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# ZAMs in Action!
## How Zoos, Aquariums and Museums can Save the Seas

## I. Introduction

In the not so distant future, global warming will cause sea level rise, catastrophic weather events and widespread extinctions. And yet carbon gas emissions are rising.

Plastic marine debris from consumer goods kills hundred of thousands of birds, turtles, and other marine life each year. And yet people keep using plastic.

Right now, over 5,000 barrels of oil is spilling in the Gulf Coast each day (Robertson & Kaufman, 2010). Yet people still drive to work and idle their cars.

As these examples illustrate there is a clear disconnect between what society knows about the environment and what it does with that knowledge. Individuals' daily activities can have a huge impact on the aforementioned environmental problems. Households can dramatically reduce their carbon emissions by buying a solar water heater. Diners can bring their own silverware instead of using plastic utensils. Drivers can buy hybrids, carpool or take public transportation. Some people do consciously take these actions to reduce their impact on the planet, but many people do not.

Many key environmentalists, policy makers, and activists had have identified a lack of general public understanding of the human/nature connection as a key barrier to curbing environmental degradation (Abbasi, 2006). But how do we reach people? How do we encourage them to take the conservation actions that could help save our planet?

Over 200 million people visit zoos, aquariums and museums every year. Visitors come to these establishments excited and ready to learn about plants, animals and the environment. Because of their position as trusted sites for public education[i] Zoos, Aquariums and Museums (ZAMs) are perfectly positioned to be strong environmental

advocates. My research will explore what sorts of programs and general strategies ZAMs should be employing to promote conservation behaviors amongst their visitors.

I will be focusing on conservation communication as it relates to marine ecosystems and watersheds because I will be conducting my research in partnership with The Ocean Project. The Ocean Project in a non-profit which "advances ocean conservation in partnership with zoos, aquariums, and museums (ZAMs). We [the Ocean Project] help them reach their millions of visitors and the public on the importance of conserving our ocean planet. Our aim is to help our Partners effectively educate for conservation action" ("About the Ocean," 2009).

I will be conducting site visits of a number of different ZAMs across the country. I will document different methods of marine conservation education and evaluate the effectiveness of these outreach programs at "educating for action." I will be working with the Ocean Project and its network of ZAMs to explore and identify characteristics of educational programs that are particularly effective at promoting conservation by:

1. Altering participants' behaviors, making them more marine-friendly
2. Developing an "ocean ethic" wherein people understand the intrinsic and practical value and limitations of oceans.

This research will try to answer the question:

***How can ZAMs effectively educate the public in a way that creates lasting attitudes and behaviors that promote marine health?***

A significant amount of research has been done investigating weather or not visitors actually learn things at ZAMS (Falk, et al, 2007; Ecsite-UK, 2008) these studies have found that ZAMs do increase knowledge and create memorable, emotional

experiences. However, the connection between ZAMs and sustainable behavior change is less studied and the results have been less conclusive (Ballantyne & Packer, 2005)

My research will focus on helping ZAM professionals understand what "educating for action" should look like by identifying concrete examples of effective outreach exhibits and programs. This research is not meant to be prescriptive for all ZAMs, but an attempt to identify and measure the success of specific examples of conservation education. My hope is that these examples will provide inspiration for ZAM administrators, educators, exhibit designers. These professionals will be best equipped to further develop these ideas into strategies that fit their ZAMs individual goals and visitor demographics.

From my background reading I predict that ZAMs who's programs follow the Ocean Project's "Framework for Conservation Communication" (either intentionally or coincidentally) will be most successful at inspiring marine friendly behavior change amongst their visitors. The framework suggests that ZAMs should,

1. Promote positive emotional connections to the ocean
2. Convey the importance of the interconnectedness of all life
3. Emphasize the importance and power of individual responsibility

A significant part of my work will be operationalizing this ideas-based framework into concrete indicators that can be observed and recorded. I will use these indicators to create a rubric for my site visits of different ZAMs so I know what factors I should be looking for. My methods for developing and using this rubric, as well as my plan for measuring visitor learning are detailed in the "Conceptual Design of the Study", portion

of this proposal. The remainder of this proposal will present the background for this study, the methods, a discussion of the feasibility, and a proposed timeline and budget.

