STUDENT PROJECT REPORT TO THE UNIVERSITY OF HAWAII MARINE OPTION PROGRAM

Mokupapapa Discovery Center Internship

Project Leader
Alexander Lau
Marine Option Program
University of Hawaii at Hilo

Marine Option Program (MOP) 2015

Project Time Line
September 2nd, 2015- December 15th, 2015

Advisor

Dr. S. Colbert, Ph.D.
Marine Science Department
University of Hawai'i at Hilo

TABLE OF CONTENT

ABSTRACT

Papahānaumokuākea, The North Western Hawaiian Islands (NWHI) are an important string of islands that are the homes of Albatrosses. The NWHI are important for the development and breeding of Albatrosses because the islands are protected by a boarder in placed by the Hawaiian government. Plastics are a big marine issue because Albatross fledglings are ingesting microplastics, threatening their survival. Outreach and education is a solution to address marine issues associated with plastics. Mokupapapa Discovery Center is my internship location which specializes to educate the public about the NWHI and marine issues associated with plastics. For my project I proposed an activity utilizing a stuffed animal for children to explore the harms of plastics in Albatrosses. My internship also includes daily duties to gain valuable experience how to educate the public who visit Mokupapapa Discovery Center.

INTRODUCTION

Papahānaumokuākea or also known as The North Western Hawaiian Islands (NWHI) are a string of islands, North West of Hawai‘i’s main Hawaiian Islands. The islands are significant hunting and breeding grounds for a small in species, but large in numbers of Laysan Albatross. The known three Albatrosses that are found exclusively on the NWHI’s are Black-footed Albatross (*Phoebastria nigripes),* Laysan Albatross (*Phoebastria immutabilis),* and Short-tailed Albatross (*Phoebastria albatrus)* who inhabit Midway Island and Laysan Island (U.S. Fish & Wildlife Service 2017). The NWHI restricts stepping foot or treading the waters within the 582,578 square miles of protected boarders, all in the efforts to prevent the spread of invasive plants, invasive animals (Papahānaumokuākea Marine National Monument 2018). Including, marine life, Hawaiian artifacts, and animals who reside on the islands (Papahānaumokuākea Marine National Monument 2018). Within the protected boarders 99.7% of Albatrosses who inhabit Midway Island and Laysen Island breed on the islands and hunt within the waters, providing an ideal environment for their population counts and growth development (Robertson et al. 2003, Sileo et al. 1990). Even though the islands are protected, the Albatrosses are not safe from direct impacts of plastics that encroach their environment (Acampora et al. 2014).

Plastics are a direct danger to Albatrosses; the materials break down into smaller pieces causing harm when ingested. When plastics break down from over exposure to the elements, the plastics wither down into microplastics (Rilling 2012). Once plastics are broken down into smaller pieces, the plastics are then called “secondary plastics” which are pieces of plastics that originated from whole plastic bottle or container that we call “primary plastics” (Rilling 2012). Albatrosses can mistake microplastics for a variety of reasons, colors, shapes, and an easy target resembling a piece of pelagic fish, egg, or shrimp (Carpenter & Wolverton 2017). Adult Albatrosses are not the primary sea birds who are endangered by microplastics it’s the fledgling or infant Albatrosses who lay in wait to be fed (Gray et al. 2012).

Fledglings are infant Albatrosses who are completely dependent on the parents who shelter, protect, and feed before maturity to leave the nest (Acampora et al. 2014). Adult Albatrosses can store food before being regurgitated as feed for their fledglings (Acampora et al. 2014). When fledglings are fed, both the adult and infant can’t distinct what is food or plastic, after feeding it’s already too late (Carpenter & Wolverton 2017). Fledglings don’t have the ability to regurgitate contents in their stomach during their fledgling stage (Acampora et al. 2014). The plastics sit in the stomach, registering the brain to deny more food since the stomach is occupied with indigestible plastics, resulting in fledglings to die with a full stomach (Azzarello & Vleet 1987). Since 1990 20% of fledglings are affected by the patterns of ingesting plastics and increasing with more plastics being used around the world (Louis et al. 1990). There is a solution to address this marine issue, outreach and education.

Outreach and education can be a solution to address microplastic by bringing the issues to the community. For people who are not aware how plastics, they are unaware how the material harms Albatrosses who inhabit the NWHI (Carpenter & Wolverton 2017). A growing concern because people continuously use plastic without knowing how plastics items can be broken down into microplastics (Carpenter & Wolverton 2017). To educate the community how microplastics affect Albatrosses, lectures, activities, and community service is an approach to have the people

closer to the problem without the need to visit the islands (Strawn 1994). For an activity to be more interactive using visual aids is a highly recommended method because it allows people to touch and see microplastics, leave a more lasting impression (Stokes 2002).

