, 90 percent of the floor of the Aquarium is devoted to the Pacific Northwest, Puget Sound and ocean waters of Washington State.^{clxvii} One of the most prominent exhibits is the Window on Washington Waters. Located at the main entrance to the Aquarium, this 120,000 gallon tank recreates coastal and Puget Sound habitat and displays over 800 fish and

invertebrates native to the Pacific Northwest.^{clxviii} There are other exhibits that display coral reef fish from Hawaii as well as sea dragons from Tasmania.

The Seattle Aquarium also actively works on species conservation. For example, the Aquarium manages the AZA studbooks for sea otters, puffins and the lined seahorse. Studbooks track the pedigree and demographic history of each individual of a species that is held in captivity.^{clxix} The Aquarium's research scientists also conduct research and cutting edge field work to advance the scientific understanding and conservation of Washington State's population of sea otters.

The Seattle Aquarium has also established a strong presence outside of its facility. Through its Beach Natural Program, 100 Seattle Aquarium volunteer naturalists canvassed 180 Puget Sound beaches and spoke with 34,944 beachgoers in 2010.^{clxx} In this way, the Seattle Aquarium's reach expands beyond the physical constraints of its facility in downtown Seattle to promote conservation across a wide swath of the Puget Sound basin.

Collaborations and Partnerships:

The MOA specifically encourages the SEAS to partner with local, regional and national organizations, such as the University of Washington, the Puget Sound Partnership and the National Science Foundation, in order to advance its conservation mission.^{clxxi}

The Seattle Aquarium has also established a COSEE Ocean Learning Communities center and has partnered with Sound Citizen, The University of Washington's Institute of Science and Mathematics Education and the UW Ocean and Coastal Interdisciplinary Sciences GK-12 program to promote marine science and conservation education.^{clxxii} The Seattle Aquarium has also partnered with the Woodland Park Zoo, Pacific Science Center, Museum of Flight, Burke Museum, Islandwood and KCTS (the local PBS station) to coordinate and promote Science, Technology, Engineering and Mathematics education.^{clxxiii} Recently, the Seattle

Aquarium has developed climate change education programs in collaboration with the Ocean Change Education Aquarium Network, the NW Zoo and Aquarium Alliance, the UW Climate Impacts Group and the UW School of Museology. The collaboration has co-hosted a climate change workshop and shared educational materials.^{clxxiv}

Green Maintenance and Operations:

According to Mr. Plunkett, the Seattle Aquarium strives to implement green practices, but still has a long way to go. At this point, he sees the local zoo in Seattle as the leader in green operations, but the Seattle Aquarium is learning and working to improve how it does business.^{clxxv} For example, it is participated actively in the AZA climate initiative and green practices working group, used green building techniques during its 2007 expansion (including a solar hot water heating system and demonstration for the Aquarium Café).^{clxxvi}

Staff Leadership:

The individual leadership and personal drive of the Seattle Aquarium staff and Board has had a tremendous impact on the Conservation Department as well as on conservation issues in the Pacific Northwest. It is important to view the institutional story as a collection of individual efforts. The passionate, motivated and devoted individuals on the staff have made lasting contributions to marine resource conservation. One story stood out as emblematic of this impact. During the course of the interview, Mark Plunkett described how he spent 13 years working to create 150 acres of marine reserves along Seattle's shorelines. On his own personal time, he rallied his colleagues and friends to promote a city ordinance that would protect the wildlife along Seattle's intertidal zone. He had seen collectors take animals from the beaches and, as he explained, "I just got really angry with that."^{clxxvii} So he worked tirelessly to make collecting wildlife at certain popular beaches illegal. These personal actions illustrate the capacity and

devotion of the Seattle Aquarium staff. Drawing on this impressive wellspring of ideas and energy, the Seattle Aquarium will be able to achieve its aspirational conservation goals.

The New England Aquarium:

Introduction:

Opened in 1969, the NEAq is one of the premier aquariums in the United States and stands as a “global leader in ocean exploration and marine conservation.”^{clxxxviii} The Aquarium strives “to protect the blue planet through hands-on programs, live animal and interactive exhibits, public lectures and forums, and research and conservation projects.”^{clxxxix} The NEAq’s mission is to “increase understanding of aquatic life and environments, to enable people to act to conserve the world of water, and to provide leadership for the preservation of sustainable use of aquatic resources.”^{clxxx} Conservation has been the central purpose of the Aquarium since 1992 when the Board of Directors adopted the mission “to present, promote and protect the world of water.”^{clxxxxi}

With over 1.3 million visitors a year and approximately 6,500 members, the institution is a regional and global leader for ocean exploration and marine conservation. The average visit to the NEAq typically lasts one hour and thirty minutes.^{clxxxii} Its exhibits seek to illustrate the beauty of the marine environment and revolutionize the way aquatic life is displayed, interpreted and cared for. For example, in 1982, the NEAq was the first institution to establish an interactive tide pool touch tank, known as the Edge of the Sea exhibit.^{clxxxiii} This exhibit redefined the visitor experience at aquariums by giving children (as well as older visitors) the chance to physically interact with living marine life. Visitors were encouraged to dip their hands into the cold water and experience firsthand what it would be like to live in Boston Harbor.^{clxxxiv} Additionally, the NEAq is also the only US aquarium to have a major research laboratory on site.^{clxxxv}

Conservation and Education Program:

The NEAq has three mission related departments including Conservation, Education and Research. While these are distinct Departments, their projects often overlap. For example, the Research Department manages the “longest-running and most comprehensive North Atlantic right whale research and conservation initiative in the world” and has also worked to realign shipping lanes to protect whales.^{clxxxvi}

The NEAq was the first aquarium in the country to establish a conservation department.^{clxxxvii} As Heather Tausig, Vice President for Conservation, explained, the Department has four main projects: sustainable seafood, marine protected areas, the ocean health index and the marine conservation action fund.^{clxxxviii} There are twelve staff who work on the Sustainable Seafood project, two work on the marine protected areas work, four people manage the ocean health index and one person administers the action fund. The Department derives its funding from private foundations and private companies that partner with the aquarium.^{clxxxix}

The Conservation Department has thought carefully about what conservation messages are appropriate and effective for different segments of their audience. For example, in the main building, the Conservation Department has included conservation messaging from the sustainable seafood project in the Gulf of Maine exhibit. Additionally, the seafood program has partnered with a range of corporate partners including popular grocery stores in New England. The Aquarium has leveraged this partnership to not only alter corporate seafood purchasing practices, but also educate seafood consumers when they are shopping. For example, Giant Grocery company includes aquarium messaging in their stores to help encourage consumers to make healthy, sustainable seafood choices.^{cx} In other arenas, the Department has made the conscious choice to only spotlight their work and not encourage their audience to become involved. For example, the Department uses social media and blogs to promote its marine

protected areas work in the Phoenix Islands. The messaging for the general public around this work does not always include information about how individuals can help out.^{cxci}

Politicians and nonprofit advocacy organizations frequently ask the NEAq to weigh in on conservation issues such as the groundfish fishery management plan, the national ocean policy, or catch shares. Heather Tausig explained that “unless it is clearly stated or clearly evident, at least to us, we don’t often take an advocacy position around particular issues that don’t acknowledge some of the consequences.”^{cxcii} The Aquarium has an unstated goal of “not being one sided without acknowledging the either unintended consequences or implications of things.”^{cxciiii} This is reflected in the recent IRS tax submissions. According to the NEAq’s 2010 990 form, the Aquarium spent \$74,776 on lobbying expenses to influence a legislative body. According to the IRS regulations, they were entitled to spend one million dollars. Additionally, though they were entitled to spend \$250,000 on grassroots lobbying, they did not allocate any funding for this type of work.^{cxciiv}

Communicating about Climate Change:

The Aquarium is a national leader in climate change education. Over the last decade, the Education Department at the NEAq has developed a comprehensive climate change program that seeks to understand and then share how to communicate about this challenging topic. This emphasis on verbal communications reflects the fact that the Aquarium has “a lot of space constraints in our building as one of the older buildings in the United States. So we do a lot more intensive focus on what we can deliver through our staff verbally than what we do within the layout of where people are walking.”^{cxciiv} The Aquarium’s climate education work can be broken down into several components. In collaboration with the National Aquarium in Baltimore (“NAIB”), the Aquarium of the Pacific in Los Angeles, the Birch Aquarium in La Jolla, the Vancouver Aquarium in British Columbia and the MBA, NEAq has launched a

learning group to develop a model for how to communicate the science and conservation messages associated with climate change. The six aquariums in the learning group are also working with the Frameworks Institute, a research and consulting firm that focuses on strategic communications.^{cxv} Dr. Paul Boyle from the AZA explained the underlying premise of this work. While zoos and aquariums are trusted conservation messengers, “we’ll have one chance to interact with the public about climate from a zoo’s [and aquarium’s] perspective and so I want to get it right.”^{cxvii} As a result, NEAq is leading a comprehensive effort to ensure that what they learn is disseminated widely. As of 2010, NEAq and the Frameworks Institute had trained approximately 1,000 educators at six other aquariums to engage in climate change interpretation with visitors.^{cxviii}

Though the final conclusions of the learning group are still forthcoming, they have agreed on an overarching approach. As one of the leaders of the group noted in an anonymous interview, aquariums need to take a “wide angle lens” and foreground the broader issue of climate change. Next, aquariums need to talk about the issues in terms of underlying American values, such as Americans as innovators, how we strive to be responsible in the world and want to be a part of something larger than ourselves. While the Frameworks Institute is still conducting additional market research on these messages, initial results show that this is a successful way to discuss climate change.^{cxix} Next, the learning group has determined that aquariums need to use a causal sequence that illustrates the specific implications of the scientific findings (for example, the atmosphere serves as a heat trapping blanket, with climate change, temperatures will increase which will cause coral reef bleaching). Critically, the Aquarium must also discuss solutions with its visitors so that individuals can take specific actions to address the causal sequence.^{cc} As a staff member at the NEAq noted, “our challenge is to have people

approach an exhibit and think [that] seeing these animals is about seeing a piece of the world that I'm in and that my life is connected to.”^{cci} The staff member acknowledged that it is a sizeable challenge to get visitors to understand that, when they see something in a tank, “it’s about experiencing something that is really a part of the world we live in all the time whether or not we are standing in front of that exhibit.”^{ccii} In this way, the NEAq seeks to stimulate its visitors to think about systemic issues and connect their daily life and personal values to the ocean in order to spur action.

The second facet of the NEAq climate change education program is to develop a national network of aquariums to create a system to share information and collaborate to address climate change. Funded by the National Science Foundation (“NSF”), NEAq has organized the National Network for Ocean Climate Change Interpretation (“NNOCCI”) in order to form a broad community of education practitioners from ten aquariums. The Frameworks Institute has led a “series of workshops, homework assignments, webinars, an active Blog and collaborative messaging projects” train members of the aquarium community to address climate change in their work with the public.^{cciii} Overall, NEAq recognizes that aquariums and zoos “have to learn as a community” and that collaboration and dissemination of information is critical to achieving its conservation mission.^{cciv}

In 2009, the NEAq installed Live Blue kiosks on the floor of the Aquarium. Designed to “encourage visitors to take action toward marine conservation efforts worldwide,” the kiosks include information and recommendations about how individuals can lessen their impact on the ocean.^{ccv} For example, the live blue recommendations include suggestions for reducing greenhouse gas emissions and purchasing sustainable seafood.

