

THESIS

INVESTING IN TOMORROW'S NATURAL RESOURCE STEWARDS:
HOW UNDERSTANDING TARGET AUDIENCES CAN IMPROVE EFFORTS TO
RECONNECT YOUTH WITH NATURE

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ABSTRACT

INVESTING IN TOMORROW'S NATURAL RESOURCE STEWARDS: HOW UNDERSTANDING TARGET AUDIENCES CAN IMPROVE EFFORTS TO RECONNECT YOUTH WITH NATURE

This thesis presents two manuscripts that explored how conservation education efforts could be improved through development of more targeted educational initiatives informed by research. The overall research and outreach initiative, upon which these manuscripts were based, encompassed the ideals of the “No Child Left Inside” movement, which grew in part from Richard Louv’s (2008) best-selling book *Last Child in the Woods*. Underlying this movement are linkages between time spent outside as a child and overall mental and physical health and well-being as well as future commitment to environmental stewardship. Broad scale societal and demographic changes (e.g., urbanization, economic growth, increasing levels of income and education, and population growth, among others) impact how children and families interact with nature. Environmental education can contribute to addressing these changes by facilitating interactions with nature. The overall purpose of this thesis was to evaluate environmental education programs offered by state fish and wildlife agencies that would account for public values toward wildlife by reaching out to diverse target audiences, making both methodological and theoretical contributions to the field of environmental education.

The purpose of the first paper was to evaluate the Lincoln Safari, an established, successful program developed to encourage families to explore natural and cultural heritage sites within an urban area. The objectives of evaluating this program were to 1) assess the diversity of

participants in the program in terms of their values toward wildlife, 2) document how participating in the Lincoln Safari influenced conservation behaviors, and 3) understand key elements that attracted families to participate in the Lincoln Safari. Data were collected via a mixed-methods approach that included an on-site survey administered to participants in the 2010 Lincoln Safari program in Lincoln, Nebraska, monthly follow-up surveys administered via e-mail, and focus group interviews with a select group of participating families. Results indicated that the Lincoln Safari has been successful in attracting a variety of age groups and wildlife value orientation types. Quantitative analysis of engagement in environmental stewardship behaviors showed that there was a link between the number of years a family had participated in the Lincoln Safari and the amount of time they reported spending outdoors as a family over the past year as well as their engagement in recycling behaviors. Furthermore, individuals with certain value orientations toward wildlife were more likely than others to report increases in other environmental stewardship behaviors. Focus group interviews corroborated these findings, revealing, for example, that Lincoln Safari participation resulted in increased mindfulness of the environmental impact of daily decisions. Additionally, these focus group interviews revealed elements of the Lincoln Safari that made it particularly appealing to families. Overall, families found it attractive because it awakened a sense of adventure, facilitated multigenerational learning, and helped families to create memories.

The second paper documents a methodological approach for studying outcomes of youth participation in an environmental education program that included service learning and integration of cultural heritage values in the Ka`u region of the Island of Hawai`i. The purpose of this study was to learn about how the integration of cultural heritage values into the program affected how participants related to nature, and to develop a methodological approach for

evaluating environmental education programs for underserved groups in culturally sensitive areas. This study was based in part upon previously conducted interviews with key elders in the community that highlighted the importance of building upon existing partnerships, working with local residents already connected within the community, and integrating cultural heritage values into environmental education programs in Ka`u in order to maximize interest and participation in programs in this region. Researcher observations, photovoice, document analysis and semi-structured interviews were then used to assess a recent 2011 offering of the Imi Pono No Ka Aina (Seeking Excellence for the Land) program in Ka`u. Participants' program portfolios, which consisted of participants' written program materials, researcher observations, photographs and interview transcriptions, were analyzed to better understand the impact of the program on participants' views of nature and wildlife. Analysis showed that incorporating cultural heritage values into the Imi Pono no ka Aina program in Ka`u was successful in connecting Hawai`ian youth from Ka`u to nature, and that employing a mix of qualitative methodologies yielded a more holistic understanding of the participants' experiences than relying on a single data source.

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This thesis is dedicated to my grandparents, Mary Louise and Leighton Wagner. I know how proud you would be knowing that I have not only accomplished the goals I set out to accomplish, but also that my work has and is making a small difference in supporting the kinds of environmental education programs that help kids to develop a love for nature. My own love for nature grew from hours of play as a child in your backyard. Without you, I would not be the person I am today, and I am forever grateful for your influence on my life. I'd also like to thank my parents for their support and prayers. I know you're proud of me for pursuing this dream.

I'd also like to thank my advisor and committee members who made this thesis possible. It was certainly not by chance that I landed in a qualitative research methods class taught by Dr. Timothy Davies during my first semester at CSU. I went from knowing next to nothing about qualitative research to having the confidence and skills required to produce this thesis. You recognized something inside of me that I didn't know I possessed, and I thank you for your encouragement. Brett Bruyere, you are a good person and I am truly glad to know you. Your passion for the communities in which you work has helped me to set a high standard for the kind of work I hope to do in the future. In addition, you helped to make this project fun. I'd also like to thank Tara Teel, who has served as an advisor, mentor and friend over these last three years. Somehow, you always managed to find time for me. You trusted me with a tremendous responsibility to travel to Hawaii representing CSU through research and study. Thank you for investing in me; you have made a huge difference in my life.

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will benefit you directly through similar program offerings in the future, now that we know how important they are!

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INTRODUCTION

Where will our future stewards of nature come from? This is one of the many questions raised by Richard Louv in his 2008 best-selling book, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*, on the widening divide between children and the outdoors. What he refers to as “nature-deficit disorder” is a phenomenon that stems from a variety of broad-scale changes occurring in today’s society, including, for example, population growth and changes in land use (Cordell, Bergstrom, Betz & Green, 2004; Rivkin, 1995) as well as urbanization, economic development and technological advancement (Clements, 2004; Pergams & Zaradic, 2006, 2007; Roberts, Foehr & Rideout, 2005; Rideout & Hamel, 2006).

Along with these changes has come a shift in how people interact with and think about the natural environment, which has implications for future natural resource stewardship as well as overall physical and emotional development and academic achievement among children (Jordan & Robinson, 2008; Burdette & Whittaker, 2005; Taylor & Kuo, 2006; Chawla, 1988, 1998, 1999; Wells & Leckies, 2006). Learning about nature increasingly occurs in indirect ways (i.e., restricted or managed contexts such as zoos or parks) or through vicarious or symbolic experiences (i.e., television) as opposed to through direct day-to-day experience (Kahn & Kellert, 2002). Therefore, children’s perceptions of the natural world are likely to be increasingly influenced more by television programming and technology than by time spent outside. Given the well-established relationship between time spent outdoors as a child and future commitment to natural resource stewardship (Bunting & Cousins, 1985; Bixler, Floyd & Hammitt, 2002; Chawla, 1988; Kals & Ittner, 2003; Kellert, 2002; Louv, 2005; Phenice & Griffore, 2003; Pyle, 1993; Schultz, Chriver, Tabanico & Khazian, 2004; Sobel, 2002; Wilson, 1993), a decrease in

direct interaction with nature raises concerns about whether future generations will be interested in the management and conservation of natural resources.

When considering the potential consequences of this growing disconnect between children and nature, it is clear that the future of conservation hinges upon the ability of natural resource agencies to respond to the societal trends that have contributed to a lack of connection with nature among today's youth. Without opportunities to forge connections with nature at a young age, children may no longer value nature as adults (Miller, 2005). This growing disconnect is of particular concern to state fish and wildlife agencies that rely heavily upon park visitation and recreation participation to fund conservation initiatives (Pergams & Zeradic, 2006). A successful broad-based response on the part of these agencies will depend in part on the reach and effectiveness of their conservation education programs, and in particular their strategies for connecting children and families to nature. This calls for environmental education programs that are tailored to meet the needs of target audiences and that can attend to the diversity of values toward wildlife and nature that exist in contemporary society.

Thesis Organization and Purpose

This thesis is based on a larger investigation that was designed to improve the reach and effectiveness of state fish and wildlife agencies' conservation education programs through development of more targeted educational initiatives that account for barriers to program participation and wildlife values of the public. The two primary objectives of this thesis are addressed separately in the form of two individual articles. First, Article 1 evaluates the Lincoln Safari, a nature based program that has already proven successful in attracting a broad and diverse following, in order to 1) determine whether the Lincoln Safari is attractive to a diversity of audiences with respect to their values toward wildlife, 2) determine the extent to which a

recent 2010 offering of the Lincoln Safari program elevated past participants to the “next level” of natural resource stewardship; in other words, beyond getting people outside and raising awareness, has the program been successful in drawing people into action?, and 3) document elements that contribute to the program’s success to highlight lessons learned that might be adapted for developing programs in other locations. Article 2 documents a mix of qualitative methodological techniques used to understand how integrating cultural heritage values into a Ka`u, Hawai`i environmental education program can influence how youth view nature. The intent of developing this approach was two-fold: 1) it highlights the importance of considering context when developing evaluative research methodologies, and 2) it documents the lived experiences of twelve teenagers who learned about nature through a cultural lens in the 2011 Imi Pono no ka Aina program in Ka`u, Hawai`i in order to demonstrate whether integration of cultural heritage values into an environmental education program is an effective way to reconnect Hawai`ian youth with nature and culture.

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**A MIDWESTERN ADVENTURE IN ENVIRONMENTAL STEWARDSHIP:
EVALUATING THE SUCCESS OF THE LINCOLN SAFARI**

INTRODUCTION

Where will our future stewards of nature come from? This is one of the many questions raised by Richard Louv in his 2008 best-selling book, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*, on the widening divide between children and the outdoors. What he refers to as “nature-deficit disorder” is a phenomenon that stems from a variety of broad-scale changes occurring in today’s society, including, for example, population growth and changes in land use (Cordell, Bergstrom, Betz & Green, 2004; Rivkin, 1995) as well as urbanization, economic development and technological advancement (Clements, 2004; Pergams & Zaradic, 2006, 2007; Roberts, Foehr & Rideout, 2005; Rideout & Hamel, 2006).

Along with these changes has come a shift in how people interact with and think about the natural environment, which has implications for future natural resource stewardship as well as overall physical and emotional development and academic achievement among children (Jordan & Robinson, 2008; Burdette & Whittaker, 2005; Taylor and Kuo, 2006; Chawla, 1988, 1998, 1999; Wells & Leckies, 2006). Learning about nature increasingly occurs in indirect ways (i.e., restricted or managed contexts such as zoos or parks) or through vicarious or symbolic experiences (i.e., television) as opposed to through direct day-to-day experience (Kahn & Kellert, 2002). Therefore, children’s perceptions of the natural world are likely to be increasingly influenced more by their social surroundings and by television programming than by time spent outside. Given the well-established relationship between time spent outdoors as a child and future commitment to natural resource stewardship (Bunting & Cousins, 1985; Bixler, Floyd & Hammitt, 2002; Chawla, 1988; Kals & Ittner, 2003; Kellert, 2002; Louv, 2005; Phenice &

Griffore, 2003; Pyle, 1993; Schultz, Chriver, Tabanico & Khazian, 2004; Sobel, 2002; Wilson, 1993), a decrease in direct interaction with nature raises concerns about whether future generations will be interested in the management and conservation of natural resources.

When considering the potential consequences of this growing disconnect between children and nature, it is clear that the future of conservation hinges upon the ability of natural resource agencies to respond to the societal trends that have contributed to a lack of connection with nature among today's youth. Without opportunities to forge connections with nature at a young age, children may no longer value nature as adults (Miller, 2005). Furthermore, this growing disconnect is of particular concern to state fish and wildlife agencies that rely heavily upon park visitation and recreation participation to fund conservation initiatives (Pergams & Zeradic, 2006). A successful broad-based response on the part of these agencies will depend in part on the reach and effectiveness of their conservation education programs, and in particular their strategies for connecting children and families to nature. This calls for environmental education programs that are tailored to meet the needs of target audiences and that can attend to the diversity of values toward wildlife and nature that exist in contemporary society.

To contribute to this need and identify lessons learned that could be applied in other areas, the purpose of this study was to evaluate the Lincoln Safari, a program offered by the Healthy Families Play Outside Partnership, which included, among others, the Nebraska Game and Parks Commission and the Lincoln Children's Zoo. This program was developed to educate families about natural resource stewardship by encouraging them to spend time outdoors at various cultural and natural sites throughout the Lincoln, Nebraska area. Although the Lincoln Safari had already proven successful with regard to its ability to attract a following that was representative of the different sociodemographic and racial/ethnic groups in the Lincoln area

(Teel & Bruyere, 2008), this study sought to expand documentation of the program's success by examining its ability to attract people with a diversity of values toward wildlife and to generate conservation-oriented behavior change among its participants. The concept of wildlife value orientations, designed to capture the array of values people hold toward wildlife, was used as a foundation for exploring these questions.

Wildlife Value Orientations

Recent research on wildlife value orientations in the western United States provides a framework for thinking about ways to improve agencies' educational initiatives in the face of changing societal conditions (Manfredo & Teel, 2008; Manfredo, Teel & Henry, 2009; Teel, Dayer, Manfredo & Bright, 2005; Teel & Manfredo, 2009). An important conclusion drawn from this work is the need for tailored approaches that readily attend to the diversity of wildlife-related interests in contemporary society. According to this research, forces of modernization have impacted the circumstances of daily life in America in such a way as to stimulate a shift in societal thinking about wildlife. Similar to the more general human-nature divide that Louv (2008) describes, findings suggest that as children become increasingly removed from direct interaction with wildlife through such changes as urbanization, this can in turn impact how they think about wildlife as adults. At a societal level, these changing conditions (i.e., increased urbanization, rising levels of education and income) have led to a shift away from a *utilitarian*¹ value orientation toward wildlife and the simultaneous rise of a *mutualism* view. While the former defines wildlife primarily as a resource to be used and managed for human benefit, the latter perceives wildlife as capable of relationships of trust with humans and as life forms deserving of rights and caring. These two contrasting wildlife value orientations have different

¹ *Utilitarian* has also been referred to as *domination* in prior research (Manfredo et al., 2009; Teel & Manfredo, 2009)

implications for how people will respond to a variety of wildlife issues and for participation in wildlife-related recreation activities (e.g., Dietsch et al., 2011; Teel & Manfredro, 2009). Based on these two primary orientations, four different “types” of people have been identified through previous research (Teel & Manfredro, 2009):

1. **Utilitarian Wildlife Value Orientation Type.** Utilitarians believe that wildlife should be used and managed primarily for human benefit. Individuals with a strong utilitarian orientation are more likely to prioritize human well-being over wildlife in their attitudes and behaviors. They are also more likely to justify treatment of wildlife in utilitarian terms and to rate actions (e.g., hunting, lethal removal) that result in death or harm to wildlife as acceptable.
2. **Mutualist Wildlife Value Orientation Type.** Mutualists view wildlife as capable of living in relationships of trust with humans, as if part of an extended family, and as deserving of rights and caring. Those with a strong mutualism orientation are less likely to support actions resulting in death or harm to wildlife, more likely to engage in welfare-enhancing behaviors for individual wildlife (e.g., feeding), and more likely to view wildlife in human terms.
3. **Pluralist Wildlife Value Orientation Type.** Pluralists hold both a mutualism and a utilitarian value orientation toward wildlife. Which of the value orientations plays a role in their thinking is situationally-contingent, meaning that the role of a specific orientation can vary depending on the given situation. For certain issues, Pluralists are likely to respond in a manner similar to that of Utilitarians, whereas for other issues they may respond more like Mutualists.