My hope is that this research will help ZAMs mobilize their 200 million visitors to engage in positive environmental behaviors. My partnership with the Ocean Project insures that my research will truly be useful. I will be able to use the Ocean Projects network of 1,077 partner organizations to both collect and disseminate this information. I hope that this research can help close the gap between what we know and what we do when it comes to protecting and preserving the world oceans.

## II. A Review of the Relevant Literature:

On the Need for More Public Engagement in Environmental issues:

The first step in promoting conservation behaviors is increasing public understanding of environmental concerns. In this era of severe environmental degradation creating an informed public is essential. Many of the environmental problems we face today: climate change, deforestation, or plastic marine debris can be traced to general over consumption and a lack of public understanding of these often complex issues. Global warming is a prime example. There is a consensus among (the vast majority of) scientists that global warming is taking place and it is being caused by human activities. However, that consensus does not carry over to the general public, in March of 2010, 46 % of American's attributed global warming to natural causes (Newport, 2010) rather than human behaviors. Most environmental problems are also plagued by similar gaps in understanding.

This lack of understanding leads to a lack of action and engagement in the general public. Experts of site this lack of public will as a "key missing ingredient in tackling our energy and climate challenges" (Abbasi, 2006, pp. 6).

On the Specific Case of the World Oceans:

When it comes to a lack of public engagement and understanding the plight of the world's oceans is no exception. According to the Pew Ocean Commissions 2003 Report (2003, p. 5) "America's oceans are in crisis and the stakes could not be higher." Ocean ecosystems are threatened by nutrient loading, pollution, over exploitation and climate change. And yet the majority of the public believes the oceans to be in relatively good health (*America, the ocean,* 2009).

This lack of understanding represents a huge potential to both educate and motivate a uniformed audience. According to Ocean Project's National Tracking Survey (2009) people generally feel very uninformed about ocean health. When asked about the health of deep oceans, 47% of respondents said they simply did not know. Respondents felt they knew a little more about costal areas, but this still represents a significant area for public outreach.

On the potential of ZAMs:

ZAMs are in many ways an ideal place to do environmental outreach. First off, they have a large audience; ZAMs reach over 200 million visitors each year ("About the Ocean," 2009). According to Ocean Project Tracking Data (2009) ZAMs are also highly trusted by their visitors as sources of reliable, accurate information. ZAMs are perfectly poised to educated people about conservation and sustainable behaviors not only because of their large audience, but also by virtue of their position as centers of life-

long learning.

As Roy Ballantyne and Jan Packer (2005, p. 281) point out in their article on environmentally sustainable attitudes and free-choice learning, "only a small percentage of the public's understanding of the world in general, and environmental conservation and sustainability in particular, is gleaned from [formal education]. Over the course of a lifetime, the average citizen spends only 3% of his or her time in school." Life-long, free-choice learning, like the learning that takes place at ZAMs happens significantly more often through out a persons' lifetime. This is particularly salient for contemporary environmental issues, because many of these concepts (carbon foot print, food miles, etc) were not taught when today adult decision makers were in school. Informal education represents a key way to reach this important demographic.

On Learning Outcomes at ZAMs:

A significant amount of research has been done investigating whether or not visitors actually learn things at ZAMS (Falk, et al, 2007; Ecsite-UK, 2008) these studies have generally found that ZAMs do increase knowledge and create memorable, emotional experiences. During an eight month follow up study "over half of visitors (61%) talked… about what they learned (either reinforced prior understandings or new knowledge gained) from their zoo or aquarium visit" (p. 11).

In 2007 the Association of Zoos and Aquariums (AZA) did a comprehensive study of visitor learning at zoos and aquariums. Their study "first focused on understanding something about the nature of the visitors who come to zoos and aquariums; in particular their motivations for visiting. The second phase focused on measuring changes in visitor's short and long-term conservation-related knowledge and attitudes" (Falk, et al.

2007 p. 7). This study identified four "types" of ZAM visitors, what they are looking for in their experience and how to reach out to them. My study will build upon this work to see how these different types of visitors can be inspired to take conservation actions.

A major finding of the AZA study that will inform my research is the finding that "individual action messages, such as 'There is a lot I can to do conserve,' and 'I am part of the solution to nature's problems,' significantly increased as a consequence of the visit" to a zoo or aquarium. Identification with these statements increased by 61% and 54%, respectively (Falk, et al. 2007, p. 11). Visitors clearly leave a ZAM confident and motivated to take conservations action. My research will investigate under what circumstances this feeling translates into actual behavior change.