Teen Programs:

The NEAq is a leader in teen programming. The Aquarium has developed a comprehensive program targeting youth ages 13 to 19. The Aquarium offers World of Water (“WOW”) Courses for students in grade 8 – 10 to learn about marine science and “build skills for problem solving, leadership and environmental stewardship.”^{ccvi} The Aquarium has also developed the live blue Ambassadors program where teens 13 and up engage in different service learning activities including coastal and aquatic habitat clean-up and restoration, public outreach and citizen science. Designed to give students an opportunity to earn community service credits, the program also seeks to instill an understanding of marine science and foster a stewardship ethic.^{ccvii} The Aquarium offers a series of science camps, including the Harbor Discoveries Camp during the summer. Recently the Aquarium launched the Sea TURTLE Dive Program (Teen Underwater, Research, Training and Learning Expedition). This program offers 10 teens the chance to get scuba certified and learn about marine conservation and research in the Bahamas.^{ccviii} Finally, the Aquarium has a well-developed teen volunteer and paid summer internship program for youth living in Boston, Chelsea and Cambridge, Massachusetts. Over 700 inner city teens have participated in the paid program since its inception. All together, the teen program has been celebrated for its success in increasing “teen’s understanding of ocean threats, knowledge of Aquarium Conservation Programs, and personal involvement in conservation actions.”^{ccix} According to the Aquarium’s own publications, the program is recognized as “one of the most innovative and inspirational opportunities available for young people in the region.”^{ccx}

Monterey Bay Aquarium:

Introduction:

Proposed in 1977, the Monterey Bay Aquarium's history is intimately connected to a group of marine biologists from Stanford University and several members of the Packard family, including David and Lucile Packard and their two daughters Nancy Burnett and Julie Packard. This initial cohort established the Monterey Bay Aquarium Foundation. With a one-time personal gift of \$55 million from David and Lucile Packard, the MBA Foundation set out to design and construct an aquarium on the site of the last operational sardine cannery in Monterey Bay. According to the MBA website, while David and Lucile intended the aquarium to be self-sustaining by the time it opened to the public, they still played an active role in the early decisions facing the nascent institution. For example, Lucile hand selected many of the building's interior finishes, including quartz tiles and wall colors. David also played an active role and helped design some of the exhibits, including the wave machines for the Kelp Forest and Sandy Shore Aviary.^{ccxi} After seven years of "dreaming, planning and construction," the MBA opened on October 20th, 1984.^{ccxii}

The Monterey Bay Aquarium is currently staffed by approximately 420 employees – making it one of the largest aquariums in the world.^{ccxiii} MBA also has over 1,250 volunteers who collectively worked nearly 157,000 hours in 2009.^{ccxiv} In 2010, over 1.8 million people visited the Aquarium and over 80,000 school children visited the institution free of charge.^{ccxv} The Aquarium's website attracted more than 8 million visitors. After its first 25 years in operation, approximately 46 million visitors had come to the Aquarium. According to the latest population survey conducted by the Census Bureau, the population of California is slightly over 38 million people.^{ccxvi} To some degree, all these people are part of the human ecology of Monterey Bay.

By navigating the MBA's 175,064 square feet of exhibits and public spaces, visitors not only have the chance to discover the diversity of plants and animals that inhabit the Bay, they also learn how they can protect the Bay by making more sustainable lifestyle choices and participating in state and federal marine conservation policy.^{ccxvii} This conservation agenda is intentional and is the direct result of the Aquarium's mission to "inspire conservation of the oceans."^{ccxviii} While MBA was founded with a strong conservation ethic, the Aquarium focused its mission on this important topic in January of 1997. Thus, the Aquarium's "concise, accessible, and to-the-point" mission establishes conservation education and action as the organization's top priority.^{ccxix} As MBA's Executive Director, Julie Packard, notes in the latest annual report, "at the root of our work, however, are people – and the power we have to reach and inspire them to care about, and care for our oceans."^{ccxx}

Prior to adopting its current mission statement in 1997, MBA had more neutral conservation goals focused on raising awareness.^{ccxxi} The shift to inspiring conservation action required a shift in the organization's culture. At that time, James Covell oversaw the docent program comprised of 500 volunteers. MBA used its volunteers as proxies for future visitors to test out its new conservation messaging. Staff learned quickly that they needed to be careful about conservation messaging. As Mr. Covell explained, "we decided early on that our conservation messages need to come from a real positive, hopeful place."^{ccxxii} Instead of using fear as the basis for conservation, MBA decided to establish a can-do tone and promote constructive, achievable actions for their visitors.^{ccxxiii}

The Aquarium stands as a model of conservation: it has integrated this work into every facet of its programs and operations. The Aquarium's exhibits include conservation messages. For example, the Real Cost Café lets visitors learn about sustainable seafood by having them

choose seafood dishes from a menu.^{ccxxiv} The MBA conducts a range of scientific research on otters, great white sharks, tuna and other species endemic to Monterey Bay. The scientists work to educate policy-makers, visitors and the general public about the conservation implications of their findings.^{ccxxv} The Aquarium has also adopted environmentally responsible business practices – sourcing sustainable seafood at its café and renovating the facility according to US Green Building Council standards.^{ccxxvi}

In 2004, the Aquarium innovated by creating the Center for the Future of the Oceans (“CFFO” and the “Center”) as a department of the Aquarium in order to inspire action for conservation of the oceans. The Center seeks to “empower individuals, influence policy and contribute to the protection of the oceans” by focusing on four key priorities: 1) marine protected areas, 2) federal ocean policy reform, 3) sustainable seafood, and 4) protecting wildlife and marine ecosystems.^{ccxxvii} According to Michael Sutton, Director of the Center, CFFO’s biggest strength is that it is a part of the Aquarium. The Center’s strategic plan is fully integrated into the Aquarium’s strategic plan so that new exhibits and educational messaging is synergized with existing advocacy campaigns.^{ccxxviii} The Center has cultivated an Ocean Action Team comprised of approximately 2,000 visitors and members. This group has been mobilized to “write letters, attend public hearings and speak out on ocean conservation issues ranging from marine protected areas to...sea otter legislation.”^{ccxxix} In 2011, MBA took a prominent marine conservation advocacy stance by sponsoring California State Bill AB 376, a bill to ban the trade in shark fins. CFFO employees helped train MBA educator staff and volunteers to raise awareness and support for the bill among visitors. CFFO complemented its educational outreach campaign with direct lobbying in Sacramento.^{ccxxx} The Center hired the Conservation Strategy Group, a Sacramento-based consulting and lobbying firm.^{ccxxxi} This firm not only assists MBA with ocean

conservation advocacy at the California State House, but also was contracted to consult on donation strategies. This illustrates one way in which MBA is working to integrate its fundraising and advocacy strategies.^{ccxxxii}

In part, the MBA's conservation work is bolstered by the organization's financial strength and stability. As James Covel remarked, conservation work is "well-supported at the Aquarium" so that if his staff has an idea, they can typically find funding to make it work.^{ccxxxiii} According to the California Office of the Attorney General, the Aquarium had assets of \$289.8 million in 2009. This is up from \$181.9 million in 2002.^{ccxxxiv} Therefore, at the same time that the organization established the CFFO and increased its advocacy and lobbying efforts, its assets increased nearly 60%. As of 2010, the most recent year for which financial records are available, the Aquarium had \$203.43 million in operating funds and \$62.28 million in its endowment.^{ccxxxv} According to Michael Sutton, this is the largest aquarium endowment in the country.^{ccxxxvi} The Aquarium also earned \$31.4 million from admission fees and \$9.14 million from membership fees.^{ccxxxvii} The Aquarium is also fortunate to receive large contributions from private individuals. According to the MBA Consolidated Financial Statement, the Aquarium had two donors during FY 2010 and three donors during FY 2009 whose individual pledged donations each accounted for more than 10% of the total pledge receivable balance. When combined, the donor pledges accounted for 53% and 73% of the total pledges for 2010 and 2009 respectively.^{ccxxxviii}

Like conservation advocacy non-governmental organizations ("NGO"), such as the Natural Resources Defense Council, MBA has made conservation a part of its brand. However, unlike a traditional conservation NGO, the Aquarium has both an authority and an attraction brand that it can use to support its conservation agenda. As Michael Sutton explained, MBA has

an authority brand – it is perceived by the community to be a credible source of information about marine science and conservation. Unlike traditional conservation NGOs, the Aquarium also has an attraction brand. Its facility – the physical bricks and mortar structure – attracts visitors and helps establish its reputation within the community. Mr. Sutton noted that politicians are drawn to aquariums and often use the Aquarium as a backdrop to make important conservation announcements. In this way, politicians recognize that the general public is drawn to the attraction brand of the Aquarium. The attraction and authority branding of the Aquarium support its conservation message and visa-versa. As Michael Sutton noted, “MBA is a better aquarium because we have a strong conservation program.”^{ccxxxix} Thus, the Aquarium has rooted its success as a brand on a foundation of conservation work.

The following sections explore how the MBA is able to successfully implement this multi-faceted conservation agenda. Drawing on the Total Ecology Framework, I outline the organization’s strengths according to the Human, Institutional and Biophysical Ecologies of Monterey Bay.

The Human Relationship to Monterey Bay:

The opening of the MBA in 1984 marked an important turning point in the human ecology of Monterey Bay. For the prior 300 years, humans were primarily connected to the ocean through resource extraction. Now, tourism and government represent two of the three largest economic sectors in Monterey County.^{ccxli} A mere 10.6% of Monterey’s workforce is employed in farming, forestry and fishing and, given the agricultural nature of the area, it is likely that most of those individuals were not engaged in a marine-based economy.^{ccxlii} Further, of Monterey County’s top nine attractions, as defined by the local tourism board, six involve the ocean or coast.^{ccxliii} As a result, the tourism industry, led by the Aquarium, is redefining people’s connection to the marine environment.