4. Distanced Wildlife Value Orientation Type. Distanced individuals do not hold either a mutualism or a utilitarian orientation. As their label suggests, they tend to be less interested in wildlife and wildlife-related issues. The Distanced group is also more likely than the other groups to express fear, or a concern for safety, while in the outdoors due to the possibility of negative encounters with wildlife (e.g., the risk of being attacked or contracting a disease).

The cognitive hierarchy, a theory adapted from the field of social psychology, is helpful in organizing key concepts, including value orientations, that form the basis for human behavior (Homer & Kahle, 1988; Manfredi et al., 2009). Values, which form the foundation for this hierarchy, are enduring beliefs that are typically formed during childhood and are shared within a culture (Schwartz, 2006; Rokeach, 1973). They are thought to influence higher-order cognitions such as attitudes and behavioral intentions, which ultimately influence behavior. Given that the primary goal of many environmental education programs is to affect behavior change (Hungerford & Volk, 1990), understanding human values could be of particular interest to environmental educators. However, since values transcend specific situations and contexts, they are unable to explain individual variation in attitudes and behaviors (Bright et al., 2000). Value orientations, however, give direction and meaning to the values one holds and therefore can play a stronger role in explaining individual variation within a given domain such as wildlife (Manfredi et al., 2009; Teel & Manfredi, 2009). Empirically, this has been demonstrated through previous research linking wildlife value orientations to attitudes toward a variety of wildlife management issues and wildlife-related recreation behaviors (e.g., Dietsch et al., 2011, Teel & Manfredi, 2009).

Study Purpose

Building on the prior research described above, the purpose of this study was to evaluate the Lincoln Safari program in order to lend insight into ways state fish and wildlife agencies might improve their conservation education efforts through development of more targeted educational initiatives. The three primary objectives in evaluating the Lincoln Safari were as follows: 1) determine the extent to which Lincoln Safari participants represented the four wildlife value orientation types identified through prior research, 2) determine the extent to which a recent 2010 offering of the Lincoln Safari program elevated past participants to the “next level” of natural resource stewardship; in other words, beyond getting people outside and raising awareness, has the program been successful in drawing people into action?, and 3) understand specific elements of the Lincoln Safari program that make it attractive to families.

METHODS

Site and Program Description

According to the U.S. Census Bureau (2010), the city of Lincoln, Nebraska is comprised of 75.4 square miles. It is located in southeastern Nebraska and exists within both Lancaster and Seward counties. Lincoln’s park system contains over 100 individual parks, which are connected by nearly 100 miles of recreational trails. Lincoln, which is located on the Great Plains, has a moderate climate with four distinct seasons. Precipitation falls predominantly during the warmer months. The U. S. Bureau of Economic Analysis reported that in 2010, the population of Lincoln, Nebraska was 302,954 individuals and per capita personal income was \$37,599.

The Lincoln Safari program, offered for the first time in 2008, was developed to better connect families to nature through a self-guided “passport” program in which participants visit up to 26 natural and cultural sites throughout the city using a map and guidebook containing clues, activities and information on environmental stewardship. The program has attracted a

large following since its inception in 2008, successfully engaging a group of individuals representative of the demographic diversity in the Lincoln area (Teel & Bruyere, 2008).

Sampling and Data Collection

An initial survey (See Appendix) was administered to individuals who registered for the 2010 Lincoln Safari ($n = 393$) to gather background information on wildlife value orientations, motivations for program participation, reported engagement in environmental stewardship behaviors over the past year, beliefs about the benefits to children of spending time outdoors and past participation in the Lincoln Safari. A set of 14 statements was used to measure “basic belief dimensions” that aligned with the two primary wildlife value orientations of utilitarian and mutualism identified through prior research (Teel & Manfredi, 2009). Belief dimensions of appropriate use of wildlife and hunting designated the utilitarian orientation, whereas the mutualism orientation was indicated by social affiliation and caring belief dimensions. Behaviors of interest, informed by previous research (Bruyere, 2008), included time spent outdoors, recycling, green consumer behavior (e.g., avoiding products that come in excess packaging), reuse behaviors (e.g., repairing broken items or purchasing used appliances), energy conservation (e.g., taking shorter showers), alternative transportation behaviors (e.g., riding the bus), and nature stewardship (e.g., picking up litter at natural areas). In addition, participants were asked to indicate how well informed they were about opportunities for spending time outdoors.

A subset of individuals who expressed interest in a more extensive follow-up study was later invited to participate in an online survey (See Appendix) designed to track people over time in order to learn more about participant families’ experiences in the Lincoln Safari. The online survey was administered monthly throughout the summer and early fall of 2010. Reasons for

participating in the 2010 Lincoln Safari were documented in the first survey. In each survey, participants were asked to respond to open-ended questions about sites visited and memorable experiences related to the Lincoln Safari over the past 30 days as well as experiences within the past 30 days that have influenced engagement in environmental stewardship behaviors. Due to low numbers of participants who completed *all* monthly surveys, we were limited in our ability to track engagement in these behaviors over time; however, open-ended responses served to triangulate qualitative interview findings related to elements of the program that have contributed to its success in attracting a broad following.

Participants who completed at least three monthly surveys were invited to attend an invitation-only reception at the Lincoln Children's Zoo with their families. During this event, researchers conducted interviews with fourteen families to learn about what they particularly liked or remembered about the 2010 Lincoln Safari, its impacts on family stewardship behaviors, and suggestions for future programs. These focus group interviews were conducted in November 2010 and transcribed by one of the interviewers. Data were coded using constant comparative analysis, with open, axial and selective codes assigned to interview text (Bogdan & Biklen, 2007; Glesne, 2006; Merriam, 2002). Interviews were digitally recorded with permission from participants and lasted approximately five to eight minutes each. Families were assigned an interview time upon arrival at the zoo and were free to enjoy the zoo and refreshments before and after their interview. Interviews were conducted using an open-ended approach guided by the following questions:

Q1. What did you particularly enjoy about the Lincoln Safari this year?

Q2. Are you doing anything differently as a family as a result of participating in the Lincoln Safari program?

Q3. Have you participated in the past?

Q4. Do you have any other comments about the Lincoln Safari or suggestions for improvement?

Data Analysis

Quantitative data were entered and analyzed in PASW. Reliability analysis of items used to measure wildlife value orientations was conducted in order to ensure internal consistency of item scales (Table 2.1). Wildlife value orientation scores were calculated in a two-step process using mean composite scores from each of the four primary basic belief dimensions (i.e., social affiliation, caring, appropriate use and hunting). Mean composite scores were then collapsed to assign an overall mean score for each primary value orientation (e.g., social affiliation and caring belief dimension scores were combined and averaged to arrive at an overall score for mutualism). Next, wildlife value orientation types were revealed based on whether individuals scored high (> 4.50) or low (≤ 4.50) on each of the two value orientation scales (Teel & Manfredi, 2009).

To determine whether Lincoln Safari participation had an effect on environmental stewardship behaviors, past participation experience level was calculated based on the number of years a family had participated in the Lincoln Safari (including the current year, for a maximum of three years [2008-2010]). Individuals who had participated for two or three years were classified as “advanced” participants, and families who were participating for the first time were classified as “novice” participants.

Linkages between past participation experience level, wildlife value orientation type, and mean scoring on environmental stewardship behaviors were explored using a series of 2x4 Factorial ANOVAs in order to test for interaction effects. An alpha level of $p < 0.05$ was used to

designate statistical significance in the analysis and effect size measures (i.e., η^2) were reported to assist in evaluating the practical significance of findings (Cohen, 1988; Vaske, 2008).

Responses to open-ended monthly online survey questions about reasons for participating in the Lincoln Safari, memorable Lincoln Safari experiences that took place within the last 30 days, and general experiences within the last 30 days that influenced environmental stewardship behaviors were coded using an open coding system. All completed surveys were used for this analysis in order to maximize sample size. In other words, some families completed only one survey, whereas others completed up to six. Therefore, because of the turnover in participation from month to month, specific stewardship behaviors could not be adequately tracked over time. Instead, *all* completed surveys were included in the analysis to understand, more generally, families' overall experiences while participating in the Lincoln Safari program and the types of program-related factors that may have contributed to conservation stewardship behavior change ($n = 164$). Only the *first* survey included a question about reasons for participating in the program ($n = 64$).

Focus group interviews were transcribed and coded, and an open coding system was used to develop seven major codes and twenty minor codes for the qualitative interview data. This coding scheme facilitated dismantling the individual stories of the interview participants to retell one cohesive story about the Lincoln Safari (Bogdan & Biklen, 2007). After coding each interview separately, all of the interview codes were analyzed to determine core themes and codes that could be compared across interviews. Names were changed to insure participant confidentiality.

RESULTS

Descriptive Findings

Wildlife value orientations. Reliability results indicated high internal consistency of items comprising the basic belief dimension and wildlife value orientation scales (Table 2.1; Vaske, 2008). The four primary wildlife value orientation types identified through previous research (Teel & Manfredi, 2009) were present, demonstrating that the Lincoln Safari is attractive to a diversity of wildlife value orientation types. Results showed that 23% of respondents were identified as utilitarian, 22% as pluralist, 36% as mutualist, and 19% as distanced.

Past participation experience level. Results indicated that 51% of respondents could be classified as “novice” Lincoln Safari participants, meaning they were participating in the Lincoln Safari for the first time in 2010. Nearly the same percentage (49%) of respondents could be classified as “advanced” participants, meaning they had participated in the Lincoln Safari for one or two years prior to the start of the 2010 offering of the program.

Environmental stewardship behaviors. Results of the analysis of a dichotomous breakdown of stewardship behavior participation from the initial registration survey indicated that Lincoln Safari participants were already well informed about opportunities for spending time outdoors and practicing environmental stewardship behaviors prior to participating in the 2010 Lincoln Safari (Figure 2.1). For example, 99% of 2010 Lincoln Safari participants reported medium to high levels of engagement in spending time outdoors over the past year (i.e., responses of 4 and above on a scale of 1-7, where 1 means “not at all” and 7 means “very frequently” or “very well-informed”). The stewardship behavior with the lowest percent of medium or high participation was alternative transportation (59%). Means and standard deviations for all items are reported in Table 2.2.

Reasons for participation. A total of 64 individuals completed the first online monthly survey, and of these, 51 individuals responded to the question that asked, “What is the one main reason why you are participating in the program?” The primary reasons for participating in the Lincoln Safari included spending time outside (18%), spending quality time with family or friends (29%), and learning more about the Lincoln area (47%). Six percent of individuals cited a miscellaneous reason that did not fit into one of the aforementioned categories.

Exploring the Impact of Lincoln Safari Participation and Wildlife Value Orientations on Environmental Stewardship Behavior

Overall, past participation in the Lincoln Safari had a significant impact on time spent outdoors over the past year and the stewardship behavior of recycling (Table 2.3). Measures of practical significance for these relationships suggested a large, substantive effect (Cohen, 1988). Advanced Lincoln Safari participants reported higher levels of engagement in outdoor activities over the past year ($M = 6.19$, $SD = 1.00$) compared to Novice participants ($M = 5.90$, $SD = 0.92$, Figure 2.2). Similarly, Advanced Lincoln Safari participants reported higher levels of engagement in recycling behaviors over the past year ($M = 5.76$, $SD = 1.63$) compared to Novice participants ($M = 5.36$, $SD = 1.95$, Figure 2.3).

Although there was no significant difference in engagement in stewardship behaviors that could be attributed to wildlife value orientation type or past participation experience level, factorial ANOVA tests revealed a significant interaction effect of wildlife value orientations and participation experience level on engagement in green consumer behavior (Figure 2.4), reuse behavior (Figure 2.5), and energy conservation behavior (Figure 2.6; Table 2.3). Specifically, individuals classified as *distanced* with respect to their wildlife value orientation showed differences in their average level of engagement in these behaviors based on past participation

experience level. Distanced individuals who were Advanced Lincoln Safari participants reported higher rates of participation in green consumer behaviors ($M = 5.21, SD = 1.10$) than distanced individuals who were Novice program participants ($M = 4.00, SD = 1.27$). Similarly, distanced individuals who were Advanced Lincoln Safari participants reported engaging in higher levels of reuse behaviors ($M = 5.11, SD = 1.32$) than distanced individuals who were Novice program participants ($M = 4.13, SD = 1.41$). Finally, distanced individuals who were Advanced Lincoln Safari participants reported a higher level of involvement in energy conservation behaviors ($M = 5.75, SD = 0.93$) than distanced individuals who were Novice program participants ($M = 5.07, SD = 1.06$).

There were no differences in engagement in alternative transportation or nature stewardship behaviors that could be explained by wildlife value orientation type or past participation experience level (Table 2.3).

Qualitative findings from open-ended online survey questions and in-person focus group interviews corroborated these findings. When asked to describe experiences over the past 30 days that have influenced environmental stewardship behaviors, many individuals indicated that they were already engaging in these behaviors prior to participating in the Lincoln Safari (19%) or that they had not done anything differently in the last 30 days (21%). However, others were able to directly link instances of behavior change over the past 30 days to spending more time outside due to Lincoln Safari participation (16%) or visiting specific sites featured in the Lincoln Safari (13%). Additional reasons mentioned in conjunction to behavior change included media events (e.g., the BP oil spill, 4%), school or other educational learning (5%), general behavior change (12%), general positive statements about the Lincoln Safari (5%), and miscellaneous (4%).

Examples of open-ended responses used to identify these categories are included below:

Already engaging in behaviors: “This has been my way of thinking and living for longer than 30 days or the 3 years of the Safari. I can’t say that anything has recently influenced this behavior.”

Not doing anything differently: “Nothing comes to mind.”

Spending more time outside: “Just being outside and seeing the most natural forms of entertainment that our community already has in place for us. My family has enjoyed the simple Safari and parks more than video games or watching a TV show.”

Visits to specific Lincoln Safari sites: “Trip to the recycling center inspired me to begin recycling.”

“After visiting the Lincoln Water System’s Xeriscape gardens, we have purchased a different sprinkler for our garden that doesn’t spray up into the air near as far as our previous one. This saves water from evaporating.”

Media events: “The oil spill in the Gulf is very upsetting, especially to see so much natural habitat destroyed. It really made me think about how our actions can have such a dramatic impact on the environment.”

School or other educational learning: “Kids have been learning a lot more about recycling at school and have been asking what we can do to help out at home.”

General behavior change: “Trying more to reduce, reuse and recycle.”

General positive statements about the Lincoln Safari: “We love the Lincoln Safari and what it stands for. We are also involved in our CSA [Community Supported Agriculture], which we love, and recommend highly.”