Outreach can be mobile, reaching out to communities who live further away from the coastline (Dickey 2005). For students and communities who live more inland, the issues about microplastics harming Albatrosses may seem less important. How ever this is an important issue that everyone should know about to better their own decisions and sustainable practices in the future. Using electronic computer games, online lectures, and live chats are methods to reach out to communities who are less accessible to learn about microplastics (Kim et al. 2006). Using technology to convert inaccessible education into distance learning, allowing for students and the community to interact and learn from computer programs and video lectures (Kim et al. 2006). Allowing exposure to how microplastics harm Albatrosses, then later debrief possible solutions within their own communities to help prevent or limit the use of plastics (Diduck 1999). It's all about encouraging empowerment for the community to make a change on how to reduce the use of plastics (Diduck 1999).

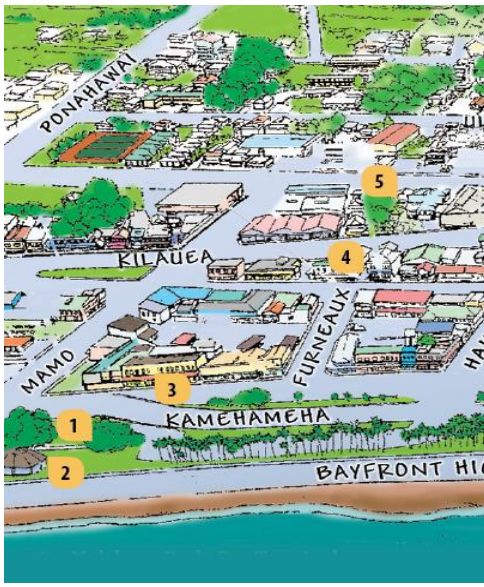
OBJECTIVES

1) Propose an activity to be used by Mokupapapa
2) Perform daily duties on the main floor of the center
3) Shadow Mokupapapa staff to understand the facilities style of educating the public about the NWHI
4) Gain valuable hands-on-experience to educate people who visit the discovery center

MATERIALS AND METHODS

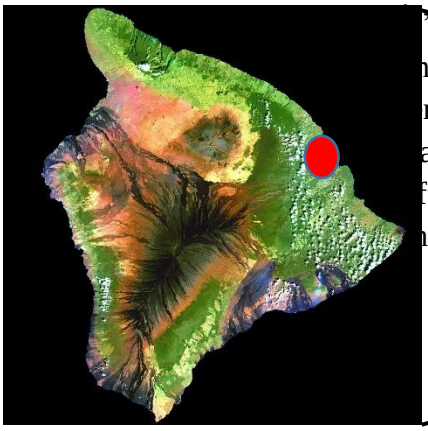
Sight Location

Mokupapapa Learning Center is located in Hilo, Hawai‘i. The building is a former owned building by the Kenan family located at the far end of Down Town Hilo, right across Cronnies Burger Joint. The learning center's main objective is to educate visitors for free because the center is a non-profit organization dedicated to educating everyone about the NWHI. The facility facilitates nature, culture, and about NWHI within 582,578 square miles of protected boarder. Once a week, the learning center offers free lectures for the community. If there isn't a special event or lecture, the facility offers walk up activities and an aquarium to enjoy at a person's own pace.



Daily Duties

When I enter through the doors of Mokupapapa, my first task is to get ready and sit at the front desk to welcome visitors. At the front desk I greet new visitors to the facility and introduce ’s mission to educate everyone about the NWHI. Using a o walks through the center’s doors as evidence how often the ry now and then, when the main floor is slow I would walk and ask if they had any questions regarding the center. Before they have any last-minute questions. For locals I remind them eld in Mokupapapa, events could range from free lectures to



Proposing activities is encouraged by staff, opening the floor to new ideas and approaches to educate the community. An idea proposed is using a stuffed animal based on marine animals, adding in new features, like a stomach made of a shirt sleeve. The prototype uses a dinosaur stuffed animal, two added features are installed. A shirt sleeve as the stomach and a snorkel tube in the throat leading to the stomach, simulating internal organs. The activity is means to educate children about the harms of microplastics when ingested by an animal. Further testing is needed how to deliver the activity for a more lasting impression about the dangers of animals who ingest plastics.

Shadowing

To better grasp and gain valuable experience during my internship, I would shadow staff who are professionals within their own field. During my daily duties I would observe how staff would educate and engage visitors about the NWHI. Understanding the style and direction how the center wants me to engage with visitors when I am on my own. Taking note how staff speak with various age groups when it comes to answering question, responding to comments, and addressing concerns. Valuble experience to help better my own skill sets how to educate the community.

Educating the Community

With every opportunity I stride to educate every visitor who visits Mokupapapa. If visitors are new to the center, the first thing I mention is the existence of more islands that extend from the main Hawaiian Islands, laying out the themes of the center. For locals, they are familiar with my introduction to the center, if they were to focus on an exhibit or watch a video I intercept them about and ask if they have any question. Asking repeat visitors if they have any questions about an exhibit. In the end I stride to at least teach one thing about the NWHI with everyone who I engage with in Mokupapapa.