According to US Census data, approximately 661,000 people lived in the two counties bordering the Bay in 2008. The purpose of the Aquarium is to show the local residents and other Aquarium visitors that they “affect, are affected by, or are otherwise concerned” with the biophysical ecology of the Bay.^{ccxliii} The Aquarium connects residents, visitors and the general public through a variety of channels. At the highest level, the Aquarium is overseen by a twelve member Board of Trustees. Drawn primarily from private sector businesses, academic institutions, non-profit charitable foundations, and MBA partner organizations, these community leaders broaden the reach of the Aquarium and connect MBA to a diverse range of organizations at the local, state, national and international levels.^{ccxliv}

MBA makes a concerted effort to study its visitors and members of the general public through a combination of focus group analysis, market research and opinion surveys. They conduct this research before, during and after visits to MBA to gauge the effect exhibits and conservation messages have on different audience sub-populations.^{ccxlv} Even though some of this information is proprietary, the Aquarium makes a point of sharing their findings with other aquariums and zoos in order to demonstrate that conservation messages and advocacy are not only possible but effective. Further, the Aquarium also hires consultants to perform summative evaluations “to understand how visitors engaged with and interpreted the content” of various exhibits.^{ccxlvii} Observers monitor how long visitors spend in the exhibit and how they interact with specific exhibit components. Evaluations also typically include in-depth interviews with visitors to assess their response to the exhibit and the conservation messages. In this way, MBA reviews its performance and continuously learns about their visitors to better inform future exhibits and conservation messaging.^{ccxlvii}

As a result of this type of work, MBA knows a lot about its visitors and members. For example, the MBA audience is comprised mostly of residents from California and the San Francisco Bay area. According to Mr. Covell, a high percentage of visitors are professionals with high incomes and green values. Further, the majority of visitors come in groups. Approximately 60% of the group parties only include adults while 40% include adults and children. Further, 60% of all guests are return visitors. This high rate of return illustrates that the Aquarium is doing something right and that it has the chance to share its messages with the same individual on multiple occasions. As a result, MBA writes its' messaging for an 8th grade level whereas most institutions target a 4th grade level of proficiency. Ultimately, Mr. Covell explained that “we have a pretty good sense of who our audience is and we tend to design exhibits for that audience. So that means because we have an audience with green values to a large extent we can get away with conservation messaging here that maybe other institutions with other audiences would not be very successful with.”^{ccxlvi}

The MBA has multiple offices that collaborate internally to develop conservation messaging. For example, the Audience Research Department oversees the summative evaluations to measure what and how people are learning at the Aquarium. The Communications Department oversees media outreach and has developed expertise in new media, including social media and networking. The Marketing Department conducts ongoing audience segmentation studies of the broader Monterey and Bay Area community. The Guest Experience Program oversees the interpretation staff and docents that interact with visitors on the floor of the Aquarium. Finally, the Center for the Future of the Oceans staff identify conservation issues and help design messaging that can help it advance given the political or policy context.^{ccxlix}

While the human ecology of Monterey Bay has shifted away from a relationship based on resource extraction, the Aquarium is designed to preserve the historic character of Cannery Row and remind visitors about the important legacy of human uses of the marine environment. The Aquarium sits on the site of the old Hovden Cannery facility, the last operational cannery in Monterey. From afar, the Aquarium's jumbled, chaotic roofline resembles the hodge-podge array of old canneries that used to line the Bay. The Aquarium's architect, Charles M. Davis of the firm Esherick Homsey Dodge and Davis intended the building to reflect "the nature of Cannery Row itself – seemingly chaotic, a hodgepodge of roofs."^{ccl} The Aquarium also replaced the original Hovden Cannery smokestacks with fiberglass replicas and displayed the original cannery boilers, "the most essential equipment in the canning process," responsible for generating steam used to cook the fish, power the machines and clean the cans.^{ccli} Finally, the Aquarium retooled the cannery pump-house so that instead of pumping sardines from fish hoppers, it now brings sea water from Monterey Bay into the Aquarium for use in the exhibits.^{cclii}

Navigating a Complex Seascape:

The MBA operates within a complex institutional and legal framework. As mentioned above, the Aquarium's Conservation Program advocates for specific marine policies and laws at the State and national level. As outlined below, MBA has been successful in promoting marine conservation action for several reasons: 1) it is very careful to operate within the legal constraints mandated by its 501 (c) (3) non-profit tax status, 2) it actively forms partnerships and joins coalitions to amplify its reach and strengthen its message, and 3) it formally and informally participates in the governmental decision-making process.

The Aquarium carefully follows the IRS rules and has engaged in lobbying in accordance with section 501(h) and Form 5768.^{ccliii} According to the latest IRS records, between 2006 and

2009, the Aquarium spent between \$24,140 and \$142,964 on lobbying each year. In 2006, the Aquarium spent approximately 83% of its lobbying dollars on grassroots lobbying to influence public opinion and the remainder to influence a legislative body. From 2007 to 2009, the Aquarium spent the majority of its money on legislative lobbying. For example, in 2009, the Aquarium spent \$142,964 on total lobbying expenditures of which \$138,304 was to influence a legislative body and \$4,660 was to influence public opinion. According to the expenditure limits defined by the IRS, given that the Aquarium has total exempt expenditures of \$55.24 million, MBA is entitled to conduct \$1 million in nontaxable lobbying. Thus, between 2006 and 2009, it fell significantly below this threshold. The IRS also mandates that grassroots nontaxable lobbying only account for 25% of total lobbying (i.e. \$250,000 per year for the Aquarium). Again, even in 2006 when the Aquarium spent the most on grassroots lobbying, it was \$135,000 below this limit. Overall, even though MBA actively engages in marine policy advocacy, it consistently falls short of the lobbying limits imposed by the IRS.^{ccliv}

These statistics illustrate several key points. First, as MBA Vice President Mike Sutton noted in an interview, MBA keeps meticulous records of its advocacy work and closely tracks dollars spent on lobbying to comply with federal and state tax regulations.^{cclv} Second, the CFFO has traditionally focused its lobbying efforts on a legislative body (as opposed to seeking to change public opinion). Finally, and critically, given the Aquarium's expenditures on education, exhibits and other non-taxable services, MBA is eligible to devote considerably higher amounts of resources to advocacy and lobbying without compromising its non-profit tax status. Presumably, most other aquariums in the United States would fall under this category given that they have budgets over \$1 million.

An Emphasis on Local and National Partnerships:

MBA collaborates with a diverse range of scientific, academic and advocacy organizations in California that are engaged in marine science and conservation.^{cclvi} This legacy of partnership dates back to the organization’s founding when four marine biologists at Stanford University’s Hopkins Marine Station submitted a proposal for the Aquarium to the David and Lucile Packard Foundation in 1977.^{cclvii} As a condition of the initial \$55 million “personal gift” from David and Lucille Packard, the Aquarium had to become an independently operated and funded organization with only occasional project-based support from the Foundation.^{cclviii}

While the Aquarium hasn’t received much additional monetary support from the Packard Foundation, it has benefited tremendously from an extensive network of marine science and advocacy organizations funded by the Foundation’s Conservation and Science Program. For example, David Packard founded the Monterey Bay Aquarium Research Institute (MBARI) in 1987 to conduct deep-sea research “through the development of better instruments, systems and methods for scientific research.”^{cclix} MBA and MBARI have collaborated to publicize deep-sea scientific research, for example, by jointly developing the Aquarium’s *Mission to the Deep* exhibit.^{cclx} In 2008, the Packard Foundation funded the creation of the Center for Ocean Solutions (COS), a collaboration between Stanford University (through the Woods Institute for the Environment and the Hopkins Marine Station), MBA and MBARI in order “to solve the major problems facing the ocean, and prepare both current and future leaders to take on these challenges.”^{cclxi} Focused on the Pacific Ocean, COS is designed to integrate the expertise of natural, physical and social scientists, law and policy experts and aquarium educators.

In addition to the collaborations supported by the Packard Foundation, MBA has partnered with a wide range of other local and national organizations. These include the Cal State Moss Landing Marine Laboratory, the Long Marine Laboratory at UC Santa Cruz, the

Monterey Bay National Marine Sanctuary Office, the Monterey Institute of International Studies, The Naval Post Graduate School and the National Marine Fisheries Service Pacific Fisheries Environmental Laboratory. This diverse network of ocean science, education and governance institutions strengthens MBA's ability to inspire conservation of the ocean.

Active Participation in Governmental Policy Decision-Making:

In addition to having access to a rich network of institutional partners, the MBA staff and Board formally and informally participate in State and Federal ocean governance. For example, MBA Executive Director Julie Packard was a member of the Pew Oceans Commission.^{cclxii} The Aquarium staff and Board have also played a formal role in the implementation of the California Marine Life Protection Act (MLPA). Michael Sutton, Vice President and Founding Director of the Center at the Aquarium, was appointed to the California Fish and Game Commission in May of 2007. He was reappointed in 2009 and his term extends to 2015.^{cclxiii} The Commission is responsible for a variety of decisions that impact California's marine resources. For example, the Commission provides oversight review for the CA Department of Fish and Game's fisheries policies and sets bag limits and approves take methods for sport fishing in State waters.^{cclxiv} Critical to the MBA's advocacy agenda, the MLPA grants the Commission ultimate authority to approve or deny marine protected area designations that prohibit "activities that upset the natural ecological functions of the area."^{cclxv} Meg Caldwell, MBA Board member and Executive Director of the COS, serves on the MLPA Blue Ribbon Science Taskforce responsible for making recommendations for implementing the MLPA to the Department of Fish and Game.^{cclxvi} In this way, the Aquarium is fully integrated into the institutional ecology of marine governance of Monterey Bay and Coastal California.

Focused on Monterey Bay:

An important strength of the Aquarium is that, since its founding, the organization has focused its exhibits, education and advocacy on the unique marine life and habitats found along coastal California and in Monterey Bay. This was an innovative idea in 1984. At the time, the other prominent US aquariums, such as the New England Aquarium in Boston and the National Aquarium in Baltimore, focused their exhibits on coral reefs and large sharks to the exclusion of local marine life and habitats.^{cclxvii}

By focusing on a specific biophysical environment, MBA allows visitors to explore in-depth “one of the richest and most diverse environments in the world: rich in that it supports huge number of organisms, and diverse in that a wide range of physical habitats support multitudes of species.”^{cclxviii} This richness and diversity is caused by upwelling currents that result from strong spring and summer winds pushing surface waters south along the coast. The southerly currents are pushed offshore as a result of the Coriolis Effect allowing deep water, rich in nitrates and phosphates, to come to the surface. When the deep, nutrient rich waters reach the photic zone, this spurs high levels of primary productivity in the form of phytoplankton blooms and algae growth. For example, giant kelp, the dominant alga in the kelp forests of Monterey Bay, grows over a foot per day during the spring and summer.^{cclxix}

Overall the Aquarium has approximately 35,000 animals and plants representing 550 different species in over 200 galleries and exhibits. As such, they seek to represent the diversity of marine life and habitats found in Monterey Bay and coastal Californian waters.^{cclxx} Visitors can explore rocky tidal pools, sandy beaches, deep sea canyons and giant kelp forests, all within the confines of the Aquarium.^{cclxxi} By limiting their focus to the waters of Monterey Bay and coastal California, the Aquarium provides an in-depth, coherent view of the challenges facing a

particular place as well as the steps necessary to protect that place. Its conservation message is not diluted by the innate complexity of a diverse range of biophysical regions.