Miscellaneous: “With the heat, I have tried to watch how I can conserve energy even more.”

In response to an open-ended interview question where families were asked whether they were doing anything differently as a result of Lincoln Safari participation, one family shared how the Lincoln Safari called them to more intentional involvement in recycling behaviors. Although they were already aware of the importance of recycling, they learned through participating in the Lincoln Safari that they could further their positive impact by properly disposing of toxic or

electronic substances. Elaine, a mother of two children age 9 and 6, recalled how the Lincoln Safari helped her family to improve upon things they were already doing:

“...It spurred us to do more...difficult recycling...like the toxic or electronic...we’d make a special effort now to try to find those because we were already...recycling.”

Similarly, participating in the Lincoln Safari provided an outlet for children to develop an interest in helping to care for the environment, through activities like recycling, as they grow and mature. Jennifer, mother of a 5-year-old boy, shared how the Lincoln Safari has helped to engage her son in recycling:

“We were already...recycling...conserving resources...but he helps with recycling now.”

Exploring Participants’ Perspectives on the Lincoln Safari

Analysis of the focus group interview data and open-ended online survey questions about families’ experiences participating in the Lincoln Safari revealed the following key findings that contribute to an understanding of the Lincoln Safari’s success. Interview responses are denoted in this section with individual names, whereas survey number denotes survey responses.

Elements, each of which will be discussed in turn below, that make the Lincoln Safari particularly appealing to families and thus contribute to its success in attracting a broad and diverse following include:

- The Lincoln Safari *awakens a sense of adventure* in participants.
- The Lincoln Safari *facilitates multigenerational learning and discovery* about the Lincoln area.
- The Lincoln Safari helps families to *create memories by spending quality time* together.

Awakening a Sense of Adventure

Kids, in particular, found the maps and the guidebooks intriguing. Some participants particularly enjoyed the published materials:

Greg, age 6: “We still have our book from last year.”

Hannah, age 9: “We LOVE the maps.”

Brian, age 5: “[I liked] coloring in the paper thing.”

Natalie, mother: “...the very first year [was] the only year they gave out tote bags and crayons because I remember getting that stuff...I’m always impressed with the little booklet. I always think the clue is really cool and then we read about it before on the opposite page...”

Other parents and guardians reported that their children enjoyed searching for specific locations using the map and clues:

Mallory, mother: “They...liked the map...finding the posts.”

Ginny, grandmother: “They liked following clues. We would make it like an adventure.”

4526: “We love finding the posts all around town. My son loves to go on a ‘treasure hunt’ to find them.”

10481: “We have had a great time as a family trying to decipher the clues and finding the posts. The kids each take turns reading the clues and coloring the etchings for that clue.”

10508: “The kids really love finding the rubbings and guessing what it is.”

10142: “We enjoy the ‘treasure-hunt’ searching for the post. The kids pretend to be pirates...”

Parents and grandparents enjoyed seeing this sense of adventure evoked from their children and grandchildren. Marge, a grandmother of 15, said:

“I really liked the safari book and the maps are great, the clues are fun...the kids love the clues. Without them, we probably wouldn’t find the post.”

Although not all participating families had children, the Lincoln Safari sparked a sense of adventure in all ages. One woman reported participating in the Safari with her grown children and her mother-in-law. She suggested that the program might also be targeted toward older adults:

Lynn, adult: “I’ve taken my mother in law a couple of times. My mom, she would have loved it. Just literally loved it...if you have a sick or older parent that really likes that sort of stuff...that’s really cool...even if they can’t walk into the park, they can watch you walk down and look at your rubbing when you come back.”

Lynn also enjoyed exploring new parks and using clues to find specific locations.

Lynn, adult: "...all the small parks are...really fun to go get into because you walk to areas of the park that you don't normally otherwise go to and you get your little clue and it tells you, oh, so many steps past this bench or that bench or past the light, and so I think it gets you [to] all of those areas."

Facilitating Multigenerational Learning and Discovery about the Lincoln Area

In addition to attracting a diversity of wildlife value orientation types, the Lincoln Safari was attractive to both new and lifelong residents of Lincoln, and people of all ages.

Jennifer, parent: "We learned a lot of new places in Lincoln, and new parks we've never been to...the kids really liked Memorial Stadium the best."

Elaine, mother: "We've lived here for 15 years...it took us to parts of Lincoln...we didn't know existed."

1054: "Having only lived in Lincoln a few years, we are seeing and learning about parts of Lincoln previously unknown to us. Great experience with grandchildren."

10407: "The Lincoln Safari has been a fun experience...our kids are older, but our teenager has had a great time driving us to areas we've not been before."

10439: "First time to Wildwood Lake in the 15 years I have lived in Lincoln. Once youngest child is older, plan on camping there sometime."

One couple indicated that they often participate in the Lincoln Safari with their grandkids, reporting that the program helped them to become better acquainted with Lincoln after they moved to the area from Iowa.

Marge: "We had no idea there was so much here."

Harry: "Lincoln really has a lot of green areas. They really do."

Other families shared the opinion that the Lincoln Safari gives purpose to destinations.

Mark, father: "...it forces you to go all over Lincoln...forces you to explore, so that's what I really liked."

Sam, father: "The advantage of the safari was we only went to one or two parks usually, but this way, you go to more places. That's...the real advantage, that you go to places you wouldn't necessarily go otherwise."

Richard, father: "I really liked the introduction to new areas that's taking you to someplace you haven't been before."

2476: "We have discovered parks we didn't know existed. Each one has had something to capture my grandchildren's imagination. Any time spent in nature, is time well spent."

Laura, mother: "...it gives outings more purpose, you know, it gives us a place to go that we would have never gone to before...it's just – getting them out to new places, we

would never hit two thirds of the places we go if we just stay in our own little corner of Lincoln.”

10514: “We have been going to different parks instead of the regular one or two we always visit.”

Sylvia, mother: “It gives us more reasons to be outside.”

2556: “We pass the Oak Lake Dog Run all the time, but never stopped before. Next time we’ll have to bring our dog!”

1609: “It’s really getting outside and have a specific destination and purpose...”

Having a purpose behind a destination encourages spending more time outside. This finding is corroborated with the quantitative findings from the initial survey which indicated that Advanced Lincoln Safari participants spent more time outdoors as a family over the past year than Novice program participants.

Richard, father: “You kind of get locked into a couple parks or a couple spots where you can go for a hike...there’s days you would go out and go to a park to do a safari when you might not have gone out.”

One potential explanation for the increased time families spend outside as a result of participating in the Lincoln Safari is the fact that the Lincoln Safari is easy to incorporate into busy schedules when a Safari stop is added to something the family is already doing.

Susan, mother: “...if we were going somewhere anyway...to a football game...we took the safari book with us...[as] kind of an add on.”

Elaine, mother: “...some days, I would just get off work and pick them up and we’d go, you know, it really wouldn’t be an all day thing...”

Diana, mother: “...we just kept our safari book in the car.”

Creating Memories by Spending Quality Time Together as a Family

According to research by Louise Chawla (1998, 1999), memorable experiences in the outdoors with a positive adult role model are key determinants of future commitment to environmental stewardship. It seems that the Lincoln Safari facilitates these kinds of memorable experiences.

10396: “An enjoyable experience. Had lots of fun. Memorable moments to remember.”

1657: "...It gives us a chance to be together in nature...the best thing about the day we did these 8 rubbings was we went as a whole family..."

One family, consisting of a mother, a father, and a seven-year-old son, shared their favorite memories.

Melissa, mother: "I liked Spring Creek Prairie."

Adam, son: "I liked Salt Creek."

Melissa, mother: "...that was probably my favorite...Salt Creek in the spring because the frogs were going wild and then we got to watch the sunset...and it was very nice."

In another case, the Lincoln Safari provided opportunities for parents to share family stories with their children.

Diana: "There was one [park] we went to, that's where my husband...proposed to me, but we haven't ever been back there, and so then we just happened to go there for that, and so then I was able to tell them that story."

With increasing demands placed on a family's time due to work and extracurricular activity conflicts (Louv, 2008), it is sometimes difficult for families to find time to spend together. One mother said that the Lincoln Safari helps to bring the family together:

Stella, mother: "...we're busy all the time, and it's hard to just do things with the family because a lot of times we're just kind of running every which way, so it's good to be together as a family."

Families also enjoyed the sense of community that came from participating in the Lincoln Safari when fellow Safari participants could be identified.

Amber, mother: "...we would run into the first year especially other families at the rubbing post, going at the same time, and that was fun – trying to find those and sometimes trying not to give them the clues so they have the fun of finding it."

Renee, mother: "Everybody signed up the first year and especially...all the moms that go to the library storygroup...I see a lot of bags...every once in awhile I'll hear a couple of the moms talking about, you know, they went to this park and they found it."

DISCUSSION

The primary purpose of this study was to evaluate the impact of the Lincoln Safari program in light of previous research on wildlife value orientations to consider ways to assist state fish and wildlife agencies in the development of more targeted initiatives for connecting children and families to nature. Results indicated that the Lincoln Safari engaged a diversity of wildlife value orientation types and positively impacted the amount of time families reported spending outdoors as well as their engagement in certain kinds of environmental stewardship behaviors over the past year. Qualitative analysis of interview data served to corroborate quantitative survey findings, indicating that the Lincoln Safari had a positive impact on certain environmental stewardship behaviors such as recycling for participants. In addition, it revealed elements that contribute to the success of the Lincoln Safari. These include the Lincoln Safari's ability to appeal to underlying family values and ideals of a sense of adventure, multigenerational learning and quality time spent together.

Several past studies have examined barriers to nature-based program participation in relation to program design (Allison & Hibbler, 2004; Bruyere et al., 2008; Hong & Anderson, 2006; Miller, 2005). This study offers a new perspective in that it involves a retrospective look at an already successful program that has been able to account for barriers such as time constraints and cost that have been identified in previous research. First, families indicated that one aspect of the Lincoln Safari they found particularly appealing was its flexibility. Instead of adhering to a strict schedule, families were provided with leeway to choose times of the day and year that worked best with their schedules, with several families indicating that they stored their Lincoln Safari materials in the car for ease of being able to access while involved in other activities outside the home. Secondly, the Lincoln Safari was a free program that offered free materials to

participants. However, some families voiced disappointment in the decrease in program materials provided during the first year in comparison to subsequent years.

Although past research has explored the relationship between wildlife value orientations and wildlife-related attitudes and behaviors across a host of issues (Manfredo et al., 2009; Teel & Manfredo, 2009), its contributions to developing nature-based programs has received little attention (McCoy, 2010). Given that a diversity of wildlife value orientation types are represented in potential audiences for environmental education programs, particularly considering those offered by state fish and wildlife agencies, there is a need to further explore ways to broaden the reach of such programs to appeal to publics with different wildlife-related interests (Bruyere, Teel & Newman, 2009). Understanding wildlife value orientations of program participants can help agencies to assess whether or not they are achieving objectives of reaching out to populations that are diverse with respect to both ethnic and sociodemographic characteristics as well as inward values. This may be of particular interest to agencies that wish to affect behavior change through their programming since campaigns to change behavior are most effective when rooted in the underlying values of the audience (Hungerford & Volk, 1990).

Developing a better understanding of a program's effectiveness through rigorous and detailed evaluation is an important step in determining program impacts and whether or not all segments of the target population are being adequately served by environmental education programming. One important limitation of this study is that the sample population included only those individuals who voluntarily participated in a recent 2010 offering of the Lincoln Safari. In other words, although analysis prior to this study indicated that participants were representative of the ethnic and sociodemographic diversity of the Lincoln area (Teel & Bruyere, 2008), little was known about individuals who chose *not* to participate in the Lincoln Safari. Future research

aimed at informing ways to expand the reach and effectiveness of programs such as the Lincoln Safari could focus on identifying the characteristics of these individuals and factors that may have limited their participation.

Considering the anticipated future changes in the composition of American society with regard to both ethnic and demographic diversity as well as the resulting range of public thought related to wildlife and the natural environment is an important step in being able to adequately evaluate the reach and effectiveness of environmental education programs. Another area warranted for future research entails further evaluation of the impact of family structure on participant satisfaction with nature-based programs. For example, do ethnically diverse families who may prefer to participate in environmental education programs in large groups (Cordell et al., 2004) experience the same benefits as smaller, more traditional families?

When considering the potential consequences, both in terms of implications for human well-being and impacts on ecosystems, it's clear that the future of conservation hinges on the ability of natural resource agencies to respond to societal trends that are widening the divide between children and the outdoors. Formulation of a broad-based response will depend in part on the reach and effectiveness of agencies' conservation education programs, and in particular their strategies for connecting children to nature. Lessons learned from this study, including elements that make for a successful and far-reaching nature-based program such as the Lincoln Safari, offer guidance for conservation organizations wanting to improve and enhance the relevance of their educational efforts to reconnect children with the nature.

TABLES AND FIGURES

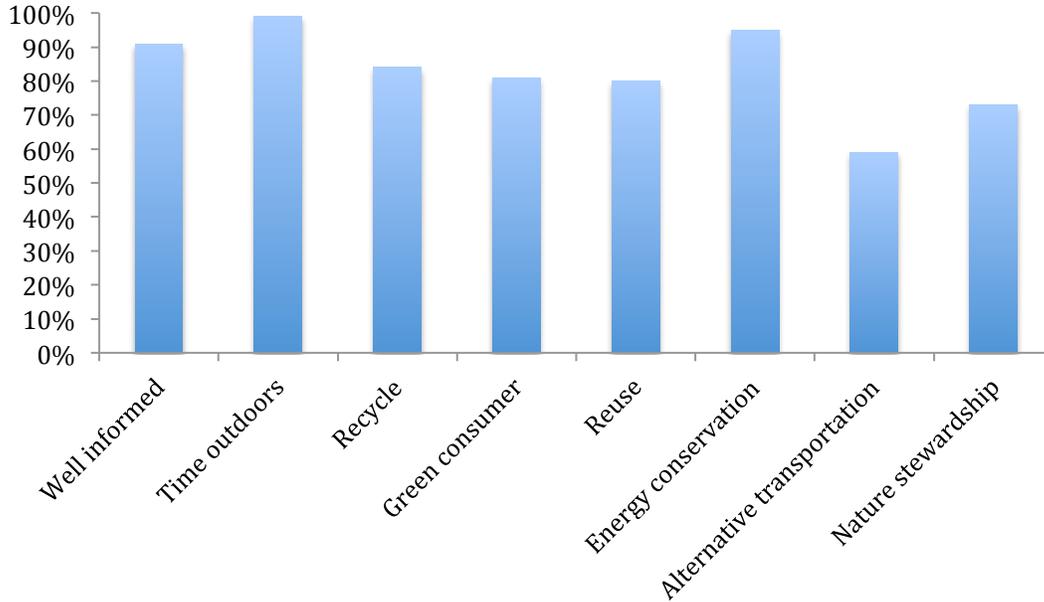


Figure 2.1. Percent of 2010 Lincoln Safari participants who reported medium or high levels of being informed about opportunities for spending time outdoors, spending time outdoors, and engaging in stewardship behaviors over the past year^{1,2,3}

¹ Items were measured on the 2010 Lincoln Safari initial registration survey, $n = 393$ (see appendix).