DISCUSSION

I spent a whole semester of my internship learning and applying my knowledge for the community and visitors who visit Mokupapapa. It was a challenge initially to feel for the vibe and style how the center operated when it comes to engaging visitors about the NWHI. I would fumble and sound hesitant when I attempt to organize my thoughts how to incorporate the center's learning objectives mixed with my knowledge about marine science. Shadowing staff who were familiar with the center's learning objectives allowed me to learn from their actions and script how they engaged with visitors to the center. Learning on the job, including trial and error opened opportunities for me to figure out how to incorporate everything to compose a smooth and articulate script.

The proposed activity using a stuffed animal has been postponed. The initial prototype was a simple throat and stomach, but from the center's staff who evaluated the concept was deemed too simple without a clear learning objective. Further modifications I made to the stuffed, the more complicated the result became. Due to road blocks and time constrains to finish my prototype, the activity was put on hold.

CONCLUSION

In the beginning of the internship I was overwhelmed how to mix my knowledge the learning objectives about the NWHI. I didn't know how to welcome visitors to the center without overwhelming them with hospitality I felt awkward and uncomfortable from my initial styles of

welcoming. Eventually, week by week I would start to notice how staff would welcome visitors with a calm and cool composure. Tips and other suggestions were provided when I asked, critiques were spoken after staff began evaluating my performance. Eventually I found my own style how to speak and welcome visitors, trial and error to compose a better script adapted to various age groups. I found my own style to educate visitors and it's a style discovered by the contributions from staff and visitors at Mokupapapa Discovery Center.

REFERENCES

Acampora H, Schuyler QA, Townsend KA, Hardesty BD (2014) Comparing plastic ingestion in juvenile and adult stranded short-tailed shearwaters (Puffinus tenuirostris) in eastern Australia. Marine Pollution Bulletin 78. pp. 63-68

Avery-Gomm S, Provencher JF, Morgan KH, Bertram DF (2013) Plastic ingestion in marine-associated bird species from the eastern North Pacific. Marine Pollution Bulletin 72. pp. 257-259

Azzarello MY, Van Vleet ES (1987) Marine birds and plastic pollution. Marine Ecology - Progress Series 37. pp. 295-303

Broaddus-Lawrence PL, Treole K, McCabe RB, Allen RL, Toppin L (2000) The Effects of Preventive Vocal Hygiene Education on the Vocal Hygiene Habits and Perceptual Vocal Characteristics of Training Singers. Journal of Voice 14. pp. 58-71

Carpenter E, Wolverton S (2017) Plastic litter in streams: The behavioral archaeology of a pervasive environmental problem. Applied Geography 84. pp. 93-101

Derraik JGB (2002) The Pollution of The Marine Environment by Plastic Debris: A Review. Marine Pollution Bulletin 44. pp. 842-852

Gray H, Lattin GL, Moore CJ (2012) Incidence, mass and variety of plastics ingested d by Laysan (Phoebastria immutabilis) and Black-footed Albatrosses (P. nigripes) recovered as by-catch in the North Pacific Ocean. Marine Pollution Bulletin 64. pp. 2190–2192

Jiménez S, Domingo A, Brazeiro A, Defeo O, Phillips RA (2015) Marine debris ingestion by albatrosses in the southwest Atlantic Ocean. Marine Pollution Bulletin 96. pp. 149-154

Sileo L, Sievert PR, Samuel MD (1990) Causes of Mortality of Albatross Chicks at Midway Atoll. Journal of Wildlife Diseases 26 (3). pp.329-338

Dickey MD (2005) Three-dimensional virtual worlds and distance learning: two case studies of Active Worlds as a medium for distance education. British Journal of Educational Technology 36.pp. 439-451

Diduck A (1999) Critical education in resource and environmental management: Learning and empowerment for a sustainable future. Journal of Environmental Management 57. pp. 85-97

Kim SH, Mims C, Holmes KP (2006) An Introduction to Current Trends and Benefits of Mobile Wireless Technology Use in Higher Education. AACE Journal 14. pp. 77-100

U.S. Fish & Wildlife Service (2017) National Wildlife Refuge System. Accessed 5 May. https://www.fws.gov/refuge/Midway_Atoll/wildlife_and_habitat/Birds_of_Midway.html

Papahānaumokuākea Marine National Monument (2018) National Ocean Service. Accessed 5 May. https://www.papahanaumokuakea.gov/

Robertson CJR, Bell EA, Sinclair N, Bell BD (2003) Distribution of seabirds from New Zealand that overlap with fisheries worldwide. Science for Conservation 233. pp. 6-23

Rillig MC (2012) Microplastic in Terrestrial Ecosystems and the Soil?. American Chemical Society 46. pp. 6453−6454

Louis S, Sievert PR, Samuel MD (1990) CAUSES OF MORTALITY OF ALBATROSS CHICKS AT MIDWAY ATOLL. Journal of Wildlife Diseases 26. pp. 329-338

Strawn C (1994) Beyond the buzz word: empowerment in community outreach and education. Journal of Applied Behavioral Science 30.pp. 159-174