Comparative Summary of the Three Aquariums:

As the preceding sections illustrate, each aquarium detailed in this case study strives to fill its own conservation niche. The Seattle Aquarium is experimenting with a variety of conservation projects. The New England Aquarium is fine tuning its climate change and conservation messaging. Finally, the Monterey Bay Aquarium has emerged as the aquarium leader for conservation advocacy. Even though each has developed its own priorities and strengths, the three institutions have employed similar strategies to advance their respective conservation agenda. Each institution has placed an emphasis on collaboration. Whether with universities, other informal educational institutions or conservation organizations, each aquarium has sought to partner with other institutions to amplify their conservation work. To varying degrees, each aquarium has focused its conservation work on specific biophysical environments. The Monterey Bay Aquarium was the first institution to focus solely on a particular place. Currently, the Seattle Aquarium devotes 90% of its floor space to the Puget Sound and Pacific Ocean. While the New England Aquarium's exhibits are global in nature, it has focused its conservation agenda on specific places including the Phoenix Islands in the South Pacific. Staff members at each aquarium have also participated in the governmental marine policy process. While Michael Sutton at the Monterey Bay Aquarium is the most active in this regard, staff members at the New England and Seattle Aquariums have also participated in state and national ocean policy efforts. Finally, each aquarium has also made an effort to tell the human story of the coasts and ocean. The Monterey Bay Aquarium's physical structure is built on the foundation of an last cannery to grace Cannery Row. The Seattle Aquarium is inspiring people to reconnect with the Puget Sound waterfront through the City of Seattle sponsored planning effort.

Finally, the New England Aquarium convened a forum during the Cod Wars of the 1990's to give fishermen a chance to share their story and debate fishery management regulations in a neutral space. Ultimately, this shows that even as aquariums pursue their individual conservation agenda, they rely on similar strategies and tactics.

Lessons Learned:

Aquariums need to Develop and Harness Social Capital:

Professor Putnam's description of the importance of social capital provides an important intellectual framework from which to reconsider the role of an aquarium or zoo. Putnam's overarching lesson is that "investment in social capital was not an alternative to, but a prerequisite for, political mobilization and reform."^{cclxxii} This suggests that aquariums will not achieve widespread marine conservation without simultaneously promoting the creation of social capital. To successfully achieve their conservation mission, aquariums and zoos need to reconsider their role vis-à-vis the creation of social capital. This can be expressed in terms of what expectations or conditions they place on membership. For example, by joining an aquarium, members not only financially support the institution and gain access to the facility over the course of a year, they could also be required to promote the conservation agenda in specific and measurable ways. Though hard to enforce, there are ways to establish incentives for members to participate. For example, instead of paying to join or attend the aquarium, if visitors commit to taking certain steps (purchasing sustainable seafood or calling their Senator, for example), they would be entitled to a partial refund on the cost of attendance or membership.

There are other ways that aquariums can promote the creation of social capital. It is perhaps ironic to write this in a terminal paper for a Professional Master's degree, but aquariums (and other organizations and institutions) need to find a better balance between professionalizing social movements and growing grassroots efforts to promote conservation.^{cclxxiii} For example,

they could simultaneously recruit visitors, members and the public and hire professionals to advance their conservation agendas. Further, they can use the social experience at their institutions to create an opportunity to advance social activism. For example, they can encourage their visitors to think of themselves as a community by providing repeat opportunities to socialize with the same group of visitors, both inside and outside the aquarium facilities. The aquariums could sponsor or organize local chapters that hold tutorials so that people can learn about, purchase and prepare sustainable seafood.

Putnam highlights that social capital rich organizations are associated with smaller offshoot organizations that form at the periphery of the main organization. For example, he describes quilting groups that formed out of parent-teacher councils. In the same way, aquariums could seek to spur the creation of ocean-themed sub-groups for their members. An aquarium could organize a Community Supported Fishery that has a pick up location at the Aquarium (as well as elsewhere) or organize a marine themed cooking class that uses sustainably harvested fish. By inviting members to remain in contact and continue to connect through the aquarium, the institution would help build social capital and strengthen the aquarium community as whole.

Find Creative Ways to Measure Impact:

The fundamental challenge for aquariums is that they have not figured out a way to scientifically show that visitors learn conservation messages and adapt their behavior at least in part because of their experience during visits. As Mark Plunkett from the Seattle Aquarium noted, “I have yet to see anything quite honestly in my 27 years in this business that shows me long-term that there is a real sticking power to receiving a [conservation] message and it really stays with the visitor a long time after they leave.”^{cclxxiv} Mr. Plunkett worried that there was no way to prove scientifically that aquariums had heightened the awareness of the 180 million

visitors to zoos and aquariums across the country. He confided that “I have a concern that probably these excitements are fleeting and only in a small percent have impacted the conservation awareness and activity of those particular visitors.”^{cclxxv}

This sentiment is reflected in the literature. Rabb and Saunders note that the lack of qualitative and quantitative measures of the impact of an aquarium or zoo visit on visitors serves as a critical stumbling block to inspiring conservation. In fact, as late as 2000, one investigator concluded that this type of research was in its infancy.^{cclxxvi} However, Rabb and Saunders argue that “our institutions can become transformative models, inspiring and motivating urban people around the globe to have a more harmonious and sustainable relationship with the natural world.”^{cclxxvii}

To address this deficiency, the AZA formed a strategic partnership with the MBA and the Institute for Learning Innovation in order to implement a three-year, nationwide study of the impacts of a visit to an aquarium or zoo. With funding from the National Science Foundation (“NSF”), the investigators used written questionnaires, interviews, tracking studies, Personal Meaning Mapping and phone surveys (seven to eleven months after the visit) to assess 5,500 visitors perceptions of visits to one of twelve institutions.^{cclxxviii} The study was broken into two phases. During the first phase, researchers sought to understand what type of person visits a zoo and aquarium and what motivates them to make the visit. For the second phase, the researchers measured changes in visitor’s short and long-term conservation knowledge.^{cclxxix} Ultimately, the researchers concluded that “going to AZA-accredited zoos and aquariums in North America does have a measurable impact on the conservation attitudes and understanding of adult visitors.”^{cclxxx}

The report, *Why Zoos and Aquariums Matter*, details the key findings from this study. According to Jim Maddy, President and CEO of the AZA, this is the first comprehensive report

based on reliable data that validates that positive impact of zoos and aquariums to alter the conservation attitudes of visitors.^{cclxxxix} For example, the authors conclude that aquarium and zoo visits spur people to “reconsider their role in environmental problems and conservation action, and to see themselves as part of the solution” and people believe that aquariums and zoos should and do play an important role in conservation education.^{cclxxxii} Additionally, only ten percent of visitors showed statistically significant increases in conservation knowledge. However, because the report found that visitors arrive at aquariums and zoos with “higher-than-expected” awareness of ecological topics, there was no statistically significant increase in overall knowledge.^{cclxxxiii} As a result of this high level of awareness, the authors conclude that “most visitors are ready to be more engaged in advocacy efforts.”^{cclxxxiv} Ultimately, the report still concluded that more work needs to be done to assess the impact of a zoo or aquarium visit.

The Importance of Collaboration:

One clear lesson from each of the case studies is that successful aquariums partner with a wide range of institutions in order to achieve their marine conservation mission. According to Dr. Paul Boyle of the AZA, there is a “rich fabric of nonprofit institutions around North America,” including zoos, aquariums, nature centers, science museums and history museums that teach visitors about marine science and conservation. Dr. Boyle likened the visitor’s experience at multiple institutions to assembling a quilt without an overarching design in mind. “The person is aggregating some kind of information from all these institutions and experiences, but nobody is thinking about how the design of the squares are going together in the quilt.”^{cclxxxv} According to Dr. Boyle, there is a solution

I think we need to be much more collaborative across institutions and think as a profession what are the behaviors that we really ought to be working most to change, what are the things that people need to know to realize that change in those behaviors is good for them and their grandkids and how do we present part of

that message through zoo [and aquarium] experiences, and through science museums experiences, and have that add up to a quilt that is really well designed because we thought about the pattern we want to end up with.^{cclxxxvi}

As Dr. Boyle's quilt metaphor illustrates, visitors acquire scientific and conservation related knowledge at a wide range of educational institutions. As a result, collaboration across the informal educational profession is critical to ensure that visitors receive an intentional, integrated experience across institutions. The Seattle Aquarium, NEAq and MBA have each made strategic partnerships that illustrate that they value collaboration. For the NEAq, the drive to develop partnerships is rooted in the deep seated practice of the institution. As Heather Tausig explained, "historically we've always done that."^{cclxxxvii} For the most part, however, it has partnered with other marine science or conservation organizations. The challenges facing the ocean demand that aquariums recruit new and diverse organizational partners such as museums with maritime art collections, libraries with nautical themed literature or swimming and boating associations in coastal communities. As the Ocean Literacy principles illustrate, the ocean touches all facets of life. As a result, aquariums should identify and recruit partners that reflect that diversity of viewpoints.

Conservation Advocacy, Lobbying and the IRS:

In 1934, Congress enacted legislation making it legal for nonprofits to be exempt from federal income taxes provided that "no substantial part of the activities" of the organization is for "carrying on propaganda, or otherwise attempting to influence legislation."^{cclxxxviii} According to the IRS, legislation includes "action by Congress, any state legislature, any local council, or similar governing body, with respect to acts, bills, resolutions, or similar items (such as legislative confirmation of appointive office), or by the public in referendum, ballot initiative, constitutional amendment, or similar procedure."^{cclxxxix} Legislation does not include actions by

executive, judicial, or administrative bodies.^{ccxc} The IRS also defines “attempting to influence” as an organization that “contacts, or urges the public to contact, members or employees of a legislative body for the purpose of proposing, supporting, or opposing legislation, or if the organization advocates for the adoption or rejection of legislation.”^{ccxc} Therefore, while aquariums can educate the public about public policy issues, if they take a stance or encourage visitors or members to take a stance, they are engaging in lobbying. This is allowable under the United States tax code. However, nonprofits are only legally allowed to engage in lobbying as long as this work does not amount to a substantial portion of the organization’s activities.^{ccxcii}

If a non-profit engages in lobbying, it must demonstrate to the IRS that these activities do not account for a substantial amount of its work. This is difficult since the IRS has not provided a clear definition that draws the line between substantial and insubstantial.^{ccxciii} As an alternative, the IRS allows organizations to take the expenditure test under section 501(h) and complete Form 5768, *Election/Revocation of Election by an Eligible IRC Section 501(c) (3) Organization to Make Expenditures to Influence Legislation*.^{ccxciv} The expenditure test sets allowable limits on lobbying based on the size of the organization and the average of its prior four years of lobbying expenditures. If an organization exceeds the limit over the course of a four year period, the IRS may revoke its non-profit tax status. The punishment for exceeding this limit over the course of one year is an excise tax equal to 25 percent of the excess.^{ccxcv}

Each of the three aquariums presented in this paper carefully abides by the IRS rules. However, as their tax forms illustrate, they are overly cautious. The tax documents show that each aquarium spent a relatively small amount on lobbying and that none of them came anywhere close to breaching the maximum limits imposed by section 501(h). This illustrates that while each institution should continue to vigorously track their expenditures, they can also

legally do more advocacy and lobbying without compromising its nonprofit tax status. Further, nonprofits are allowed to educate people about policy without taking an advocacy or lobbying position. In this way, they can educate visitors about current governmental marine policy processes with the goal of informing the public about the current status of governmental decision-making.