² Responses were measured on a scale of 1-7, where 1 means “not at all” and 7 means “very frequently” or “very well-informed”.

³ Responses of 4 and above were re-categorized to yield the number of participants who reported medium to high levels of engagement or being informed.

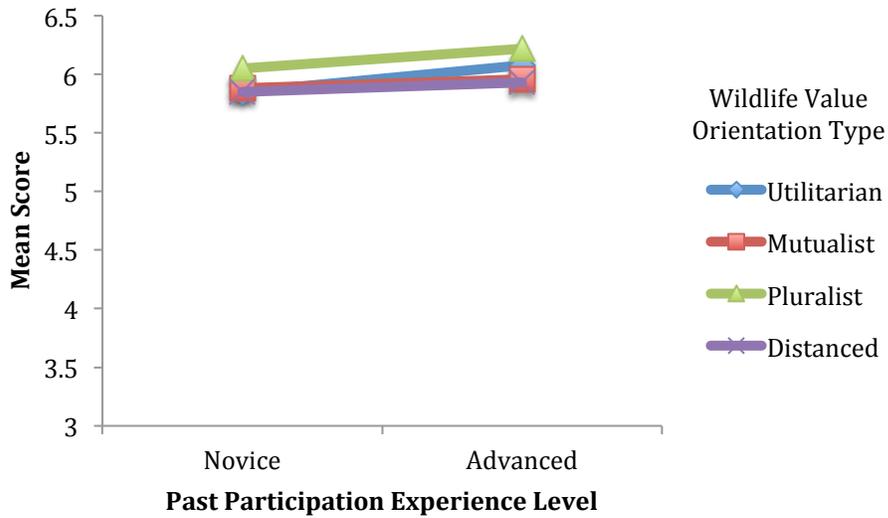


Figure 2.2. Main effect of past participation experience level¹ on mean level of engagement in spending time outdoors over the past year², from an initial registration survey of 2010 Lincoln Safari participants ($n = 393$)

¹ Novice participants were categorized as those who had not previously participated in the Lincoln Safari program prior to the start of the 2010 program. Advanced participants were categorized as those who had participated in the Lincoln Safari for one or two years prior to the start of the 2010 program.

² Stewardship behavior item responses were measured on a scale from 1 = 'not at all' to 7 = 'very frequently'.

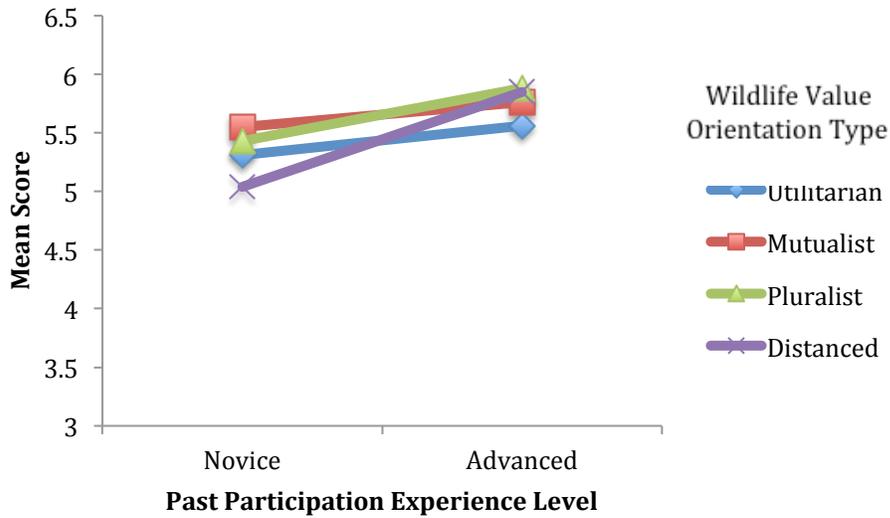


Figure 2.3. Main effect of past participation experience level¹ on mean level of engagement in recycling over the past year², from an initial registration survey of 2010 Lincoln Safari participants ($n = 393$).

¹ Novice participants were categorized as those who had not previously participated in the Lincoln Safari program prior to the start of the 2010 program. Advanced participants were categorized as those who had participated in the Lincoln Safari for one or two years prior to the start of the 2010 program.

² Stewardship behavior item responses were measured on a scale from 1 = 'not at all' to 7 = 'very frequently'.

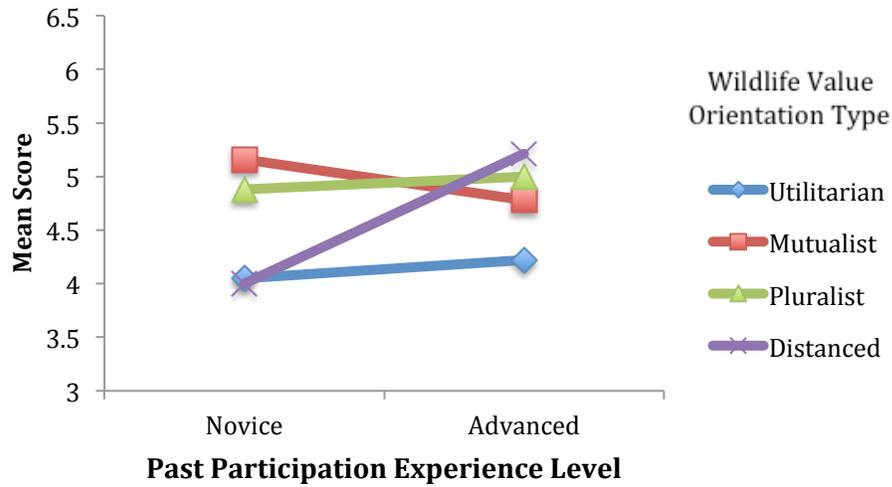


Figure 2.4. Interaction effect of past participation experience level¹ and wildlife value orientation type on mean level of engagement in green consumer behavior over the past year², from an initial registration survey of 2010 Lincoln Safari participants ($n = 393$).

¹ Novice participants were categorized as those who had not previously participated in the Lincoln Safari program prior to the start of the 2010 program. Advanced participants were categorized as those who had participated in the Lincoln Safari for one or two years prior to the start of the 2010 program.

² Stewardship behavior item responses were measured on a scale from 1 = 'not at all' to 7 = 'very frequently'.

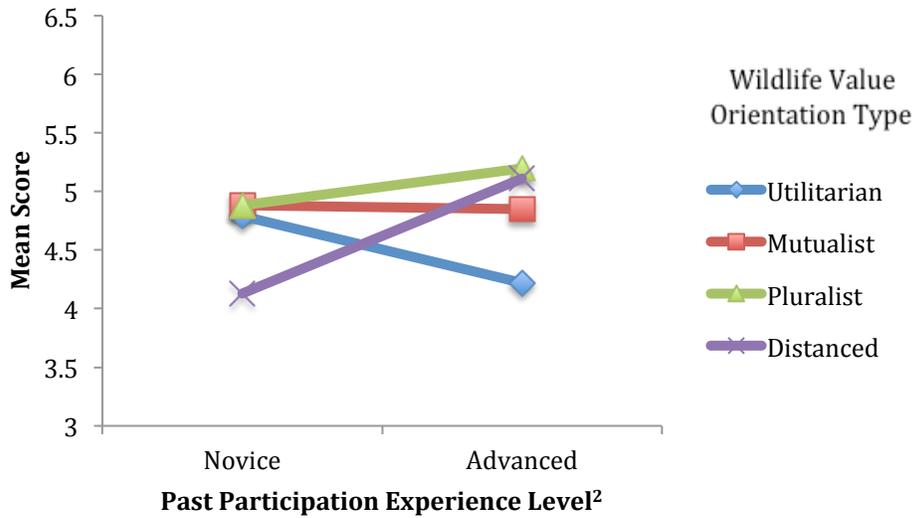


Figure 2.5. Interaction effect of past participation experience level¹ and wildlife value orientation type on mean level of engagement in reuse behavior over the past year², from an initial registration survey of 2010 Lincoln Safari participants ($n = 393$).

¹ Novice participants were categorized as those who had not previously participated in the Lincoln Safari program prior to the start of the 2010 program. Advanced participants were categorized as those who had participated in the Lincoln Safari for one or two years prior to the start of the 2010 program.

² Stewardship behavior item responses were measured on a scale from 1 = 'not at all' to 7 = 'very frequently'.

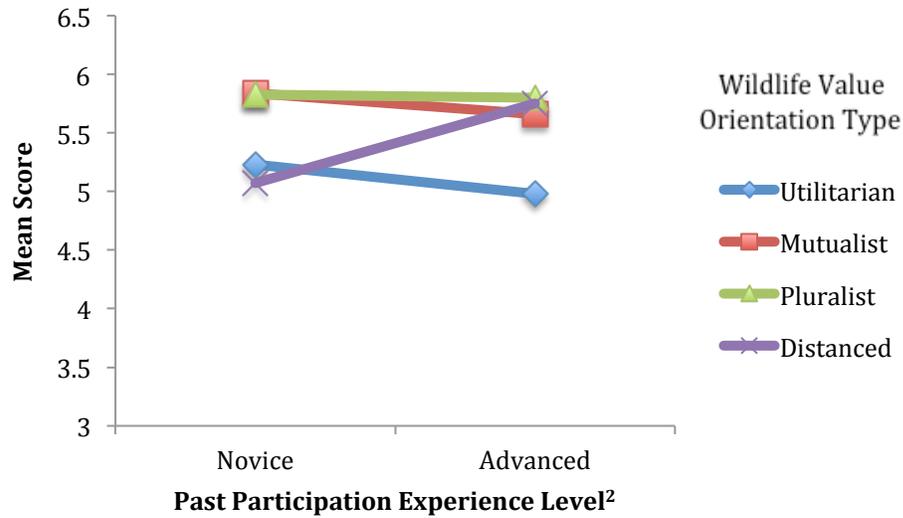


Figure 2.6. Interaction effect of past participation experience level¹ and wildlife value orientation type on mean level of engagement in energy conservation behavior over the past year², from an initial registration survey of 2010 Lincoln Safari participants ($n = 393$).

¹ Novice participants were categorized as those who had not previously participated in the Lincoln Safari prior to the start of the 2010 program. Advanced participants were categorized as those who had participated in the Lincoln Safari for one or two years prior to the start of the 2010 program.

² Stewardship behavior item responses were measured on a scale from 1 = 'not at all' to 7 = 'very frequently'.

Table 2.1. Survey items and reliability results for wildlife value orientation scales, from an initial registration survey of 2010 Lincoln Safari participants ($n = 393$).

Value orientations	Corrected Item Total Correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
<i>Basic belief dimensions</i>			
Basic belief items ¹			
Utilitarian Wildlife Value Orientation			0.74
<i>Appropriate use beliefs</i>			0.74
Humans should manage fish and wildlife populations so that humans benefit.	0.48	0.75	
The needs of humans should take priority over fish and wildlife protection.	0.63	0.57	
Fish and wildlife are on earth primarily for people to use.	0.58	0.63	
<i>Hunting beliefs</i>			0.78
We should strive for a world where there's an abundance of fish and wildlife for hunting and fishing.	0.37	0.82	
Hunting is cruel and inhumane to the animals. ²	0.64	0.69	
Hunting does not respect the lives of animals. ³	0.71	0.66	
People who want to hunt should be provided the opportunity to do so.	0.65	0.70	
Mutualism Wildlife Value Orientation			0.89
<i>Social affiliation beliefs</i>			0.83
We should strive for a world where humans and fish and wildlife can live side by side without fear.	0.60	0.81	
I view all living things as part of one big family.	0.70	0.76	
Animals should have rights similar to the rights of humans.	0.63	0.80	
Wildlife are like my family and I want to protect them.	0.69	0.76	
<i>Caring beliefs</i>			0.80
I care about animals as much as I do other people.	0.58	0.81	
I feel a strong emotional bond with animals.	0.73	0.64	
I value the sense of companionship I receive from animals.	0.64	0.73	

¹ Items measured on a scale from 1 = "strongly disagree" to 7 = "strongly agree".

² Item was reverse coded prior to analysis.

³ Item was reverse coded prior to analysis.

Table 2.2. Mean level of engagement in environmental stewardship behaviors and spending time outdoors, from an initial registration survey of 2010 Lincoln Safari participants ($n = 393$).

Variables of Interest ^{1,2}	Mean	Standard deviation
Time outdoors	6.06	0.97
Recycle	5.56	1.82
Green consumer	4.69	1.45
Reuse	4.74	1.48
Energy	5.55	1.14
Alternative transportation	3.94	1.74
Nature stewardship	4.46	1.63
Well informed ³	5.03	1.21

¹ See Appendix for corresponding survey questions.

² Responses for environmental stewardship behavior items were measured on a scale of 1-7, where 1 = “not at all” and 7 = “very frequently”. Responses for the item ‘How well informed are you about opportunities for spending time outdoors near your home?’ were measured on a scale of 1-7, where 1 = “not at all” and 7 = “very”.

Table 2.3. Two way ANOVA results examining the impact of wildlife value orientation type (WVO) and past participation experience level on time spent outdoors and engagement in environmental stewardship behaviors, from an initial registration survey of 2010 Lincoln Safari participants ($n = 393$).

	df	MS	<i>F</i> -value	<i>p</i> -value	η^2
Time outdoors					
WVO	4, 376	1.35	2.66	0.10	0.54
Past part exp	1, 376	7.02	17.68	0.02*	0.83
WVO * Past part exp	3, 376	0.38	0.41	0.75	0.003
Recycling					
WVO	4, 375	1.80	0.94	0.49	0.31
Past part exp	1, 375	16.35	10.38	0.04*	0.75
WVO * Past part exp	3, 375	1.51	0.46	0.71	0.004
Green consumer					
WVO	4, 376	11.49	1.45	0.38	0.63
Past part exp	1, 376	6.98	0.73	0.45	0.19
WVO * Past part exp	3, 376	9.79	5.25	0.001*	0.04
Reuse					
WVO	4, 376	4.10	0.60	0.69	0.41
Past part exp	1, 376	2.60	0.32	0.61	0.10
WVO * Past part exp	3, 376	8.30	4.15	0.01*	0.03
Energy conservation					
WVO	4, 376	7.66	2.56	0.20	0.74
Past part exp	1, 376	0.29	0.08	0.79	0.03
WVO * Past part exp	3, 376	3.55	2.95	0.03*	0.02
Alternative transportation					
WVO	4, 375	10.99	2.30	0.22	0.69
Past part exp	1, 375	0.10	0.02	0.90	0.01
WVO * Past part exp	3, 375	5.36	1.84	0.14	0.01
Nature stewardship					
WVO	4, 376	10.07	3.89	0.09	0.76
Past part exp	1, 376	18.32	6.96	0.07	0.68
WVO * Past part exp	3, 376	2.64	1.09	0.35	0.01

*Results are significant at the $p < .05$ level

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**SEEKING EXCELLENCE FOR THE LAND OF PARADISE:
CULTURAL HERITAGE VALUES AND ENVIRONMENTAL EDUCATION IN KA'U,
HAWAII**

INTRODUCTION

Forces of modernization have fundamentally changed how children around the world interact with and learn about nature, which has implications for future natural resource stewardship. Broad-scale changes, including population growth and changes in land use (Cordell, Bergstrom, Getz & Green, 2004; Rivkin, 1995) as well as urbanization, economic development and technological advancement (Clements, 2004; Pergams & Zaradic, 2006, 2007; Roberts, Foehr & Rideout, 2005; Rideout & Hamel, 2006), have all contributed to a phenomenon Richard Louv (2008) has called “nature-deficit disorder”, which stems from the widening divide between children and the outdoors. Learning about nature increasingly occurs in indirect ways (i.e., through restricted or managed contexts such as zoos or parks) or through vicarious or symbolic experiences (i.e., television) as opposed to through direct day-to-day experience (Kahn & Kellert, 2002). Therefore, children’s perceptions of the natural world are likely to be increasingly influenced more by television programming and technology than by time spent outside.