On the Difficulty of Creating Behavior Change

It is very difficult to change peoples' behaviors. Merely explaining the purpose of an action is not enough. The Yale Project on Climate Change and the George Mason University Center for Climate Change Communication (Leiserowitz, Maibach, & Roser-Renouf, 2010, p. 2) study showed that for most conservations actions (adjusting the thermostat, buying local food or unplugging electronics) there was a large gap between people's perceived value of the action and engagement in it. For 14 out of 17 conservation actions one to two thirds of respondents "Believe the action is important, but do not currently engage in it." My research will explore what ZAMs can do to apply the positive conservation emotions they create to this action gap.

## III. Conceptual Design of the Study:

This study will consist of three pieces all of which will take place at ZAMs or with ZAM staff. I will begin my research by interviewing key ZAM staff at 3 to 5 institutions. I will choose institutions that work closely with the Ocean Project and are familiar with the concept of "educating for action." I will use these interviews to identify barriers to conservation communication. I will also use these interviews to learn more about how ZAMs see their role in conservation.

In addition to these interviews I will conduct site visits at an additional 3-5 ZAMs on top of site visits of the locations where I interview key staff). I may do interviews at these locations if time permits, but the primary point of these visits is to develop and test my "educating for action" rubric and collect data on the effectiveness of the observed programs and exhibits. (see Approach for more details). My hypothesis is that

***ZAMs who follow the Ocean Project's "Framework for Conservation Communication" will be most successful at inspiring marine friendly behavior change amongst their visitors.***

The framework includes three elements:

1. Promote positive emotional connections to the ocean
2. Convey the importance of the interconnectedness of all life
3. Emphasize the importance and power of individual responsibility

A significant amount of my work will go into operationalizing these elements into indicators that can be evaluated during a site visit. The following is collection of some of the indicators I may select. Developing this rubric is a key part of the research I will be doing. So obviously, it is not compete at this point. In my final thesis I will include a rational for each indicator. I did this for the first indicator to give an idea about what the rest would look like. The rest of the indicators are currently just thoughtful ideas. This

section is included to give a picture of what the rubric may include; however, I expect it to evolve significantly.

*Element 1: Appeal to, and promote, positive emotional connections to the ocean that most people possess.*

Potential Indicators:

- Outdoor events - According to the Pew Report on Ocean Literacy (2003) "Experiencing coastal environments and developing environmental values bring people closer to the problems faced in coastal and ocean areas… these data suggest people need to actually experience the problems before they are likely to change their views" (p. 6). The AZA (Falk et al, 2007, p. 12) echoed that sentiment when if found that "Visitors may see their visit as a nature experience; we can successfully encourage them to explore and value nature. *Implication*: Other research has shown that spending time in nature is critical for the development of an environmental ethic and in promoting healthy children. For urban dwellers, we [ZAMs] may be their best 'nature experience'"

- Developmentally appropriate
- Hands on exhibits
- Friendly, approachable staff

*Element 2: Convey information through an "interconnectedness of life" framework that conveys the importance of the interconnectedness of all life, which holds high credibility with most people.*

Potential Indicators:

- Includes connections to contemporary local issues
- Exhibits and or programming connect terrestrial and marine ecosystems: watershed component
- Exhibits on global environmental issues such as Global Warming, Carbon poisoning, or ocean acidification.
- Directly connects ocean issues to peoples daily lives (i.e. through sea food, urban runoff or a similar issue)

*Element 3: Emphasize the importance and power of individual responsibility in protecting oceans for the future.*

Potential Indicators:

- Conscious consumer programs: Sea Food card or carbon calculator
- Commitments program: which encourage visitors to make a behavior pledge
- Volunteer opportunities to do work in the marine environment

I will use visitor surveys (see Approach section) to measure how well different programs inspire marine friendly behavior. I operationalized the behavior change variable by asking visitors how often they consider the ocean in making certain day-to-day choices, such as grocery shopping or driving schedules.

## IV. Approach

The three phases of my research will employ a number of different qualitative and quantitative research methods.

**Interviews with key ZAM staff at partner institutions.**

These semi-structured interviews will help me to identify current barriers to "educating for action" in ZAMs. I will work with the Ocean Project and use their contacts to identify the appropriate participants for these interviews. They may include museum directors, education/outreach directors or exhibit designers. These interviews will focus on upper level staff in order to get a picture of what support ZAMs need on an organizational level. I will also ask these experts about their audience demographics and strengths and weaknesses they see with in their institution. The purpose of these interviews in to shape my research around what ZAMs actually need, to insure that the results are useful.