Alternatives and Counter-Arguments:

While some aquariums can adapt the Seattle Aquarium, NEAq or MBA model to fit their own institution, some aquariums will not be able to engage in conservation action or advocacy. Some aquariums in the United States are operated as a division of a state or local government. For example, the North Carolina Aquariums are a division of the State Department of Environmental and Natural Resources.^{ccxcvi} As a result, the North Carolina Aquariums have to select and implement their conservation projects carefully so as not to inspire controversy or threaten their state funding. However, with the current government fiscal crisis, indebted state and local governments are trying to reduce their budgets. As Michael Sutton noted, there is a trend towards shifting away from city and state management of aquariums.^{ccxcvii} For example, after 33 years as a part of the City of Seattle Department of Parks and Recreation, the Seattle Aquarium only became a fully independent non-profit organization in 2010. As the Seattle Aquarium website notes, “the new management structure will enhance funding for aquarium programming and animal care while serving a broader conservation and education mission.”^{ccxcviii} Thus, government operated aquariums not only limit an aquarium’s ability to engage in marine conservation policy education and advocacy, government backing also limits an aquarium’s ability to raise funds from individuals or private charities.

It is quite possible that independent non-profit aquariums will be hesitant to integrate conservation action and policy into their education and outreach programs. While the three

aquarium highlighted in this paper have focused their mission and brand around conservation, many aquariums emphasize education and entertainment and view conservation – and in particular conservation advocacy – as a divisive topic. Their audiences may not be interested in this issue or turned off by the political nature of some of the topics. This will vary institution to institution, but one way to address this challenge is for the aquarium to educate people about personal actions to promote conservation as well as the different marine policy processes currently underway in their state or region. For example, without advocating a particular stance, aquariums could announce public comment periods or bills currently before they legislature. They could also inform visitors about existing laws and policies that impact the coastal and marine environment. As discussed earlier, the IRS allows 501(c)(3) organizations to educate people about public policy issues. As the IRS website notes, “organizations may conduct educational meetings, prepare and distribute educational materials, or otherwise consider public policy issues in an educational manner without jeopardizing their tax-exempt status.”^{ccxcix} Aquariums are expanding the focus of their educational programs beyond science to include art and culture.^{ccc} Aquariums can also engage in civic education and raise public awareness about the current state of marine law and policy. This will serve as a less contentious way to begin a dialogue around marine conservation law and policy. This would mark a critical step towards building awareness and empowering citizens to be more engaged in governance of marine ecosystems.

Some might challenge the notion that aquariums are the right type of institution to build a nationwide public constituency for ocean conservation. First, visitors may be at an aquarium for a couple hours, but they only engage in conversations with staff or volunteers for several minutes at most.^{ccci} It is challenging to expect so much to come from so short a visit. Additionally, given

that there are only 37 aquariums in the United States, there are many cities and at least 13 states without an aquarium. While this may be true, this argument does not account for the fact that tourists make up a large percentage of the Aquarium's visitors. Additionally, MBA connects with millions of people via its website. Therefore, while there are certainly areas where residents will have easier access to aquariums, given their status among tourists and their capacity to attract electronic visitors, aquariums can still be a strong force for building a public constituency across the United States.

Conclusion:

As former MBA Board Member, Pew Ocean Commission Chairman and current Secretary of Defense Leon Panetta noted, "getting American's involved in protecting the oceans is one of our greatest challenges."^{ccii} Recent polling data and market research indicate that there is much work to be done on this front. The findings also suggest that the general public expects to hear and trusts the content of aquarium conservation messages. In the face of this immense challenge and opportunity, the Seattle Aquarium, NEAq and MBA stand as models for promoting conservation education, action and policy. Each aquarium, working within its own unique set of institutional constraints, has sought to integrate conservation across all of its programs and operations. Overall, this multifaceted approach seeks to inspire conservation of the ocean.

The Seattle Aquarium has successfully navigated the complex transition from government to nonprofit management. This new governance structure allows the aquarium to explore new opportunities for conservation. Cognizant of existing staffing constraints, the CEO and Interim Director of Conservation are carefully building a robust and multifaceted approach that leverages the institutions in-depth scientific research and informal education experience.

The Seattle Aquarium aspires to serve as the central hub of marine conservation in the Pacific Northwest.

The NEAq was the first aquarium in the United States to establish a conservation department. Whether working with the shipping industry to protect Endangered Right Whales or collaborating with the island nation of Kiribati to establish the largest marine protected area in the world, NEAq has been at the forefront of marine conservation and the local, regional and international level for more than forty years. The aquarium is now methodically taking on climate change communications. By collaborating with a diverse set of institutions, it is working to identify and measure the impact of new strategic communication strategies. After it fine tunes the model, it will disseminate best practices through a nationwide network of marine educators.

Since 1984, the MBA has focused its exhibits, education and outreach exclusively on the Monterey Bay. It has nurtured a diverse range of partnerships and collaborated with neighboring academic institutions, scientific institutes and conservation advocacy organizations. Aquarium staff and board members actively participate in the governmental policy process – both as stakeholders and appointed decision-makers. Finally, and critically, the MBA has promoted conservation in a way that recognizes and celebrates the legacy of human uses of the ocean.

These three case studies illustrate that aquariums can brand themselves around conservation and remain an immensely successful and inviting destination for visitors of all backgrounds. While more needs to be done to measure the conservation outcomes associated with a visit to these institutions, the consensus is that informal science education plays a critical role in building the next generation of marine conservationists. The ocean is facing immense conservation challenges. It is time for other aquariums to take the plunge.

List of Interview Subjects:

Anonymous, New England Aquarium
David Bader, Aquarium of the Pacific
Pam DiBona, New England Aquarium
Dr. Paul Boyle, AZA Vice President of Conservation and Education
Wendy Cluse, North Carolina Aquarium at Pine Knoll Shores
Jim Covell, Monterey Bay Aquarium
Aimee David, Monterey Bay Aquarium
John Falk, Oregon State University
Alejandro Grajal, Chicago Zoological Society
Kai Lee, Packard Foundation
Meg Matthews, Shedd Aquarium (AZA Green Scientific Advisory Group)
Janice Mathisen, Seattle Aquarium
John McClaughlin, NOAA Office of Education
William Mott, President, The Ocean Project
Steve Olson, AZA Vice President of Government Affairs
Diana Payne, NMEA President and CT Sea Grant
Mark Plunkett, Seattle Aquarium
Lundie Spence, South Carolina Sea Grant
Billy Spitzer, New England Aquarium
Michael Sutton, Monterey Bay Aquarium
Heather Tausig, New England Aquarium

Acknowledgements:

I would like to thank Dr. Michael K. Orbach, Dr. Charlotte R. Clark and Kristen Maize for their guidance and assistance with this research project. I would also like to thank each of my interview subjects for their insights and for being so generous with their time.

-
- ⁱ Panetta, Leon. Forward to the Pew Ocean Commission Report, *America's Living Oceans: Charting a Course for Sea Change*. Page i. Found at: http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting_ocean_life/env_pew_oceans_final_report.pdf (12/4/11)
- ⁱⁱ See *America's Living Oceans: Charting a Course for Sea Change* (http://www.pewtrusts.org/our_work_detail.aspx?id=130) and *An Ocean Blueprint for the 21st Century* (<http://www.oceancommission.gov/>) and *Final Recommendations of the Interagency Ocean Policy Task Force* (http://www.whitehouse.gov/files/documents/OPTF_FinalRecs.pdf).
- ⁱⁱⁱ Auster, Peter J. et al. 2009. Developing an Ocean Ethic: Science, Utility, Aesthetics, Self-Interest, and Different Ways of Knowing. *Conservation Biology* 23: 233-235. Page 234.
- ^{iv} *Ibid.*, page 234.
- ^v Falk, John and Dierking, Lynn. *Lessons Without Limit: How Free-Choice Learning is Transforming Education*. AltMira Press, Lanham, Maryland 2002. Page 1.
- ^{vi} AAAS (American Association for the Advancement of Science) (2004). *AAAS Survey Report*. Found at: http://www.aaas.org/news/releases/2004/aaas_survey_report.pdf (3/2/12). (Referred to as AAAS 2004).
- ^{vii} AAAS 2004.
- ^{viii} The Ocean project. *America, the Ocean, and Climate Change: New Research Insights for Conservation, Awareness, and Action Key Findings*. Found at: http://www.theoceanproject.org/resources/doc/America_the_Ocean_and_Climate_Change_KeyFindings_1Jun09final.pdf (11/22/11) page 1. (Referred to as: America, the Ocean, and Climate Change)
- ^{ix} *Ibid.*, page 3.
- ^x *Ibid.*, pages 2-3.
- ^{xi} *Ibid.*, page 4.
- ^{xii} *Ibid.*, page 7.
- ^{xiii} Personal Communication, Bill Mott, April 1, 2011.
- ^{xiv} America, the Ocean, and Climate Change, page 8.
- ^{xv} *Ibid.*, page 10
- ^{xvi} *Ibid.*, page 15.
- ^{xvii} *Ibid.*, pages 15-16
- ^{xviii} *Ibid.*, page 15.
- ^{xix} Kisling, Vernon N. Jr. (ed). *Zoo and Aquarium History: Ancient Animal Collections to Zoological Gardens*. CRC Press: Boca Raton, 2001. Page 1.
- ^{xx} Kisling, Vernon N. Jr. Page 30.
- ^{xxi} Rabb, G.B. and Saunders, C.D. (2005). The Future of Zoos and Aquariums: Conservation and Caring. *International Zoo Yearbook*, 39 1-26. Page 1.
- ^{xxii} *Ibid.*, page 2.
- ^{xxiii} Kisling, Vernon N. Jr., page 41.
- ^{xxiv} Rabb and Saunders, page 2.
- ^{xxv} *Ibid.*, page 6.
- ^{xxvi} *Ibid.*, page 6.
- ^{xxvii} Falk and Dierking 2002, page xiii.
- ^{xxviii} Association of Zoos and Aquariums. "About AZA." Found at: <http://www.aza.org/about-aza/> (12/4/11).
- ^{xxix} Personal Communication, Steve Olson, March 16, 2012.
- ^{xxx} Fuller, Stephen S. *Economic Impact of Zoo and Aquarium Operations and Construction Spending*. Found at: http://www.aza.org/uploadedFiles/About_Us/aza-economic-impacts-zoos-aquariums-final-2009.pdf (12/18/11) page 8.