This shift in how knowledge about nature is acquired is especially relevant to specific cultural groups that have historically relied upon transmission of traditional ecological knowledge (TEK) in order to share information about the environment and environmental processes. TEK encompasses the unique, local knowledge of particular groups of people situated within a culture and is passed from generation to generation (Dudgeon & Berkes, 2003). TEK, defined as a complex arrangement of knowledge, practice and beliefs that incorporates local ways of knowing and interacting with ecosystems (Berkes, 1999), is a specific focus within a

body of literature on indigenous knowledge, which includes, more broadly, the unique, local knowledge of particular groups or peoples (Dudgeon & Berkes, 2003).

When considering the potential consequences of this growing disconnect between children and nature both in terms of children's physical and emotional development and academic achievement (Jordan & Robinson, 2008; Burdette & Whittaker, 2005; Taylor and Kuo, 2006; Chawla, 1988, 1998, 1999; Wells & Leckies, 2006) as well as future commitment to natural resource stewardship (Bunting & Cousins, 1985; Bixler, Floyd & Hammitt, 2002; Chawla, 1988; Kals & Ittner, 2003; Kellert, 2002; Louv, 2005; Phenice & Griffore, 2003; Pyle, 1993; Schultz, Shriver, Tabanico & Khazian, 2004; Sobel, 2002; Wilson, 1993), it is clear that the future of conservation hinges upon the ability of conservation organizations to respond to the societal trends that have influenced how children learn about and interact with nature. In particular, the environmental education programs of these organizations demand attention in being able to reach diverse audiences and help shape their perceptions of the natural world. However, few studies have focused on how to implement and evaluate effective environmental education programs in unique cultural contexts (Beh, 2011; Bray, Clark & Stevens, 1998; James, 1998). Thus, there is a need to better understand how transmission of cultural knowledge and values can play a role in influencing the outcomes of environmental education programs in these areas.

Understanding the local cultural context in places such as Hawai'i has the potential to improve efforts to reconnect children from distinct cultural backgrounds to nature. This points to a need for both understanding cultural context when planning and implementing programs designed to reach certain underrepresented groups, and developing culturally sensitive evaluation methodologies to document the reach and effectiveness of these programs. To this end, TEK is a

useful framework for better understanding how to develop and evaluate more targeted educational initiatives that are tailored to specific audiences.

TEK as a Framework for Learning About Nature Through Culture

Values, which form the basis for higher-order cognitions such as attitudes and ultimately influence behaviors, are “enduring beliefs about desired end states” (Rokeach, 1973; Schwartz, 2006). Values typically form during childhood and are shared within a culture. Given that the primary goal of many environmental education programs is to affect behavior change (Hungerford & Volk, 1990), decoding human values with respect to the environment and natural resources could be of particular interest to environmental educators working with youth. Hence, understanding how to integrate cultural heritage values, which are rooted in TEK, into environmental education programs is an important consideration when working with culturally distinct audiences.

Habermas’s (1984) theory of communicative action, which states that individuals challenge others’ arguments based on truth, appropriateness and authenticity in order to understand each other by negotiating common meanings through shared assumptions of place, has been applied to TEK (Butz, 1996; Chinn, 2007). This implicates the complexity of cognitive processes that facilitate the actual transmission and acceptance of this knowledge both at the individual and societal levels. Social learning is one avenue through which TEK acquisition can occur (Bandura, 1977), and it involves teaching and learning strategies that have the capacity to shape human values and behavior toward the natural world.

Strongly rooted in culture, intergenerational transmission of TEK is dynamic and transactional and involves the process through which older generations deliberately transmit values, knowledge and skills to younger generations at various life stages (Cristancho & Vining,

2009). The United Nations Environmental Program (2007) states that this collectively-owned knowledge is rooted in a strong oral tradition that is of a practical nature to natural science fields and is often shared through stories, songs, folklore, proverbs, rituals, community laws, and local language.

However, there are several key differences between how today's children in many societies learn TEK versus how they learned it in the past. These differences can be attributed to the loss of native languages (Cristancho & Vining, 2009; Ellis, 2005), the diminishing role of the oral storyteller (Butz, 1996; Chinn, 2007; Cruikshank, 1997; Green, Billy & Tapim, 2010; Pierotti & Wildcat, 2000; Reid, Teamy & Dillon, 2002, Thompson, 2004), and standardization of formal education based on Western science (Chinn, 2007; Cristancho & Vining, 2009; Reid et al., 2002; Thompson, 2004; Zarger, 2002), all of which lead to a lack of direct contact with nature and a lack of connection with children's individual social and cultural situations (Chinn, 2007; Cristancho & Vining, 2009). To this end, understanding how to better incorporate TEK into environmental education programs in the face of changing societal conditions has much to contribute to the ability of conservation organizations to target programming toward more narrowly defined groups, particularly in culturally sensitive regions.

Transmission of TEK from one generation to the next is an important part of education in many indigenous communities (Reid et al., 2002). However, modernization has fundamentally changed how TEK is transmitted and received. Agrawal (1995) argued that in order to preserve the knowledge, we must also work to preserve the culture within which the knowledge is situated, which implicates an understanding of the underlying cultural heritage values that exist within a particular group. In order to prevent the aforementioned barriers from leading to an extinction of TEK as elders die off, it is important for indigenous peoples to work within the

institutions that serve them (Hobson, 1992) to promote transmission of TEK by providing incentives for both younger and older generations to come together (Cristancho & Vining, 2009). This can be encouraged by allowing elders to use traditional oral teaching methods instead of forcing them to adopt Western-based environmental education. In addition, teachers working within formal education systems must be encouraged and rewarded for respecting the oral traditions associated with TEK (Ignas, 2004) in order to serve as a bridge between elders and youth (Thompson, 2004).

Methodological Considerations for Integrating Cultural Heritage Values into Environmental Education

Developing a holistic understanding of the effect of culture on how youth connect with and relate to nature implicates a methodological approach that can fully assess the broader impacts of incorporating TEK into a formal environmental education program. Some have argued against conducting research on children since children lack political clout (Darbyshire, Macdougall & Schiller, 2005), are incomplete adults incapable of higher-order thinking (Burnam, 1994; Oakley, 1994; Scott, 2000; Walkerdine, 1993), and can be better conceptualized as part of larger social units (Kalnins, McQueen, Backett, Curtis & Currie, 1992). Nonetheless, it is important to understand how children relate to the natural world. Since values form during childhood (Rokeach, 1973), well-designed environmental education programs for today's youth have the potential to shape the values of tomorrow's adults, which has implications for future natural resource stewardship. After all, today's kids have to live in the future (MacDougall, Schiller & Darbyshire, 2004). Over the last several decades, new advances in research involving children's experiences has led to a shift away from research *on* children and a rise in research

with or research *for* children, where children are seen as active agents in the research process who can serve as key informants (e.g., see Darbyshire, 2000; Oakley, 1994).

Using multiple methods when researching children's experiences is valuable because, rather than duplicating data, it offers complementary insights and understandings that would be difficult to access through reliance on a single method of data collection (Darbyshire et al., 2005). For instance, visual methods, such as mapping and photovoice, have been proven to generate different ideas than those derived solely from written or verbal interviews (Booth & Booth, 2003; Killion & Wang, 2000; McIntyre, 2003; Wang & Burris, 1997; Wang and Redwood-Jones, 2001). These kinds of techniques for qualitative research involving children have led to advancements in our understanding of children's use of physical space (MacDougall et al., 2004) as well as how children relate to the natural environment (Aitkin & Wingate, 1993; Dodman, 2003; Morrow, 2001; Percy, 1995; Rasmussen & Smidt, 2003; Young & Barrett, 2001).

Cultural context must also be considered when choosing a research methodology. In many cases, mistrust of a research agenda can develop when local community members see conservation agencies and institutions as agenda setters. Instead of being driven by an outside group of elites, goals for the research must be viewed as reflecting the shared interests of the broader community (Ballard, Trettevick & Collins, 2008). Photovoice, a qualitative research methodology rooted in feminist theory, constructivism and document photography, has been employed as a community-based participatory research strategy that has proven particularly useful in eliciting information from culturally diverse groups by giving participants the opportunity to take photographs that address a salient community concern (Hergenrather, Rhodes, Cowan, Bardhoshi & Puia, 2009; Beh, 2011). In addition, it ensures that participants

who may not otherwise be heard have a chance to contribute to community dialogue, allows entry into some communities that would have otherwise been restricted, and can enhance respect for community member knowledge by enabling the researcher and community members to become co-learners by equitably bridging cultural differences (Jurkowski & Paul-Ward, 2007; Castleden, Garvin & First Nation, 2008; Booth & Booth, 2003).

Study Purpose

This study was part of a larger project designed to help state fish and wildlife agencies develop more targeted environmental education initiatives through a better understanding of target audiences, including their values toward wildlife and the natural environment. The purpose of this study was to 1) learn about how incorporating cultural heritage values into a formal youth environmental education program in Ka'u, Hawai'i impacted participants' views about Hawai'i's natural resources and 2) document a culturally sensitive qualitative methodological approach for evaluating environmental education programs targeting youth who have been traditionally underserved by these kinds of programs.

METHODS

Site and Program Description

Hawai'i's Biodiversity Crisis

Historically, Hawaii was characterized by ahupua`a, distinct mountain to sea ecosystems that consisted of watershed units that extended from the forest to the lagoon and reef (Berkes, Colding & Folke, 2000; Kaneshiro, Chinn, Duin, Hood, Maly & Wilcox, 2005). Modern-day communities in Hawaii still bear the name of their historic ahupua`a (Kaneshiro et al., 2005), marking the importance of linkages between nomenclature, place and biodiversity (Maffi, 2005).

The severity of the biological diversity crisis in Hawai`i is particularly disturbing when considering the unprecedented human-induced avian extinction crisis. Before human colonization, the islands supported a diverse avifauna, evidenced by detailed fossil records preserved in lava tube caves (Pimm, Moulton, Justice, Collar, Bowman & Bond, 1994, Wallace & Leonard, 2011). Although much is still unknown about the ancient Hawai`ian social-ecological system, records indicate that prior to 1778, the islands of Hawai`i were organized into complex chiefdoms (Cordy, 1974) that consisted of up to 400,000 people living in close relationship with the land (Kaneshiro et al., 2005). During the time between initial Polynesian colonization and the arrival of the first European settlers in 1778, approximately 48 bird species went extinct (Wallace & Leonard, 2011), and following European colonization and the resulting collapse of the ahupua`a system, 23 more bird species became extinct (Kaneshiro et al., 2005; Pimm et al., 1994). The 1980's and 1990's gave rise to a fortress model of preservation, following the logic that humans were the cause of this biodiversity loss and that in order to save species, humans would need to be removed from protected areas (Drew & Henne, 2006).

The last few decades have seen a cultural renaissance of the ancient ahupua`a system and more interest from indigenous populations in being involved in conservation plans (Kaneshiro et al., 2005). However, due to the fact that in modern Hawai`i, almost all birds existing below 1000 meters are non-native species, and only 10% of native, endemic bird species have survived human impact, opportunities to see these native species first-hand are severely diminished (Pimm et al., 1994). Because these birds exist in isolated habitats, there is little call from the public to increase funding and conservation action (Wallace & Leonard, 2011).

The `alala (*Corvus hawaiiensis*), for example, currently exists only in captivity, and its survival to date can be attributed to a mix of legal and social factors, conservation advocacy,

good luck and landowner cooperation (Pimm et al., 1994). Hawai`i's only designated conflict species, the 'alala used to occur mainly on private lands and was a source of contention for landowners who wanted to pursue activities such as logging on their property (Wallace & Leonard, 2011). An important first step in generating support for species such as the 'alala is engaging community youth in programs that educate them about Hawai`i's unique natural and cultural resources. A message about the need for 'alala protection may be more appealing if combined with content from cultural stories (Teel & Bruyere, 2010). However, in certain regions, generating interest and participation in environmental education programs has proven challenging for conservation organizations.

The Imi Pono no ka Aina Program

Imi Pono no ka Aina means 'Seeking Excellence for the Land'. This place-based environmental education program, which incorporates service learning and experiential learning in order to inform young people about Hawai`i's natural and cultural resources, takes place over two weeks during the summer months and is offered to Hawai`ian youth through the Three Mountain Alliance Watershed Partnership. This partnership consists of The U.S. Fish and Wildlife Service, The National Park Service, U.S.D.A. Forest Service, The Hawai`i Department of Land and Natural Resources, the Hawai`i Department of Public Safety, U.S.G.S. Biological Resources, King Kamehameha Schools, The Nature Conservancy, and the Department of Agricultural Natural Resources Conservation Services Division. Although the program had been previously offered successfully in several locations on the Big Island of Hawai`i, youth from the Ka`u region were underrepresented among program participants, and agency partners were interested in expanding the program to the Ka`u area.

In partnership with the Hawai`i Department of Land and Natural Resources (Division of Forestry and Wildlife), the Three Mountain Alliance, and the Western Association of Fish and Wildlife Agencies, a research team from Colorado State University investigated perceptions of teachers, parents and community representatives in Ka`u to help enhance and expand the reach of nature program offerings in this area (Teel & Bruyere, 2010). Interviews were conducted in 2009 with several key informants to understand values toward wildlife and nature, barriers to program participation, and preferences for program formats and content in order to inform an offering of the Imi Pono no ka Aina environmental education program in Ka`u in June, 2011 (see McCoy, 2010 for a description of research methodology).

Interviews with parents, teachers, and community leaders in Ka`u, Hawai`i in 2009 revealed that (Teel & Bruyere, 2010):

- ***Interest in programs about nature in Ka`u was high.*** Results revealed a history of close connection with and use of natural resources among native Hawai`ians. However, many parents and community leaders expressed concern that this history may be diminishing among today's youth, and indicated an interest in having children learn about the cultural uses of nature as a way of maintaining connections with the past. This finding indicated the need for environmental education programs in Ka`u to integrate lessons and activities that appeal to cultural heritage values. For example, instead of framing a message for protection of species by indicating the need to preserve biological diversity, a message about the need for species protection may be more appealing if combined with content from traditional stories that convey the cultural significance of a species.
- ***Results revealed a primarily utilitarian orientation toward wildlife and nature,*** indicating that wildlife and nature should be used and managed for human benefit.