**Guided Site Visits to ZAMs.**

I will be conducting site visits at a variety of ZAMs across the country to get a good idea of what "educating for action" looks like in the field. I will be working with my advisors and ZAM experts to develop a rubric that will guide my analysis of the extent to which ZAM I visit effectively "educates for action." I will use the Ocean Projects framework for conservation communication to develop my rubric (see

Conceptual Design Section). I will also collect data on the target and actual audience of the institutions that I visit.

I will also make note how the indicators I select (see Conceptual Design Section) are achieved. These are some potential ways of delivering an indicator to the ZAM audience:

| | |
|---|---|
| Web information | One time interactive program |
| Static Exhibit | Interactive event |
| Interactive exhibit | Reoccurring event |

During site visits I may conduct another round of semi-structured interviews with ZAM staff about how effective and well received they feel these programs are.

**Audience Surveys**

In order to evaluate how effective these programs are I will conduct pre, post and follow up surveys to see how much information visitors retained and how that knew knowledge did or did not their change behaviors. I will also collect data on visitors understanding of, and feelings of personal connection to, the Ocean. By matching my personal connection questions to those in the Ocean Project National Tracking survey, I will be able to compare this information to the national data that the Ocean Project publishes. This will help me see to what extent, if at all, the group of people who visit ZAMs have different levels of Ocean emotions that the average American. I will use the survey in Appendix A in order to conduct this data.

In addition to the survey I will also ask visitors to map which exhibits and events they attended in the museum. I will match this data with my qualitative descriptions of these exhibits and events to figure out what qualities of an exhibit or program make it effective at communicating conservation.

I will partner with the ZAMs I am visiting to administer these surveys. Depending

on the location of the ZAM and how much time I can spend their, I may administer the pre and post visit surveys to a random group of 30 visitors at each site.

To collect this data I will intercept visitors as they are entering the museum. I will ask them if they would be willing to participate in my study. I will use a technique used by the AZA to collect visitor information of this nature. I will offer people the use of pedometer to see how many steps they will take during their visit. The AZA has found this strategy to be incredibly effective, "Amazingly, as we found with similar interventions, virtually everyone sought us out at the end of their visit, returned their pedometers and consented to being interviewed about their visit." People feel obligated to return the pedometer, so they will seek out the interviewer instead of the interviewer having to hunt down participants. This way I can more easily conduct pre and post surveys with the same group of participants. I hope that by using this AZA technique I can be equally as effective.

I will asks visitors who are surveyed to, if they are willing, provide me with follow up contact information so that I can contact them by e-mail, snail mail or phone to conduct one follow up survey in six months. This sixth month follow up will include similar questions in order to gauge how much visitor have retained and grown in their thoughts about marine conservation. This survey will be Internet and e-mail based, with a phone follow up for those who do not respond to the e-mail.

For institutions where I cannot visit long enough to conduct surveys myself (locations I travel to, where can not stay for the extended hours it takes to collect 30 surveys) I will ask the staff of that ZAM to assist me. I will be able to train ZAM staff on

how to conduct the surveys during my site visit so I can insure that all data will be collected in the same way.

While this method does have its merits there are also a number of concerns about feasibility and validity. I feel this project will be feasible but difficult. It is always tricky to get people to participate in surveys and interviews. The 6-month follow up may prove particularly difficult. However, I hope that collecting multiple types of contact information (e-mail, cell number, mailing address) will help to achieve a relatively high response rate. I feel strongly that because I am doing this work during the summer and have the backing of the incredibly well connected Ocean Project. I should be able to compete this research in the 9 month time period.

Another concern with this research method is the validity. One weakness of the pre-visit surveys conducted at the door is that they may excessively modify the experience of visitors and change the posttest results. I will be consulting with my advisors about the possibility of doing a retrospective-pre test, like the AZA uses, instead. In this method participants are asked what their perceptions were before the visit and how they changed during the visit once at the end of the visit. In this method participants are selected at the beginning of their visit so that they map where they go in the ZAM, but are only given very general information about the purpose of the study. I will consider this option with my advising team.