-
- ^{xxx} Fuller, Stephen S., Table 2, page 14.
- ^{xxxii} Falk and Dierking 2002, page xiv.
- ^{xxxiii} Falk, John H. et al (2007). *Why Zoos & Aquariums Matter: Assessing the Impact of a Visit to a Zoo or Aquarium*. Association of Zoos & Aquariums. Silver Spring, MD. Page 3 (2/4/12).
- ^{xxxiv} Gusset, M. and Dick, G. (2011). The Global Reach of Zoos and Aquariums in Visitor Numbers and Conservation Expenditures. *Zoo Biology*30: 566-569. Page 568.
- ^{xxxv} Fraser, J. and Sickler, J., Measuring the Cultural Impact of Zoos and Aquariums. *Int. Zoo Yb.* (2009) 43: 103-112. page 103.
- ^{xxxvi} Fraser, J. and Sickler, J, page 103.
- ^{xxxvii} Fuller, Stephen S. (2000). *The Economic Impact of Zoo and Aquarium Operations and Construction Spending*. Center for Regional Analysis, George Mason University. Fairfax, VA. Page 1.
- ^{xxxviii} *Ibid.*, page 1.
- ^{xxxix} *Ibid.*, page 2.
- ^{xl} *Ibid.*, page 12.
- ^{xli} Gusset, Markus and Dick, Gerald. (2011) The Global Reach of Zoos and Aquariums in Visitor Numbers and Conservation Expenditures. *Zoo Biology*, 30. 566-569. Page 567.
- ^{xlii} *Ibid.*, page 566.
- ^{xliii} *Ibid.*, page 568.
- ^{xliv} Morgan, J.M. & Hodgkinson, M. (1999). The motivation and social orientation of visitors attending a contemporary zoological park. *Environment and Behavior* 31, 228-239.
- ^{xliv} Clayton, S., Fraser, J. & Saunders, C. (2008). Zoo experiences: Conversations, connections and concern for animals. *Zoo Biology* 28 (5), 377-397.
- ^{xlvi} Rabb and Saunders, 2005, page 11.
- ^{xlvii} Personal Communication, Mark Plunkett, January 12, 2012.
- ^{xlviii} *America, the Ocean and Climate Change*, found at: [http://theoceanproject.org/download-reports/\(11/22/11\)](http://theoceanproject.org/download-reports/(11/22/11)).
- ^{xlix} Personal Communication, Anonymous, December 16, 2011.
- ^l *Global Warming's Six Americas in May 2011*, Yale Center on Climate Change Communication, found at: <http://environment.yale.edu/climate/files/SixAmericasMay2011.pdf> (2/16/12).
- ^{li} Personal Communication, Anonymous, December 16, 2011.
- ^{lii} Personal Communication, Mark Plunkett, January 12, 2012.
- ^{liii} Personal Communication, James Covell, 11/22/11.
- ^{liv} Personal Communication, James Covell, 11/22/11.
- ^{lv} Falk and Dierking 2002, page x.
- ^{lvi} National Research Council. *Learning Science in Informal Environments: People, Places, and Pursuits*. Washington, DC: The National Academies Press, 2009. Page 12. Found at: http://www.nap.edu/catalog.php?record_id=12190#toc (3/16/12).
- ^{lvii} *Ibid.*, page 12-13.
- ^{lviii} Falk, John H. and Dierking, Lynn D. (2000). *Learning from Museums: Visitor Experiences and the making of meaning*. Walnut Creek, CA: AltaMira Press. Page 136.
- ^{lix} Falk, John H. (ed). *Free-Choice Science Education: How We Learn Science Outside of School*. Teachers College Press, Columbia University (New York). 2001. Page 7.
- ^{lx} *Ibid.*, page 7.
- ^{lxi} Falk and Dierking 2000, page 123.
- ^{lxii} *Ibid.*, page xv.
- ^{lxiii} *Ibid.*, page 25.
- ^{lxiv} *Ibid.*, page 11.
- ^{lxv} Personal Communication, Paul Boyle, March 16, 2012.
- ^{lxvi} Falk and Dierking 2002, page 45.
- ^{lxvii} Personal Communication, Paul Boyle, March 16, 2012.
- ^{lxviii} Personal Communication, Paul Boyle, March 16, 2012.
- ^{lxix} Falk and Dierking 2002, page 2.

-
- ^{lxx} Ibid., page 3-4.
- ^{lxxi} Wilson, Edward O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press. Page 1. (Referred to as "Wilson").
- ^{lxxii} The Biophilia Hypothesis, Edited by Stephen R. Kellert and Edward O. Wilson. Island Press, 1993, Washington, DC. Page 21. (Referred to as "Kellert and Wilson").
- ^{lxxiii} Wilson, page 85.
- ^{lxxiv} Ibid., page 22.
- ^{lxxv} Ibid., page 2.
- ^{lxxvi} McVay, *Prelude: "A Siamese connexion with a Plurality of Other Mortals"* in Kellert and Wilson, page 5.
- ^{lxxvii} Personal Communications with Mark Plunkett, Jim Covell and John Falk.
- ^{lxxviii} McVay, *Prelude: "A Siamese connexion with a Plurality of Other Mortals"* in Kellert and Wilson, page 17.
- ^{lxxix} Clayton, Susan and Myers, Gene. (2009). *Conservation Psychology: Understanding and Promoting Human Care for Nature*. Hoboken, NJ: Wiley-Blackwell. Page 2.
- ^{lxxx} Ibid., page 2.
- ^{lxxxii} Ibid., page 8.
- ^{lxxxiii} Saunders, C. (2003). The emerging field of conservation psychology. *Human Ecology Review* 10, 137-149.
- ^{lxxxiiii} Mascia, M. B. 2003. Conservation psychology: Challenges and opportunities. *Human Ecology Review* 10(2), 163-164.
- ^{lxxxv} Clayton, S., Fraser, J. & Saunders, C. (2008). Zoo experiences: Conversations, connections and concern for animals. *Zoo Biology* 28 (5), 377-397.
- ^{lxxxvi} Bruni, C. & Fraser, J. & Schultz, P.W. (2008). The value of zoo experiences for connecting people with nature. *Visitor Studies*, 11(2). 139-150.
- ^{lxxxvii} Susan Clayton, John Fraser, and Claire Burgess. *Ecopsychology*. June 2011, 3(2): 87-96.
- ^{lxxxviii} Putnam, Robert D. *Bowling Alone: The Collapse and Revival of American Community*. Simon & Schuster, New York 2000. Page 27.
- ^{lxxxix} Ibid., pages 185-6.
- ^{lxxxix} Ibid., page 185.
- ^{xc} Ibid., page 290.
- ^{xc} Ibid., page 41.
- ^{xcii} Ibid., pages 39-40.
- ^{xciii} Ibid., page 49.
- ^{xciv} Ibid., page 51.
- ^{xcv} Ibid., pages 338-339.
- ^{xcvi} Ibid., pages 155-156.
- ^{xcvii} Ibid., page 58.
- ^{xcviii} Ibid., page 160.
- ^{xcix} Grimm, Kristen. *Discovering the Activation Point: Smart Strategies to Make People Act*. Spitfire Strategies. Found at: <http://www.activationpoint.org/> Page 2.
- ^c Ibid., page 3.
- ^{ci} Ibid., page 6.
- ^{cii} Ibid., page 9.
- ^{ciii} "What We Do," The Ocean Project, found at: <http://theoceanproject.org/> (4/5/12).
- ^{civ} "What we Do," The Ocean Project, found at: <http://theoceanproject.org/> (4/5/12).
- ^{cv} Personal Communication, Bill Mott, April 1, 2011.
- ^{cvi} Personal Communication, Bill Mott, April 1, 2011.
- ^{cvii} "Audience" The Ocean Project, found at: <http://theoceanproject.org/youth/> (4/5/12).
- ^{cviii} National Marine Educators Association, found at: <http://www.marine-ed.org/> (1/12/12).
- ^{cix} *Ocean Literacy: The Essential Principles of Ocean Science*, found at: <http://www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf> (1/12/12).
- ^{cx} "Development of the Framework," Ocean Literacy, found at: http://oceanliteracy.wp2.coexploration.org/?page_id=31 (1/12/12).

-
- ^{cx}*Ocean Literacy: The Essential Principles of Ocean Science*, found at: <http://www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf> (1/12/12).
- ^{cxii} Personal Communication, Diana Payne, 3/15/12 and “Welcome to the National Research Council” National Research Council found at: <http://www.nationalacademies.org/nrc/> (3/20/12).
- ^{cxiii} Personal Communication, Diana Payne, 3/15/12.
- ^{cxiv} Personal Communication, James Covell, 11/22/11.
- ^{cxv} Personal Communication, Diana Payne, March 15, 2012.
- ^{cxvi} Personal Communication, Diana Payne, March 15, 2012.
- ^{cxvii} Personal Communication, Steve Olson, March 16, 2012.
- ^{cxviii} Personal Communication, Steve Olson, March 16, 2012.
- ^{cxix} Personal Communication, Steve Olson, March 16, 2012.
- ^{cxx} Personal Communication, Steve Olson, March 16, 2012.
- ^{cxxi} Personal Communication, Steve Olson, March 16, 2012.
- ^{cxxii} Seattle Aquarium. (2010). *Special Report: Seattle Aquarium to Transition to Nonprofit Management and Operation* (Referred to as “Special Report”). Page 1.
- ^{cxxiii} Personal Communication, Mark Plunkett, January 12, 2012.
- ^{cxxiv} Seattle Aquarium. Seattle Aquarium Report: Recent Achievements and 2010 Financials. Found at: <http://www.seattleaquarium.org/document.doc?id=1409>. Page 4 (Referred to as “Seattle Aquarium Report”) (1/29/12).
- ^{cxxv} Seattle Aquarium Results (2010). Report to the Seattle Parks and Recreation Department. Found at: http://clerk.seattle.gov/~public/meetingrecords/2011/parks20110707_7c.pdf. Page 2 (1/29/12).
- ^{cxxvi} *Seattle Aquarium Annual Plan to the Superintendent of Parks and Recreation for 2011*, January 2011. Found at: <http://www.seattleaquarium.org/document.doc?id=1239>. Page 1 (1/29/12).
- ^{cxxvii} *Ibid.*, page 1.
- ^{cxxviii} North Carolina Aquariums Found at: <http://www.ncaquariums.com> (12/10/11).
- ^{cxxix} Diane B. Frankel, “The Free-Choice Education Sector as a Sleeping Giant in the Public Policy Debate” found in Falk and Dierking, 161.
- ^{cx} Personal Communication, Mark Plunkett, January 12, 2012.
- ^{cx} “A New Approach to Assure Zoo’s Future” Seattle times, Editorial, Robert W. Davidson, June 10, 1994, Found at: <http://community.seattletimes.nwsourc.com/archive/?date=19940610&slug=1914838> (2/15/12).
- ^{cx} Personal Communication, Mark Plunkett, Seattle Aquarium, January 12, 2012.
- ^{cx} A Resolution designating the proposed partnership between the City of Seattle and the Seattle Aquarium Society for the Future Development of the Pacific Northwest Aquarium as a Targeted Partnership, City of Seattle Legislative Information Service, Resolution 30118, Introduced February 7, 2000. Found at: [http://clerk.seattle.gov/~scripts/nph-brs.exe?s1=&s2=&s3=&s4=licata\[spon\]+and+%40dir%3E%3D20000000+and+%40dir%3C20010000&Sect4=AND&I=200&Sect2=THESON&Sect3=PLURON&Sect5=RESN1&Sect6=HITOFF&d=RESN&p=1&u=%2F~public%2Fresn1.htm&r=17&f=G](http://clerk.seattle.gov/~scripts/nph-brs.exe?s1=&s2=&s3=&s4=licata[spon]+and+%40dir%3E%3D20000000+and+%40dir%3C20010000&Sect4=AND&I=200&Sect2=THESON&Sect3=PLURON&Sect5=RESN1&Sect6=HITOFF&d=RESN&p=1&u=%2F~public%2Fresn1.htm&r=17&f=G). Page 3 (1/29/12). (Referred to as “Resolution 30118”).
- ^{cx} Resolution 30118, Feb 2000, page 3.
- ^{cx} Special Report, page 1.
- ^{cx} Fiscal Note for Non-Capital Projects, found at: <http://clerk.ci.seattle.wa.us/~public/fnote/30737.htm> (1/29/12).
- ^{cx} Special Report, page 1.
- ^{cx} Seattle Aquarium. “Window on Washington Waters: Take a dive into Puget Sound.” Found at: <http://www.seattleaquarium.org/page.aspx?pid=950> (1/29/12).
- ^{cx} Special Report, page 1.
- ^{cx} *Seattle Aquarium Operations and Management Agreement*. “Transition Agreement.” Found at: <http://www.seattleaquarium.org/document.doc?id=957> (1/29/12) (Referred to as “MOA”).
- ^{cx} Special Report, page 1.
- ^{cx} MOA, page 10.