Although somewhat similar to the utilitarian wildlife value orientation detected in previous research (Manfredo & Teel, 2008; Manfredo, Teel & Henry, 2009; Teel, Dayer, Manfredo & Bright, 2005; Teel & Manfredo, 2009), it was slightly different given the unique cultural context in which it was expressed. To illustrate, one key informant suggested a more reciprocal human-nature relationship:

“The Earth gives to us, so we must give back to the Earth.”

Participants frequently made reference to the interconnectedness between Hawai`ian culture and the natural environment. One participant, for example, said:

“If you’re talking about our culture, you’re talking about nature.”

The importance of nature and wildlife were discussed in relation to traditional native uses (e.g., forests were used by native Hawai`ians to obtain wood for building canoes and to gather plants for medicinal and ceremonial uses, fishing and hunting were common forms of subsistence) and native myths/folklore that recount the interdependence among people and nature. This finding implicated the need for programs to appeal to these core values toward wildlife and nature.

- ***Results indicated a desire for programs to occur during the summer months and for advertisement to occur through word-of-mouth by trusted, familiar sources in the community, such as kapuna elders.*** Working directly with community members to advertise programs and recruit participants was identified as an important element that could lead to a program’s success. In addition, exploring opportunities for greater partnerships with local organizations could also lead to better program promotion.

These findings were used to inform the 2011 offering of Imi Pono no ka Aina in Ka`u that included enhanced cultural content in order to account for the unique cultural context of the

region. The selection of 2011 program participants from Ka`u was based on an application process during which students were asked to indicate why they wanted to participate in the program. Partnering agency staff chose participants based on the authenticity of their application materials (i.e., written application materials were completed by the student as opposed to the student's parent or guardian, and applicants expressed a genuine interest in Hawai`ian culture and the environment).

Data Collection

A basic interpretive qualitative case study was undertaken by the primary author in June 2011 to understand the lived experiences of 12 Ka`u youth ranging from 11-17 years of age as they participated in the Three Mountain Alliance partnership's two week Imi Pono no ka Aina program. A mix of qualitative research methodologies (i.e., researcher observations, open-ended interviews, photovoice and document analysis of workbooks maintained by participants during the program) was used to create portfolios for each of the 12 participants in order to evaluate the impact of the 2011 offering of the Imi Pono no ka Aina program in Ka`u on each participant.

The portfolio components provided context for how each participant related to nature prior to, during and after his or her involvement in the program, and contributed to addressing the objective of learning whether incorporating cultural heritage values into the program affected participants' views of Hawai`i's environment. These portfolios contained the following data sources:

1. A written survey completed by participants on the first day of the program allowed researchers to understand characteristics of the individual, including demographics (e.g., age, gender), prior experience with nature (e.g., how often they experience nature), and

current knowledge and current connection to nature through a short written response to the prompt, “Tell us a personal story about nature that is memorable to you”.

2. Written responses from participant workbooks in response to the prompt “What did you like about today” were recorded at the end of each day.
3. A written statement compiled by participants at the end of the second program week in response to the following verbatim prompt developed by program leaders:

Please write as much as you can and answer as many questions as you can. We will use your words to help us justify why this program is needed in the future. Please, try your best and don't be afraid to give us suggestions for the future. Your ideas will help us improve this program for next time.

Topics:

- 1) What things did you learn over the past two weeks?
 - What were your favorite activities or lessons?
 - What lesson or activity was your least favorite?
 - What could be changed in the future to make the program better?
 - 2) How did this program impact your views of the island of Hawai'i?
 - 3) Why do you feel conservation is important to our home?
 - 4) If you were to choose to work in the conservation field in the future, what type of work or job would you be interested in?
 - 5) Lastly, give us your overall opinion of what you've been through over the last two weeks. Do you think this experience will help you in the future?
4. Photographs were taken during the second week of the two week program using a photovoice technique where participants were prompted to respond to the question “What does nature mean to you” by taking 10-15 photographs of their own.
 5. Open-ended interviews were conducted near the end of the program in which each student was asked to explain the photographs he or she took, followed by two general questions and one specific question chosen based on researcher observations and conversations with the child throughout the duration of the program in order to understand how participating in the program has impacted his/her thinking about nature. The general questions included: 1) Is your view of nature the same or different than it

was before the program, and 2) What is the most valuable thing you learned during the program?

6. As the primary researcher, I recorded observations of program participants during the duration of the 2011 program in a field notes journal.

Data Analysis

The multiple components of each participant's portfolio, as outlined above, were coded using open, axial and selective codes, which were then grouped together for each participant to identify key themes (Bogdan & Biklen, 2007; Glesne, 2006). Elements for each individual participant were combined and analyzed at the portfolio level. In other words, rather than comparing one element of an individual's portfolio to the same corresponding element in another individual's portfolio, each portfolio was examined through single case analysis to document program outcomes *for each individual*. Next, through cross case analysis, common themes that emerged across all individuals were noted, and broad conclusions were drawn pertaining to overall program outcomes based on these themes.

In addition, I maintained a researcher's reflexive journal containing field notes in order to record observations of participants (see #6 above) as well as to identify any preconceived notions and personal subjectivities that might influence data collection and analysis (Glesne, 2007). This journal served to triangulate key findings that emerged for each participant through analysis of the participant's portfolio. Triangulation was thus accomplished by using multiple data sources in addition to peer review of findings and conclusions.

RESULTS

Imi Pono no ka Aina 2011 Program Participant Portfolio Evaluations

The following section contains the stories of the individual participants in the 2011 Imi Pono no ka Aina program in Ka`u. Findings for each participant are analyzed below. Names have been changed to ensure participant confidentiality. Quotes from participants reflect verbatim language used by the participants themselves in order to preserve the personalized meaning and voice as important components of their stories (Merriam, 2002).

Ha`a

As a researcher-observer, I had an opportunity to interact with Ha`a (female) and two other program participants on the second day of the program, when we were working together in a group to plant trees at Kona Hema. I recorded this interaction in my reflexive journal:

I joined a group of the older high school girls, Ha`a, Napua, and Ka`iu. We laughed and chatted, digging and planting. Ka`iu found a few snails and showed interest, exclaiming, “Oh, look at this!” and picking it up. Ha`a had blue painted fingernails and complained that they were getting dirty. Ha`a and Ka`iu both lay down in the thick mat of dead grass. I felt that I was on my way to building rapport with these girls! I was good at getting the tree out of the pot before we planted it – the girls would struggle and hand it to me (“Give it to her, she’s good at it” ...I don’t think they knew my name ...) and then giggle when I could get it out right away.

For Ha`a, the Imi Pono no ka Aina program facilitated *connections*. Understanding how various elements of nature are connected to each other, making social connections with other students and adult leaders interested in conservation, connecting nature to cultural teachings, and making symbolic connections between nature and her personal life all demonstrate the importance of *connections* to Ha`a.

During the program, Ha`a learned how all ecosystem elements are connected to each other and how humans fit in to this system. For example, Ha`a indicated that one of her favorite activities during the program was the Olelo no`eau on interconnection. Participants were

instructed to collect several items and create a diagram that showed how these items were connected to each other. Ha`a chose a snack bag, a koa leaf, and a piece of tall grass for this activity. Regarding this activity, she said, “It was the best!” In addition, Ha`a learned that human-introduced non-native species often have particularly damaging effects on the native environment. She developed a greater appreciation for ecological restoration, understanding more fully the impacts of invasive plants and animals (e.g., cattle), and the role humans should have in caring for the environment. At Hakalau National Wildlife Refuge, for example, the group learned about gorse (*Ulex europeaus*), a noxious weed introduced to Hawai`i that poses a threat to Hawai`ian ecosystems. When asked about her learning experiences over the past two weeks, Ha`a responded:

“This pass (sic) two weeks I learned alot. I mean alot because I did not know anything about this island and our ahupua`a...another thing is that this plant name GOURSE and it took over all of the forest in Hakalau...”

Ha`a also enjoyed learning about nature while making social connections with others. On Day 8 of the program, the group visited Ka`upulehu, a dry forest on the west side of the island, and engaged in a service learning project with several hundred youth from the Hawaii Youth Conservation Corps. The participants were instructed to pair up with one or two other youth to plant endangered trees in a designated area. Ha`a recorded her favorite part of Day 8 in her program workbook:

“I liked when we got to plant and meet other people. Also when we got to share out thoughts with others.”

Near the conclusion of the program, Ha`a reported in her program journal that making these kinds of social connections was a highlight of her program experience. She particularly enjoyed meeting people with traditional knowledge about nature, like Kuhea, who could teach her about nature. As a result of this social connection with Kuhea, Ha`a was able to recall the

details of a story about a man-eating shark on her post-test in response to a question about the cultural significance of a place:

“There was once a farmer who lived by the ocean and he will always grow his own food. One day 3 girls was going to the beach and they asked the farmer if he wanted to go to the beach the farmer said no. So they left then he and the man eating shark was really close. The farmer went to the ocean and changed to a man eating shark. Then one day came they putted the farmer, to the imu the farmer was the man eating shark.”

Furthermore, she hoped to serve as a link in the chain of social connections that would lead to increased knowledge about nature for her family:

“...also, I liked when we went to Pu`uwa`awa`a and meet other people and when our Aunty Kuhea told two story about the pu`u we were sitting on and telling us that there was a man eating shark. It was really interesting and it was lovely. That’s what I learned and I will share with my family.”

Along these lines, when asked what she planned to do with the knowledge she gained through the program, Ha`a shared a desire to share the knowledge with others:

“...I plan to do is...to show other people...and make them realize that...this native tree relates to culture.”

She seemed to exude a quiet maturity during the program, which was corroborated by some of the life experiences she shared during her interview. As we discussed her view of nature as represented by the photographs she took, she shared how her photos were symbolic of a family background steeped in violence. To Ha`a, a fence symbolized protection and separation of native plants and animals from non-native plants and animals, and she extrapolated this to represent the moral obligation to choose good over bad (Figure 3.1):



Figure 3.1. A fence that is symbolic for Ha`a

“You can protect animals...from native plants. You can protect crazy people from us, and I think that is in this picture because my family, we’ve been in like, a lot...violence, and I always say put a fence right in front of you, be on the good side. You know what you should do, instead of saying bad things and doing bad things. On this side is, like, good things...and on the good side you can see that there is something that will just feel free...”

Ke`ali`i

Gregarious and talkative, Ke`ali`i (male) had a talent for making people laugh. He developed a way to remember the name of the ohelo berry, which was traditionally used as a dye in Hawai`ian culture: he would hold the dark blue berry in one hand and wave at it with the other, saying with inflection, “Oh, HELLO, berry!” From that point forward, when one of the adult leaders questioned the group about the name of that particular plant, the waving motion was used as a clue to trigger memory of the ohelo berry.

A primary outcome of participating in the Imi Pono no ka Aina program for Ke`ali`i was understanding the role humans have in preservation of Hawai`i’s environment. He captured this idea through one of his photographs (Figure 3.2), which was a self-portrait of sorts depicting him standing near a young tree that had been planted by humans. The program helped him to reconstruct his view of the place of humans in nature, and the photograph captured the notion that humans have a responsibility to take care of nature. He described this photograph in the

following way when asked if he thought it's important for people to be involved in taking care of the forest:



Figure 3.2. Ke`ali`i standing next to a newly planted tree

“I took that because there’s things that, like, we have to take good care of and gotta make sure that you, like, watch it and feed it and things like that...I think people should be involved in taking care of it...”

Although Ke`ali`i shared a story on his pre-test about spending time in nature previously and engaging in camping, hiking and hunting with his family, his views of the status of Hawai`i’s ecosystems changed as a result of the program. In his program journal, he wrote:

“Over the past two week’s we went around the island and out plant and learn about native plants...it changed alot cause I tougt Hawai`i was a not to bad but it is much more.”

The experiential learning strategies used in the program seemed to have a positive effect on Ke`ali`i. During a three-day camping trip at Hakalau National Wildlife Refuge, the group learned about vegetation restoration efforts and native birds. Ke`ali`i’s favorite activities during this trip, recorded in his program journal, included birdwatching, learning about native plants, and getting personally involved in restoration efforts by assisting with planting seedlings from the on-site greenhouse. I recorded some observations from the camping trip in my reflexive journal:

We had a couple pairs of binoculars (plus my binoculars) that the kids could share. Some of the birds we got to see were the I`iwi, `apapane, Hawaiian creeper, Urkel’s franklin, akepa (female), elepaio, oma`o, and I`o. The kids were especially excited about the I`iwi,

and the birds were so close to us that we could see them with our naked eyes. The birds were flitting back and forth between flowers of ohia trees. It is neat the kids get to see things come full circle – they planted plants, learned about why habitat conservation and enhancement is so important to birds, and got to see the actual birds on the same kinds of plants that they had planted! I was amazed at how quiet our group of 12 teenagers could be as were viewing these rare and beautiful birds.

In addition, Ke`ali`i indicated that his favorite part of the visit to the Keauhou Bird Conservation Center on the last day of the program was seeing endangered birds. The program helped him to realize that by taking care of nature, humans were simultaneously taking care of themselves. He shared his feelings of empathy for Hawai`i's natural resources in his program journal:

“Like, before I came to this program, I didn't really care much about nature...like, I could care less. But when I came here I just felt bad for, like, the trees and stuff, how they're, like, dying, like – like you can provide the birds, like those things that live in trees, and it's like we're not even taking care of ourselves.”

A secondary outcome of human intervention in ecosystems is bringing people together to build community, which is something Ke`ali`i experienced during the program. At Hakalau National Wildlife refuge, for example, a sign hanging over the greenhouse read ‘Laulima’, which one of the leaders explained to the group means ‘many hands working together’, as recorded in my field notes. During his interview, Ke`ali`i discussed the value of building social connections by working together, and the potential role nature can play in bringing people together and building community, which is something he experienced firsthand during the program:

“...we should all, like, sort of have a day when we all come together and plant trees and things like that.”

Then, he agreed when asked if he thought that doing things like planting trees together out in nature helps people to grow closer to each other, and he also agreed when asked if he experienced this during the program. These observations are especially relevant in Hawai`i, where environmental concerns often cause division in communities.

Moana

One of the youngest girls in the program, Moana was a thin girl with a petite build. Elements that contributed to Moana's improved understanding of nature displayed at the end of the program included learning names and biological details of plants and animals coupled with a novel experience. She seemed to connect strongly with ecological information conveyed through the program, and displayed a propensity toward remembering even the most complex scientific names. She did not show enthusiasm for cultural information conveyed through the program, but this may be due to the fact that she has not always lived on the island. In her story about nature recorded on the presurvey, she wrote about a hiking trip with her family:

“When I first came to the island, my family went hiking. I don't remember where...”