Finally as with all research there is an ethical component to consider. Because my study is relatively non-invasive there is a very tiny chance of it causing harm. However, in interacting with people it is always important to remember not to put any pressure on participants. I will make sure have a line informing participants that they can

stop with interviews, mapping exercises, or surveys at any time if they would like. Because I am working closely with the Ocean Project and will be interviewing ZAM directors I think my work will have a high level of beneficence. I am designing the study to be useful to the ZAM community. I will also make sure to share my findings with ZAMs who participated though web posts, the Ocean Project Newsletter and presentations.

Upon finishing my research, I will write it up into a formal thesis document. My readers will be Caroline Karp (Environmental Studies), Dan Bisaccio (Education) and Bill Mott (The Ocean Project).

V. Budget and Timeline

Budget:

A. Senior Project Personnel Salaries - $3,000 for one summer stipend
B. Administrative and Clerical Salaries – none
C. Fringe Benefits – none
D. Equipment – none
E. Travel - $261.50 : for travel to Boston ( 3 round trips, $55.50) , New York (one round trip, plus subway fare $80), and Maui (one trip, $126)
F. Participant Support – none
G. Other Direct Costs
    1) Materials and Supplies - $209 for Ocean Project logo pedometers, min order 100 pedometers. Extras could be used by the Ocean Project as giveaways. Survey Printing -- $200 to print 300 copies of a multiple page survey, including a map.

2) Publication/Documentation/Dissemination - $150 to bind final report.

3) Consultant Services – none

4) Computer Services – handled in house by Ocean Project Staff

5) Subawards – none

6) Other – none

H. Total Direct Costs – $3,817.5

**Time Line:**

**May:**
**Week 2:** Get acquainted with Ocean Project office and website. General background research.

**Week 3:** Draft ZAM directors/staff interview (to find barriers to conservation ed.), collect ideas and potential criteria for site visit rubric. Write up project ideas to present to Bill

**Week 4:** Meet with Bill about internship plan, project ideas and interview. Edit! Compile list of ZAM contacts to interview, contact them and schedule interviews. Begin compiling list for site visits. *Tentative meeting with advising team 27th?*

**June**
**Week 1:** In Pittsburg on vacation! E-mail final draft of interview questions to Bill and advisors for edits. Follow up on interview scheduling.

**Week 2:** In Florida for vacation! E-mail draft of site visit rubric to Bill for edits

**Week 3:** Schedule site visits. Send out communication to partners asking for stellar examples of "educating for action." Conduct interviews with ZAM directors/staff. Edit rubric, have draft to present to advisors.

**Week 4:** Continue interviews with ZAM directors/staff, write up and analyze their responses. Finalize site visits and rubric.

**July**
**Week 1:** Conduct interviews with ZAM directors/staff and site visits. Write up notes and make edits to a master rubric. Collect excellent examples for website section. *Tentative meeting with advising team on the 1st?*

**Week 2:** Conduct interviews with ZAM directors/staff and site visits. Write up notes and make edits to a master rubric. Collect excellent examples for website section.

**Week 3:** Conduct interviews with ZAM directors/staff and site visits. Write up notes and make edits to a master rubric. Collect excellent examples for website section.

**Week 4:** Write up highlighted program for website section. Write up notes on current rubric, ideas for further work and internship summary.

**August – home in Hawaii. Come Visit!**
**Week 1:** Site visit at the Waikiki Aquarium, Bishop Museum, Mālama Maunalua. Write up necessary case studies on these site visits

**Week 2:** Site visit and interview at Maui Ocean Center and Hawaii Nature Center (Maui branch)

**Week 3**: Finnish up additional site visit write-ups.

**Week 4**: Site visit at the Shedd Aquarium in Chicago

**September:**
Finnish transcribing and analyzing interviews and data. Decide if additional site visits over Thanksgiving or Christmas break would be beneficial.

**October:**
Consult with advisors about any additional data needs. Contact additional site visit/interview locations. Organize visits.

**November:**
Conduct additional visits and work on writing up data analysis.

**December:**
Conduct additional visits and work on writing up data analysis.

**January:**
Send out initial e-mail follow up surveys. Send two reminder e-mails to those who do not initially respond.

**February:**
Follow up calls for those participants that did not respond to e-mail. Collect an analyze data from follow up calls.

**March:**
Analyze all data and write report. Consult with advisors.

**April:**
Finish report and present findings to the Ocean Project and participating partner ZAMs.

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*Note: I chose to do my citations in APA format because all formal and informal education papers use APA style. If I want this to be a publishable paper, useful for ZAM professionals it should be written in APA and I don't want to have to change