-
- cxliii MOA, page 8.
- cxliv MOA, page 10.
- cxlv MOA, page 19.
- cxlvi Resolution 301180, page 11.
- cxlvii Seattle Aquarium. "Seattle Aquarium Board of Directors" Seattle Aquarium, found at: <http://www.seattleaquarium.org/page.aspx?pid=888> (1/29/12).
- cxlviii MOA, page 19.
- cxlix Special Report, page 5.
- cl Seattle Annual Report, page 5.
- cli Personal Communication, Mark Plunkett, January 12, 2012.
- clii Personal Communication, Mark Plunkett, January 12, 2012.
- cliii Personal Communication, Mark Plunkett, January 12, 2012.
- cliv Personal Communication, Mark Plunkett, January 12, 2012.
- clv Personal Communication, Mark Plunkett, January 12, 2012.
- clvi Personal Communication, Mark Plunkett, January 12, 2012.
- clvii People for Puget Sound. "What We Do." Found at: <http://pugetsound.org/about/what-we-do> and Personal Communication, Mark Plunkett, January 12, 2012.
- clviii Personal Communication, Mark Plunkett, January 12, 2012.
- clix Seattle Aquarium 2009 990 Form, Schedule C, Part II-A, page 2.
- clx Special Report, page 2.
- clxi Ibid., page 3.
- clxii Personal Communication, Mark Plunkett, January 12, 2012.
- clxiii Lawrence Hall of Science. "Reflecting on Practice," MARE. Found at: <http://mare.lawrencehallofscience.org/partnerships/current/rop> (2/20/12).
- clxiv Personal Communication, Mark Plunkett, January 12, 2012.
- clxv Seattle Aquarium Report, page 4.
- clxvi MOA, page 5.
- clxvii Personal Communication, Mark Plunkett, January 12, 2012.
- clxviii Seattle Aquarium Report, page 6.
- clxix Association of Zoos & Aquariums. "Studbooks." Found at: <http://www.aza.org/studbooks/> (12/19/11).
- clxx Seattle Aquarium Report, page 10.
- clxxi MOA, page 5.
- clxxii Special Report, page 12.
- clxxiii 2010 Seattle Aquarium Results, page 3.
- clxxiv Ibid., page 5.
- clxxv Personal Communication, Mark Plunkett, January 12, 2012.
- clxxvi Special Report, page 13.
- clxxvii Personal Communication, Mark Plunkett, January 12, 2012.
- clxxviii New England Aquarium. "About Us: An Overview." Found at: http://www.neaq.org/about_us/index.php (3/2/12).
- clxxix New England Aquarium. "Mission." Found at: http://www.neaq.org/about_us/mission_and_vision/mission.php (3/2/12).
- clxxx New England Aquarium. "Mission." Found at: http://www.neaq.org/about_us/mission_and_vision/mission.php (3/2/12).
- clxxxi New England Aquarium. "Aquarium Timeline 1969-2011." Found at: http://www.neaq.org/about_us/mission_and_vision/aquarium_history/aquarium_timeline/index.php (3/2/12).
- clxxxii New England Aquarium. 990 2010 IRS Form, Part III, Program Service Accomplishments (3/2/12)
- clxxxiii New England Aquarium. "Aquarium Timeline 1969-2011." Found at: http://www.neaq.org/about_us/mission_and_vision/aquarium_history/aquarium_timeline/index.php (3/2/12).
- clxxxiv New England Aquarium. 990 2010 IRS Form, page 2 (3/2/12).
- clxxxv Personal Communication, Heather Tausig, Thursday, March 22, 2012.

clxxxvi New England Aquarium. "Right Whale Research Background." Found at:
http://www.neaq.org/conservation_and_research/projects/endangered_species_habitats/right_whale_research/right_whale_background/index.php (3/24/12).

clxxxvii New England Aquarium. 990 2010 IRS Form, page 2 (3/2/12).

clxxxviii Personal Communication, Heather Tausig, March 22, 2012.

clxxxix Personal Communication, Heather Tausig, March 22, 2012.

cx^c Giant Food. "Seafood is a Healthy Idea at Giant." Found at:
http://www.giantfood.com/living_well/healthy_living/seafood.htm (3/24/12).

cx^{ci} Personal Communication, Heather Tausig, March 22, 2012.

cx^{cii} Personal Communication, Heather Tausig, March 22, 2012.

cx^{ciii} Personal Communication, Heather Tausig, March 22, 2012.

cx^{civ} New England Aquarium. 990 2010 IRS Form, Schedule C, Part II-A, page 2 (3/2/12)

cx^{cv} Personal Communication, Heather Tausig, March 22, 2012.

cx^{cvi} Frameworks Institute. "Mission of the Frameworks Institute." Found at:
<http://www.frameworksinstitute.org/mission.html> (2/2/12).

cx^{cvi} Personal Communication, Paul Boyle, March 16, 2012.

cx^{cvi} New England Aquarium. 2010 Annual Report, page 3.

cx^{cix} Personal Communication, Anonymous, December 16, 2011.

cc Personal Communication, Anonymous, December 16, 2011.

cci Personal Communication, Anonymous, December 16, 2011.

ccii Personal Communication, Anonymous, December 16, 2011.

cciii Frameworks Institute. "Climate Change and the Oceans." Found at:
<http://www.frameworksinstitute.org/oceansclimate.html> (2/2/12)

cciv Personal Communication, Anonymous, December 16, 2011.

ccv New England Aquarium. Annual Report 2009: Protecting the Blue Planet for 40 Years. Found at:
http://www.neaq.org/about_us/financial_information/documents/NEAqAR09.pdf (3/24/12). Page 3.

ccvi New England Aquarium. "World of Water Courses." Found at:
http://www.neaq.org/education_and_activities/programs_and_classes/teen_programs/wow_science_and_training_class.php (3/2/12).

ccvii New England Aquarium. "Live Blue Ambassadors." Found at:
http://www.neaq.org/education_and_activities/programs_and_classes/teen_programs/Live_Blue_Ambassadors.php (3/2/12).

ccviii New England Aquarium. 2010 Annual Report. Found at:
http://www.neaq.org/about_us/financial_information/documents/ARReport_2010_150dpi.pdf (3/24/12). Page 3.

ccix New England Aquarium. 990 2010 IRS Form, page 2.

ccx New England Aquarium. 2010 Annual Report, page 2.

ccx^{ccxi} Monterey Bay Aquarium. "MBA Timeline." Found at:
<http://www.montereybayaquarium.org/aa/timelineBrowser.asp?tf=3> (2/12/12).

ccxⁱⁱ Monterey Bay Aquarium. "MBA Timeline." Found at:
<http://www.montereybayaquarium.org/aa/timelineBrowser.asp?tf=19> (2/12/12).

ccxⁱⁱⁱ Monterey Bay Aquarium. "Aquarium Facts & History." Found at:
http://www.montereybayaquarium.org/aa/aa_history/aa_faq.aspx (10/2/11).

ccx^{iv} Monterey Bay Aquarium. 2010 IRS Form 990, Schedule O, page 1. Found at:
<http://www.montereybayaquarium.org/aa/financials.aspx> (11/3/11).

ccx^v *MBA 2010 Annual Review*, page 1.

ccx^{vi} California Department of Finance. *Current Population Survey: California Two-Year Average Series, March 2000-2011 Data*. Found at: http://www.dof.ca.gov/research/demographic/reports/documents/CPS_2YearReport_2000-2011.pdf. (10/15/11). Page 1.

ccx^{vii} Monterey Bay Aquarium. *Monterey Bay Aquarium Overview – 2011*. Page 5. Found at:
<http://www.montereybayaquarium.org/storage/pressroom/presskit/pdf/2011%20Monterey%20Bay%20Aquarium%20Overview.pdf> (10/2/11). (Referred to as: "MBA Overview – 2011").