Although Moana was one of the youngest program participants, she willingly participated in lessons alongside other participants when questioned about things she had learned, and seemed to exhibit remarkable ability to retain information. For instance, I recorded one such example in my field notes:

[One of the adult leaders] asked the kids to repeat a fact they learned last night. Kaikea said “there are 71 species extinct” Ke`ali`i added, “That means they're gone”. Ka`iu said “11 species are stable”. Nakoa said, “A total of 113 species were unique to Hawai`i”...Pomai said, “endemic”. Moana said, “The okiapolo`au uses tweezers”. Ha`a said, “gorse does not stop growing”. Napua said, “silverswords are only found on the big island”...I'm starting to think these kids are learning more than I am...

Similarly, Moana recognized small details in nature, and seemed to grasp how these individual elements fit into a larger ecosystem. For example, instead of focusing on cultural connections to the ohelo berry (Figure 3.3) traditionally used as a dye, like many of the other participants, Moana used the significance of this berry in plant reproduction to explain what nature meant to her. Similarly, she noticed the intricate details of an `ohia flower in another of her photographs (Figure 3.4).



Figure 3.3. Moana's photograph of 'ohelo

“Uh, kind of hard for me to explain it. The, the berries on it is – is that the seeds and fruits? And so it reproduces.”



Figure 3.4. Moana's photograph of an 'ohia flower

“It looks pretty too...when you look closely, its seeds are on it...”

Central to Moana's experience in the program was the novel experience, or seeing and doing things she had never seen or done before. On the second day of the program, the group had the opportunity to see a koa tree that was 300 years old. Moana indicated in her program journal that this was her favorite part of that day:

“I liked when we went to see the grandmother tree.”

Similarly, I observed Moana's awe at the Hakalau National Wildlife Refuge greenhouse when she had an opportunity to see and touch a rare, endangered plant and recorded the following observation in my field notes:

We all walked inside the greenhouse, Moana and Ke'ali'i gently touching leaves.

Learning about specific biological aspects of, in addition to names of species seemed to generate positive attitudes toward helping the environment while allowing Moana to understand the role she could play in environmental protection. During her interview, Moana shared the following thoughts when asked if her view of nature is the same or different from before she participated in the program:

"I think it's different now because...I've been seeing how many of these plants are endangered...and they can be saved...and how I can help the, the nature...I know the plants' names, I know how I can make it better...and do what it – do what I need to do to help it grow and stuff, cause plants have, like, different things to make it grow...they require different habitats, different kinds of soil, and – different amounts of water, and also different birds will, will pollinate."

This finding was also supported in Moana's program journal through her reflections after Day 4:

"I liked that we got to plant A LOT of plants. It makes me feel good to do work and give to the planet."

Additional support for this finding came from Moana's written reflections at the end of the program:

"I learned the scientific name of some plants and A LOT of different stuff. 'Kinda hard for me to write it all because I learned so much. If I had to pick a favorite activity or lesson it would probably be looking and learning about the birds. They were cute and fun to look at. My views of the island changed so much because I never knew mostly all of these things that the program taught me and the whole group."

Kula

Kula was a quiet girl with wavy brown hair. Two themes that emerged surrounding Kula's program experience were the importance of place-based learning in enhancing cultural

connections to the land and an understanding of the role humans should play in environmental preservation. When asked why she decided to participate in the program, Kula indicated that she already cared about the environment prior to the program, but desired to learn more about her culture:

“I wanted to learn more about the Hawaiian culture and stuff like that. And I went to this program because I want to become, like, a marine biologist or something to help animals and plants and stuff like that...I am a tree hugger [laughs].”

Kula particularly enjoyed visiting and learning about the history of different places on the island, and the program helped to strengthen her connections to Ka`u, her home. For example, on the first day of the program, Kula reported that her favorite thing about the day was “learning about the different old Hawai`ian place...learning more about where we live.” She also enjoyed learning about places and place names during the coastline walk at Keaukaha, indicating that she liked “how we learned about the different places of Keaukaha.” She also reported enjoying the scenery of a new place when the group visited Hakalau National Wildlife Refuge.

She snapped a photograph of the yellow hibiscus, or halapepe, which is Hawai`i’s state flower (Figure 3.5), and discussed her experiences viewing similar endangered plants and animals in various places on the island during the program. Learning about cultural uses of plants helped Kula to form better connections with natural resources. For example, she contrasted her previous knowledge of Hawai`ian flora with her current knowledge as a result of the program:

“...I never knew most of our Hawai`ian native plants and I only knew the ones that people talk about, like I never knew about the mamake tree as much as I do now, and the uki-uki tree and the ohawi and all those kinds of plants.”

In addition, when asked about the importance of these kinds of opportunities for kids, Kula said:

“...there’s no one, no program or someone to show us kids these plants that are endangered...”



Figure 3.5. Kula’s photograph of the halapepe, Hawai`i’s state flower

Kula also indicated that the program changed her view of nature. Although she still viewed nature as self-healing after the program, she reported a different belief about the role humans should play in helping nature, and that in doing so, humans could improve their own livelihoods. This idea was reflected in five of the photographs she took (Figures 3.6, 3.7, 3.8, 3.9 and 3.10):



Figure 2.6. Kula’s photo of a tree

“...it’s strong, and it tries to rebuild itself...[the role of humans should be] making sure they don’t cause things that they know endanger...themselves and the forest.”



Figure 3.7. Kula’s photo of a young ohia tree

“Ohia...um, it takes awhile for them to grow, just like us kids...so in a way, it’s like us...so if we don’t take care of it, it’s like we’re not taking care of ourselves.”



Figure 3.8. Kula’s photo of charred logs

“That’s, I think, some of our native trees have been cut down...and that’s one of the reasons that most of our native plants are gone, cause of logging.”



Figure 3.9. Kula’s photo of a young seedling growing among dead koa leaves

“I think it was a picture of a dead koa tree...yeah, and then a new one sprouting up, so like a rebirth kind of thing...it’s like nature can reproduce itself but sometimes it needs help from humans.”



Figure 3.10. Kula’s photo of plants growing on a log

“Um, kind of the same thing as the rebirth, like, that koa tree or one of the trees is knocked down and ferns are growing on the tree, like, bring back some of the native forests.”

This reflects the unique expression of the utilitarian wildlife value orientation previously identified through preliminary focus group research, and the potential for this kind of program to

impact the formation of children's values toward the environment. One of the conversations I had with Kai, a man working in the conservation field who led one of the group's field trips, provided evidence that many of today's Ka`u's residents do not believe that humans should play a role in helping nature. This interaction was recorded in my field notes (emphasis added) and reflexive journal as follows :

We met with Uncle Kai and Louie at the...pick up site. Kai works for [a conservation organization] and today we would be going up to...explore the rain forest. Kai and Louie are both from [the local area]. Kai is an older light-skinned man maybe in his 50's with a round belly and a shiny shaved head. He swears like a sailor, but laughs easily. Louie has dark skin and hair and looks to be around college age. I drove up to the property with the group and then rode with Kai and Louie for the rest of the way. Before we drove up to the top of the pu'u (hill), Kai explained that this particular...property is made up of 3500 acres... He told the kids that the Ka`u forest is 68,000 acres and is the largest forest in the state of HI – the largest intact forest. His organization bought these parcels so that they could be a stakeholder in the Ka`u forest. Kai asked the kids if they know what a stakeholder is. Someone said, "someone who holds a stake". Kai explained it's someone who has an interest in the land. Kai told me on the ride up that the idea behind conservation is foreign to most Ka`u natives. ***If you tell them about conservation, they believe the forest has been there for a long time and we don't need to protect it because it can take care of itself.***

Pomai

Pomai (male) seemed to be well-liked by the other program participants, and was often seen wearing a sideways baseball cap and low-riding shorts. Primary themes for Pomai's experience participating in the program included the role of sensory engagement, formation of social connections with positive adult role models, the importance of seeing birds and further development of the notion of reciprocity in human-environment interactions.

Pomai reported a connection to nature prior to his involvement in the program through a short written vignette about a meaningful experience in nature that featured sensory engagement:

"When I first went the forest smellt so good. The forest lookd so nice when we went walking."

Similar kinds of sensory engagement were central to Pomai's program experience, and led him to develop a different view of nature as a result of program participation. Pomai reported that his favorite activities were those that engaged senses of sight and touch and facilitated social connections by introducing him to a positive male role model, and this in turn led to feelings of empathy for nature. For example, he particularly liked using the o`o bar, a tool used to dig a small hole in which to plant a seedling, with Uncle Kaleo on the second day of the program, and reported this on his evaluation at the end of the program:

“My favorite thing I like was when we met Kaleo and when we was planting with the o`o bar.”

Similarly, at Hakalau National Wildlife Refuge, Pomai had a chance to see an `apapane for the first time when the group went birdwatching. He captured this experience in his program journal in response to a question asking what he liked about the day:

“When we ...seen my first time a `apapane.”

Although he had previously hunted birds, this was the first time he enjoyed simply watching them. He also enjoyed seeing the captive birds at the Keauhou Bird Conservation Center. Near the end of the program, during his interview about the photos he took, these experiences were symbolized through his photographs, and it seems that the experience of seeing the forest birds helped Pomai to develop a different idea about the role humans could play in protecting bird habitat (Figures 3.11 and 3.12).



Figure 3.11. Pomai's photograph of a small, young tree

“Planting was good because I met different people and when I was planting it felt like I was doing something good because we're helping the forest out and they're helping us out for survive and all that, and making homes for birds...and getting the native plants back.”



Figure 3.12. Pomai's photograph of a young koa tree

“A baby koa tree...I think it was planted...it'll make forests for birds...[shakes his head yes in response to a question about whether he experienced birdwatching for the first time during the program]...I went bird shooting...”

Pomai's understanding of reciprocity in human-nature relationships was further reflected in his response to an impromptu group discussion on Day 4 about what everyone had learned from the program so far. We had just finished the day's work of planting 375 seedlings, and the kids and leaders were sitting in a large circle in the tall grass near the forest's edge. Pomai's response to a question about the reason for planting trees indicated that he was beginning to understand that environmental protection and restoration benefits both people and the environment. I recorded this response in my field notes and reflexive journal:

When we planted trees at Hakalau, one of the leaders asked the kids why we did it, and Pomai replied, “to help the forest and to help us”. It seems like the kids are starting to see the connections they have to the land, and understand ways conservation can benefit people.

The impact of the program on Pomai was captured in a simple statement he recorded in his program workbook:

“I learned things I didn't no and I seen things I did not see before.”

Likewise, when asked during his interview what he thought was the most important or valuable thing he learned during the program, Pomai responded:

“...plant more trees because the trees will help us out...like, if it, the oxygen, if you plant more trees, you’ll have more oxygen. If you plant more trees, um, for shelter for birds and make, trees are like people. They have feelings. If they don’t like the way that they like to be put in a place, they will just die. And people, they can, like, move.”

Auli`i

Auli`i was one of the younger girls in the program. She was quiet around the other kids at first, but seemed to enjoy getting to know the adult leaders. For Auli`i, critical aspects of the program that helped to improve her knowledge of Hawai`ian ecosystems included the utility of cultural stories and mnemonic tricks to remember biological information and the role of sensory engagement in facilitating memorable experiences. Based on the story she shared on her initial survey as well as a conversation we had during the course of the program when she told me about her family’s six dogs, I determined that her previous experiences in nature likely centered upon her family’s home in a rural area.

Auli`i’s story from the initial survey:

“One day we went up to our land there were cows let our dogs lose run the all the way to the gate the grass is all green and haveing a good time and i think this is the life.”

She seemed to connect most strongly to the cultural stories and mnemonic devices as a way to remember the names of plants and animals. In addition, like Pomai, sensory engagement with elements in nature helped to solidify the things she was learning. As a result of these experiences, she felt that the program led her to have a deeper understanding of nature through increased knowledge.

Auli`i attributed her ability to remember the names of plants and animals to the stories she learned about them during the program. Sometimes, these stories were simply short

mnemonic phrases, such as the phrase “Mamake makes tea” to remember that the leaves of the mamake plant were used in traditional Hawai`ian culture to make tea. Other stories took the form of cultural myths or legends based in a particular place. Still others represented symbolism between plants and animals or connections between the land and the sea. Her reflections in her program journal at the end of Day 1 in response to a question about what she liked about the day demonstrate her enthusiasm for the kinds of stories she would learn during the week:

“Learning about the pu`us and native plants around me and i never knew that they have names and lots of good story’s.”

When I asked Auli`i if learning about stories helps her to remember the names of some of the plants, she responded ‘yeah’. Auli`i shared some of these stories when describing her photographs to me during the interview:



Figure 3.13. Auli`i’s photograph of a mamake plant

“This one I took...the picture of it because it’s...native, and you can make something natural of it like tea. Mamake makes tea!”



Figure 3.14. Auli`i’s photograph of a kolea plant

“This is the...this is the kolea. You can tell by how smooth it is, it feels like the leather and it looks like a turtle shell...and I liked that story.”

Auli`i was also able to recall the basic details of a cultural story on her test at the end of the program:

“Kawaliea its about a girl that’s in a pond and she can turn in to a turtle and if kid’s go out to far she will help them.”

In addition to information contained in stories, sensory engagement served to enhance Auli`i’s ability to learn while also creating fun and memorable experiences. For example, her favorite activity on Day 3 of the program was tasting a native Hawaiian raspberry. Later, when I asked Auli`i if she felt the program helped to improve her plant identification skills, she reiterated the importance of using her senses to identify plants:

“I can’t just recognize it with my eyes, I have to, like, touch it.”

Auli`i expressed a desire to teach her family about some of the things she learned, and looked forward to sharing her excitement about nature with her loved ones:

“Cause, like, before, we saw just pass all these, all these native plants, and now I can, like, when we’re driving, I can say, ‘Oh mom, look, that’s a koa tree’ or ‘that’s a kolea’. And she’ll say ‘I never knew that before’.”

Ka`iu

As one of the older girls in the program, Ka`iu appeared to assume a leadership role over the other kids. Based on analysis of Ka`iu’s portfolio, leadership and service learning were two program components that contributed to positive outcomes. She demonstrated a deep respect for Hawai`ian culture, and came to the program with a background in similar previous teachings as well as a history of previous involvement in service to the environment, as reflected in her story recorded at the beginning of the program:

“A story that is memorable to me is in my 7th grade year I went to the Volcano School of Arts and Sciences and this school has to do with a lot of nature. We found a bird on the ground right by the ‘ohia tree and we didn’t know how to care for it so we gave it to the KOEC lady and her name was Mrs. William and she was so happy she cared for it as much as she could. Doing this kind of thing meant a lot to me because if we hadn’t cared for the bird it would have died or worse. When you do something right it feels really good especially when it comes to nature.”

During the Imi Pono no ka Aina program, Ka`iu served as a mentor to the other kids, encouraging them to learn their oli, or chant, that the group recited each time they entered a new place. She was a person the other kids looked to for answers. I captured two examples of these kinds of interactions while we were camping at Hakalau National Wildlife Refuge in my field notes:

After we reached the cabin, the kids had a little bit of free time and I could hear the girls practicing their oli. Ka`iu was kind of the ringleader of this, and as one of the older girls, she was able to generate a bunch of enthusiasm for singing the song.