-
- ^{ccxviii} Monterey Bay Aquarium. "Our Mission & Leadership." Found at:
<http://www.montereybayaquarium.org/aa/trustees.aspx> (10/25/11).
- ^{ccxix} Monterey Bay Aquarium. "Explore our History." Found at:
<http://www.montereybayaquarium.org/aa/timelineBrowser.asp?tf=66> (12/4/11). (Referred to as: *MBA Explore Our History*).
- ^{ccxx} Monterey Bay Aquarium. *Monterey Bay Aquarium 2010 Annual Review*. Found at:
http://www.montereybayaquarium.org/PDF_files/aa/financials/aquarium_annualreview_10.pdf, page 2
(10/28/11). (Referred to as: *MBA 2010 Annual Review*).
- ^{ccxxi} Personal Communication, James Covell, 11/22/2011.
- ^{ccxxii} Personal Communication, James Covell, 11/22/2011.
- ^{ccxxiii} Personal Communication, James Covell, 11/22/2011.
- ^{ccxxiv} *MBA Explore Our History*. Found at: <http://www.montereybayaquarium.org/aa/timelineBrowser.asp?tf=116>
(12/4/11).
- ^{ccxxv} Monterey Bay Aquarium. "Research & Conservation." Found at:
<http://www.montereybayaquarium.org/cr/research.aspx?c=dd> (12/4/11).
- ^{ccxxvi} Monterey Bay Aquarium. "Conservation Practices at the Aquarium." Found at:
<http://www.montereybayaquarium.org/cr/aquarium.aspx> (10/27/11).
- ^{ccxxvii} Monterey Bay Aquarium. "Center for the Future of the Oceans." Found at:
<http://www.montereybayaquarium.org/cr/cffo.aspx> (12/3/11).
- ^{ccxxviii} Interview with Michael Sutton, VP and Director of the Center for the Future of the Oceans (11/11/11).
- ^{ccxxix} Monterey Bay Aquarium News Release. *Groundbreaking Study Identifies, Quantifies Conservation impact of Zoo, Aquarium Visits*. September 21, 2006. Page 2.
- ^{ccxxx} Interview with Michael Sutton, VP and Director of the Center for Ocean Solutions (11/11/11).
- ^{ccxxxi} Conservation Strategy Group. "About." Found at: <http://www.csgcalifornia.com/about.html> viewed
11/26/2011(11/10/11).
- ^{ccxxxii} Monterey Bay Aquarium. 2010 IRS Form 990, Schedule G, page 1. Found at:
<http://www.montereybayaquarium.org/aa/financials.aspx> (11/17/11).
- ^{ccxxxiii} Personal Communication, James Covell, 11/22/11.
- ^{ccxxxiv} Office of the Attorney General, State of California Department of Justice. "Charity Research Tool." Found at:
<http://oag.ca.gov/charities/charity-research-tool#Location:Default> (11/28/11).
- ^{ccxxxv} *Consolidated Financial Statements and report of Independent Certified Public Accountants: Monterey Bay Aquarium Foundation*. Grant Thornton. December 31, 2010 and 2009, page 4. (Referred to as: *Consolidated Financial Statements*).
- ^{ccxxxvi} Interview with Michael Sutton, VP and Director of the Center for the Future of the Oceans (11/11/11).
- ^{ccxxxvii} *Consolidated Financial Statements*, page 4.
- ^{ccxxxviii} *Consolidated Financial Statements*, page 11.
- ^{ccxxxix} Interview with Michael Sutton, VP and Director of the Center for the Future of the Oceans (11/11/11).
- ^{ccxl} Monterey County Economic Development Department. "At a Glance: Economy and Workforce." Found at:
<http://www.co.monterey.ca.us/EconomicDevelopment/economy-workforce.shtml> (12/3/11)
- ^{ccxli} *Ibid.*, found at: <http://www.co.monterey.ca.us/EconomicDevelopment/economy-workforce.shtml> (12/3/11).
- ^{ccxlii} Monterey County Convention & Visitors Bureau. "See Monterey: Top things to do in Monterey County, California." Found at: <http://www.seemonterey.com/tourist-attractions/> (12/3/11).
- ^{ccxliii} Michael Orbach. "The Human Ecology of Marine Policy," Slide 12. Found at: <http://courses.duke.edu>
(10/2/11).
- ^{ccxliv} Monterey Bay Aquarium. "Our Mission & Leadership." Found at:
<http://www.montereybayaquarium.org/aa/trustees.aspx> (11/25/11).
- ^{ccxlv} Interview with Jim Covell, Director of Interpretive Programs at the Monterey Bay Aquarium (11/22/11).
- ^{ccxlvi} Randi Korn & Associates, Inc. *Summative Evaluation of Hot Pink Flamingos: Stories of Hope in a Changing Sea*. Found at: <http://informalscience.org/evaluation/show/341> (11/15/11). (Referred to as: *Summative Evaluation of Hot Pink Flamingos*).

-
- ccxlvi *Summative Evaluation of Hot Pink Flamingos*. Found at: <http://informal.science.org/evaluation/show/341> (11/15/11).
- ccxlviii Personal Communication, James Covell, 11/22/11.
- ccxlix Personal Communication, James Covell, 11/22/11.
- cccl Monterey Bay Aquarium. *MBA Explore our History*. Found at: <http://www.montereybayaquarium.org/aa/timelineBrowser.asp?tf=7> (10/28/11).
- cccli Monterey Bay Aquarium. *MBA Explore our History*. Found at: <http://www.montereybayaquarium.org/aa/timelineBrowser.asp?tf=7> (10/28/11).
- ccclii *Ibid.*, Found at: <http://www.montereybayaquarium.org/aa/timelineBrowser.asp?tf=7> (10/28/11).
- cccliii Interview with Michael Sutton, VP and Director of the Center for the Future of the Oceans (11/11/11).
- cccliv Monterey Bay Aquarium 990 Form, Schedule C, Part II-A found at: http://207.153.189.83/EINS/942487469/942487469_2009_06AD4D2E.PDF (11/15/11)
- ccclv Interview with Michael Sutton, VP and Director of the Center for the Future of the Oceans (11/11/11).
- ccclvi *MBA Overview – 2011*, page 3.
- ccclvii *MBA Explore our History*, found at: <http://www.montereybayaquarium.org/aa/timelineBrowser.asp?tf=1> (11/10/11).
- ccclviii The David and Lucile Packard Foundation. “Monterey Bay Aquarium.” Found at: <http://www.packard.org/what-we-fund/foundation-commitments/monterey-bay-aquarium/> (11/10/11).
- ccclix Monterey Bay Aquarium Research Institute. “Vision Statement by David Packard, MBARI Founder.” Found in: *MBARI 2011 Strategic Plan*. Page 1. Found at: http://www.mbari.org/about/sp/MBARI_Strategic_Plan_2011.pdf (11/10/11).
- ccclx *Ibid.*, page 13.
- ccclxi Center for Ocean Solutions. *Vision, Focus and Structure*. Found at: <http://www.centerforoceansolutions.org/sites/default/files/pdf/Vision%2C%20Focus%20and%20Structure.pdf> (11/10/11).
- ccclxii Pew Oceans Commission. *America’s Living Ocean Charting a Course for Sea Change*. May 2003. Page iv. Found at: http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting_ocean_life/env_pew_oceans_final_report.pdf (12/4/11).
- ccclxiii California Fish and Game Commission. “Commissioners.” Found at: <http://www.fgc.ca.gov/public/information/bios.aspx> (10/23/11).
- ccclxiv “About the Fish and Game Commission.” California Fish and Game Commission. Found at: <http://www.fgc.ca.gov/public/information/> (11/3/11).
- ccclxv “Definitions: Marine protected areas.” Marine life Protection Act (As Amended to July 2004). Fish and Game Code, sections 2850-2863. Found at: http://www.dfg.ca.gov/mlpa/pdfs/mlpa_language.pdf page 2.
- ccclxvi California Department of Fish and Game. “California Marine Life Protection Act Initiative Charter of the MLPA Blue Ribbon Task Force, 2009-2009.” Found at: http://www.dfg.ca.gov/mlpa/pdfs/btrf_charter_sc.pdf page 2.
- ccclxvii Palumbi, S. and Sotka, C., page 149.
- ccclxviii Langstroth, Lovell and Langstroth, Libby. *A Living Bay: The Underwater World of Monterey Bay*. University of California Press: Berkeley, 2000, page 1.
- ccclxix *Ibid.*, page 2.
- ccclxx *MBA Overview – 2011*. Found at: <http://www.montereybayaquarium.org/storage/pressroom/presskit/pdf/2011%20Monterey%20Bay%20Aquarium%20Overview.pdf> (10/2/11).
- ccclxxi Monterey Bay Aquarium. “Exhibits.” Found at: <http://www.montereybayaquarium.org/efc/exhibits.aspx?c=dd> (10/2/11).
- ccclxxii Putnam, page 339.
- ccclxxiii *Ibid.*, page 378.
- ccclxxiv Personal Communication, Mark Plunkett, January 12, 2012.
- ccclxxv Personal Communication, Mark Plunkett, January 12, 2012.

-
- ^{cclxxvi} Swanagan, Jeffrey S (2000). Factors Influencing Zoo Visitors' Conservation Attitudes and Behaviors. *The Journal of Environmental Education*. 31: pages 26-30.
- ^{cclxxvii} Rabb and Saunders, page 1.
- ^{cclxxviii} Falk, John H. et al., (2007). Why Zoos & Aquariums Matter: Assessing the Impact of a Visit. Association of Zoos & Aquariums. Silver Spring, MD. Page 4.
- ^{cclxxix} Ibid., page 70.
- ^{cclxxx} Ibid., page 3.
- ^{cclxxxi} Ibid., page 5.
- ^{cclxxxii} Ibid., page 3.
- ^{cclxxxiii} Ibid., page 9.
- ^{cclxxxiv} Ibid., page 13.
- ^{cclxxxv} Personal Communication, Paul Boyle, March 16, 2012.
- ^{cclxxxvi} Personal Communication, Paul Boyle, March 16, 2012.
- ^{cclxxxvii} Personal Communication, Heather Tausig, March 22, 2012.
- ^{cclxxxviii} 26 U.S.C. § 501: US Code – Section 501 Exemption from tax on corporations, certain trusts, etc. Found at: <http://codes.lp.findlaw.com/uscode/26/A/1/F/I/501> (12/4/11).
- ^{cclxxxix} Internal Revenue Service. "Lobbying." Found at: <http://www.irs.gov/charities/article/0,,id=163392,00.html> (12/4/11).
- ^{ccxc} Ibid., found at: <http://www.irs.gov/charities/article/0,,id=163392,00.html> (12/4/11).
- ^{ccxci} Ibid., found at: <http://www.irs.gov/charities/article/0,,id=163392,00.html> (12/4/11).
- ^{ccxcii} National Council of Nonprofits. "The Powerful, Free, and Easy 501(h) Election: Benefits Galore!" Found at: <http://www.councilofnonprofits.org/nonprofit-advocacy/501h-election> (12/4/11).
- ^{ccxciii} Ibid., found at: <http://www.councilofnonprofits.org/nonprofit-advocacy/501h-election> (12/4/11).
- ^{ccxciv} Internal Revenue Service. *Election/Revocation of Election by an Eligible Section 501(c)(3) Organization To Make Expenditures To Influence Legislation*. Form 5768. Found at: <http://www.irs.gov/pub/irs-pdf/f5768.pdf> (12/4/11).
- ^{ccxcv} Internal Revenue Service. "Measuring Lobbying Activity: Expenditure Test." Found at: <http://www.irs.gov/charities/article/0,,id=163394,00.html> (12/4/11).
- ^{ccxcvi} Interview with Wendy Cluse, Conservation and Research Coordinator, North Carolina Aquarium at Pine Knoll Shores (11/15/11).
- ^{ccxcvii} Interview with Michael Sutton, VP and Director of the Center for the Future of the Oceans (11/11/11).
- ^{ccxcviii} "About Us" *Seattle Aquarium*. Found at: <http://www.seattleaquarium.org/page.aspx?pid=974> (11/26/11).
- ^{ccxcix} Internal Revenue Service. "Lobbying." Found at: <http://www.irs.gov/charities/article/0,,id=163392,00.html> (12/8/11).
- ^{ccc} Seattle Aquarium. *Gene Gentry McMahon, Waterwatching: Puget Sound and the Duwamish River*. Found at: <http://www.seattleaquarium.org/page.aspx?pid=1107> (12/8/11).
- ^{ccci} Interview with Jim Covell, Director of Interpretive Programs at the Monterey Bay Aquarium (11/22/11).
- ^{cccii} Wilmot, David et al. *Turning the Tide: Charting a Course to Improve the Effectiveness of Public Advocacy for the Oceans*. October 2003. Page 4. Found at: <http://www.oceanchampions.org/turningthetide.htm> (12/7/11).