Mark showed the kids a picture of the okiapolo`au, a bird that's only found on the big island. The kids want to ask questions and keep raising hands and shouting things out. Mark tells them to remember their questions and write them down for the end. He emphasized how special Hawai`i is – an isolated place. He asked them how different species made it to the islands. Someone said rain. Ka`iu said, “wings, waves, and wind”. One of the other kids referred to Ka`iu as “teacher”.

However, although Ka`iu may have been more advanced than some of the other program participants in terms of her knowledge about the natural environment, the program still impacted her views on nature. For example, her attitudes toward invasive species in Hawaii changed as a result of the hands-on invasive species removal experiences she participated in during the program, as shared through her written evaluation at the end of the program, her favorite part of Day 9 and her interview and corresponding photos:

“Over the past two weeks I learned a lot...I actually thought I knew everything, but going to this program has taught me so much about the forest. Also how pain in the but mullen is and gorse.”

The group spent an afternoon removing invasive mullen from the garden of a cabin where the group stayed. Although this was difficult work, Ka`iu indicated that it was her favorite part of that day:

“I liked that we worked hard today pulling out all of the weeds especially the mullen. I officially hate all invasive species but mostly mullen.”



Figure 3.15. Ka`iu's photograph representing consequences of not caring for nature

“Ohhh. I took this picture because um, I don't know what kind of tree that is, but, mmmmm, if you don't take care of the forest, it might look like that. Or um, say it was invasive, and it, and since you didn't take care of that, the native plants, invasive species will come, like, like come and overtake it, so it's, like, hard work just to take it down...and how fast that could grow.”

The program increased her awareness of the plight of native species and endangered species on the island, but it also called her to action. She indicated an interest in future service opportunities and other ways she could directly contribute to conservation in Hawai`i. She also shared a desire to talk to her family about the things she had learned, stemming from the empathy for nature she had developed as a result of the program:

“Treat the plants like it's your child or your brother or your sister...like how you want to be treated...I will share it to my family so that we can help...I think when you teach others you learn more.”

When asked about the impacts of the program on her view of nature, Ka`iu wrote:

“This program impacted my life so much. It has shown me how special these plants and animals are to each other. I feel that conservation is important so that my future generations can see these forest and their natural habitats of birds...learning about my

culture and the difference of all places has a special something in them...when people talk about forest I will know have a different point of view of the meaning forest.”

Kainani

Kainani (female) was quiet and kept to herself, but showed a great aptitude for learning, particularly when teachings about nature were paired with teachings about Hawai`ian culture, and these teachings contributed to a deeper understanding of reciprocity in human-environment interactions based on the interconnectedness of elements in nature. It seemed that kids in Ka`u were not exposed to natural history teachings in school prior to participating in the program; however, this did not mean that this particular group of Ka`u kids was not interested in learning about nature. Rather, they were lacking access and opportunity to experience the kind of education that would help them link new information about science and nature to their native culture. I recorded several examples of this in my field notes:

“In the greenhouse, Lehua was taking notes. One of the program leaders asked if they learned about kingdom, phylum, genus, and species in school. Kainani...said... “Not in Ka`u”.”

“Mark asked them if they knew what biodiversity was and he was met with a bunch of blank stares, confused looks, and heads shaking back and forth. It strikes me that these kids have a great aptitude to learn, but they need somebody to teach/mentor them.”

Kainani seemed to connect with Hawaiian words and their meanings. For example, when the group was asked an impromptu question about the meaning of ‘koa’ in Hawai`ian, she answered, “strong” right away. When reflecting on what she learned during her experience over the last two weeks in her program journal, she wrote about learning the meanings of new Hawai`ian words:

“The thing I learned in this program over the past two weeks were how the ocean and mountain could relate to each other. I also learned more Hawai`ian words and their meanings that I now know.”

Kainani’s descriptions of her photographs revealed primarily a utilitarian orientation toward nature, but it appeared that the program helped this view to develop into one of reciprocity. Several of her photographs (Figures 3.16, 3.17, 3.18, and 3.19) depicted ways humans could use nature to meet their needs:



Figure 3.16. Kainani’s photograph of koa trees

“That one, like, it gives us oxygen.”



Figure 3.17. Kainani’s photograph of ohelo berries

“This one you could make, like, dyes to color things...”



Figure 3.18. Kainani’s photograph of an ohia tree

“This one is – it’s good to make a lot of tools...with the bark...and back then, you needed tools, now you have trees.”



Figure 3.19. Kainani’s photograph of a mamake plant.

“This one, we were able to make tea out of.”

However, she also indicated during her interview that her view of nature had changed as a result of the program because she had developed a better understanding of the interconnectedness of humans and nature. This led to feelings of personal responsibility to protect and preserve both nature and cultural history of the island of Hawai`i:

“My favorite things I liked doing in this program was planting and learning ‘bout the island and how we can save it...most of the forests here on this island and on the others are dying so it’s up to people like us to save it, because if we don’t help the forest, in years to come we won’t have a forests and native plants would all die and people would not be able to save them.”

Similarly, when recording her favorite parts of the days in her program journal, Kainani often wrote about the experience of planting native plants and learning about them:

Day 8: “I like when we were planting all the plants today.”

Day 9: “What I liked doing today was working in the garden because we were helping the native plants.”

Kainani’s response to a question during the interview about whether learning about Hawaiian culture helped her to connect to nature and whether it was important to teach kids about the history and the culture confirmed the value of this kind of program for kids in Ka`u:

“...if I want to live here, I would have to know things so I could get around and learn – learn how people lived back then...if you can’t tell ‘em [kids], they’ll never know. Before, it was fun, and if they didn’t know that, then they would have a boring time. You should tell them that the way that people used to be, they had fun, not just boring. They had fun working.”

Lehua

Lehua (female) had blond highlights streaked through her dark hair. She laughed easily and seemed to especially enjoy getting to know all of the “Aunties” who helped to lead the program. Emergent themes for Lehua’s program experience included place attachment to her home, the importance of positive adult mentor influence, and the role of the novel experience, particularly when this experience involved animals. Her previous knowledge of and engagement with the environment was high, and this could likely be attributed to relationships with adults in her life (e.g., her grandmother) who served as role models and were interested in nature themselves. On her pre-test, when asked to write about a personal story about nature that was memorable to her, she indicated that her family had strong connections to the land, and that these connections manifest through a reciprocal view of humans and nature:

“When we see rubbish it’s not ours we still pick it up and throw it where it belongs. Our tutu and family we feel the `aina (land) take care us so we take care of the `aina.”

She also shared of strong family ties to Ka`u in her written reflection toward the end of the program, once again reflecting a reciprocal relationship between her family and the land:

“Punalu`u is where my grandma and grandpa were growing up. I feel like its my background and its my own yard. I take care and love Punalu`u. Punalu`u take care of us so we take care of Punalu`u.”

In addition, Lehua referred to her grandmother’s influence on her own learning about nature as she reflected on the photographs she took during the program (Figure 3.20).



Figure 3.20. Lehua’s photograph of a tree near a stone wall.

“This is the, um, the `apapane was on it...I...saw `apapane with my grandma. With my grandma. She see a lot of birds and other things.”

For this reason, Lehua did not indicate that her view of nature changed as a result of the program, but she still benefitted from learning more about nature, and was particularly impacted by the rare plants and animals she encountered for the first time during the program. For example, as the group was hiking in the dry forest at Ka`upulehu, I happened to look down at the ground and noticed a large green caterpillar, or `oka`i (see Figure 3.21). I called to one of the other program leaders, and he informed me that it was an endangered Hawaiian sphinx moth, and excitedly called to the kids to come and see. This creature, Hawai`i’s largest native insect, was

the first Hawaiian insect to be proposed for listing under the Endangered Species Act in 1997 (USFWS). Seeing one in the wild was an exciting and novel experience. I recorded the sighting in my field notes:

“On the hike back up to the cars, I looked down at my feet and saw a huge green caterpillar. I called Anela and she called one of the leaders. It turns out it was an `oka`i, or sphinx moth caterpillar. These critters are endangered and many of the leaders and older kids had never seen one.”



Figure 3.21. Large `oka`i sighting near Ka`upulehu, June 2011.

Lehua later wrote in her program journal that seeing the `oka`i was one of her favorite parts of the program:

“...at Ka`upulehu is where we got to see the big `oka`i. The `oka`i was big and it was endangered. I really loved it because I never see a big `oka`i that big in my life.”

Similarly, Lehua shared some of her favorite experiences encountering unique plants and animals for the first time during the program:

Day 4: “I liked when we got to take picture with the big and nice ohia tree...”

Day 5: “I liked when we got to see the `apahe (`apapane), elepaio and the mom koa tree.”

Day 10: “We got to learn about the Maui Parrotbill and go to see how the animals are taken care and feed.”

Lehua demonstrated a particular fondness for animals, as evidenced by some of the photos she took in response to a question about the meaning of nature to her (Figures 3.22, 3.23, 3.24). She also quickly noticed that I shared this interest, and enjoyed sharing my excitement at seeing some of Hawai`i's native animals for the first time:

Lehua later pointed out a sea turtle. The kids noticed that I got very excited when I saw a sea turtle at the black sand beach yesterday, and from then on, they would come and get me, exclaiming excitedly, "Auntie Becky, there's a sea turtle over here!"



Figure 3.22. Lehua's photograph of an ohia tree in blossom

"It had a bird on it, so I took a picture because it had a bird on it."



Figure 3.23. Lehua's photograph of an ohia blossom

"Ohia...I like ohia because I saw the bees on it..."



Figure 3.24. Lehua's photograph of 'ohelo berries

"Um, I like it because I like the inchworm eating that...that inchworm, it was climbing right there, you see it?"

The program also served to reaffirm her attachment to the place where she grew up by increasing her knowledge of cultural stories tied to that place, and she indicated an interest in sharing her new knowledge with her family:

"I learned a lot from this program. I really enjoyed myself at this program and I am really appreciate what this program taught us all. My favorite activities was at Punalu`u and Ka`upulehu because at Punalu`u is where we love to see turtles and Punalu`u is the best that's where I was born and raised...I can share this Mo`oleo [stories] with my family and friends. I enjoyed it and they will enjoyed what this program is and all about."

Nakoa

Nakoa was a quiet boy with a deep voice and an interest in a career in forestry that developed as a result of his participation in the program. For Nakoa, service learning and the positive influence of mentors stimulated thinking about future career paths as well as the role

humans should play in nature. I captured a conversation I had with one of the program leaders about Nakoa in my field notes and reflexive journal:

I asked (one of the program leaders) if any of the kids might be interested in future conservation careers. She said yes, parents are telling her that their kids are getting interested in forestry and in working outdoors. I asked her who specifically, and she said Nakoa. Nakoa is the quietest kid in the group. He is really shy and it is hard to get him to engage. Obviously, though, he is soaking things up and starting to think about how he can continue to do this kind of work.

Particularly valuable to Nakoa were the experiences of working outside to plant native plants while learning about Hawai`ian culture. He shared through one of his photographs (Figure 3.25) that although planting trees was hard work, he enjoyed it and reported a positive attitude toward helping the forest. In his program journal, he discussed his experiences working outside, some of his favorite activities and the possibility of a future career in the conservation field:

“Over the past two weeks I learned how to plant native plants and I learned about different native plants that I have never heard of. If I had to choose which job I would be interested in the conservation field in the future I would pick wildlife management, nature conservancy and forestry...this experience I had over the past two week was fun and this can help me for the future by giving me opportunitys to work in the field. We did a lot over the past two weeks like out planting native plants.”

Day 2: “I liked that we got to plant native plants...”

Day 4: “I liked that we got to plant `ohia and kolea to fill the forest.”

Day 8: “I liked that we got to plant endangered plants and learn more about them...”

Day 9: “I liked that we got rid of some of the invasive weeds from taking over the native plants.”



Figure 3.25. Nakoa's photograph of a young 'ohia tree, planted by humans.

"It felt good [to know that he was helping the forest]."

He also reported that some of his favorite activities involved the leadership of mentors with knowledge of conservation principles and Hawai`ian culture. One of his photographs (Figure 3.26) reflected the connection between the land and the sea that he learned from one of the program leaders. Nakoa recorded the following thoughts in his program journal:

Final evaluation: "I liked when we got to use the o`o bar when we planted with Uncle Kaleo."

Day 3: I liked the coastline walk with Uncle Keahi and the summer enrichment students.

Day 7: I liked that we learned about the story's that Kuhea talked about.



Figure 3.26. Nakoa's photograph of a plant that represents a connection between the land and the sea.

"I picked that one because Auntie Malia talked about the sharks...and they aggressive."

Although he was soft-spoken, Nakoa respectfully listened to information provided by program leaders, and was able to recall information when asked. For instance, during the first evening at the Hakalau National Wildlife Refuge cabin, Mark, a retired wildlife biologist, showed the group a PowerPoint presentation that documented some of the ecological restoration work he had been involved in at the refuge:

Mark showed a picture of a barren landscape taken in the 1980's and talked about reforestation, then showing a recent picture with the results of all of the outplantings, "abracadabra"! All kids shouted, "Whoa!" with amazement in their voices. Kaikea exchanged a surprised expression with Nakoa. He [Mark] showed another before and after picture and Lehua said, "whoa, that's nice". Mark said, "it's students like you that make the difference. That's why it's so important to have you out here".

The next day, Nakoa was able to recall some of the facts he had learned the night before:

Anela asked the kids to repeat a fact they learned last night...Nakoa said, "A total of 113 species were unique to HI".

As a result of the new knowledge he had gained through the program, Nakoa reported a different view of nature as a result of program participation and a deeper understanding of the

important role he could play in contributing to forest restoration. When asked if his view of nature was the same or different than it was before the program, he responded:

“Uh, different...I learned more about the forest, different names of all the plants...uh, when I came here all the, the um, plants so it fills the forest so all the trees can grow big.”

Napua

At age 17, Napua was the oldest girl participating in the 2011 program. For Napua, verbal transmission of knowledge from elders helped to facilitate a new awareness of the plight of native plant species and a deeper understanding of watersheds. At the beginning of the program, she shared a memorable story about nature that reflected a utilitarian wildlife value orientation and also strong connections with her family, demonstrating through an example that knowledge about the environment was passed verbally from her father in one particular situation to facilitate learning through experience:

“I went hunting one time in the mountains with my uncle, brother, and my dad. I was attacked by a swarm of ground bees. My dad taught me to keep running and to put mud on the stings to hide the liquid bees leaves behind in stings.”

During the 2011 program, Napua connected strongly with teachings about watersheds and water cycles. This led to a deeper understanding of the reciprocal relationship humans have with nature, as reflected in traditional Hawai`ian culture. When asked during her interview whether her view of nature was the same or different than it was before participating in the program, Napua said that her view was different because “I didn’t know the importance of catchment water...like, how the forests and like when it rains and the water comes down...” Similarly, one photo (Figure 3.27) of a water catchment tank depicted an example of how humans could use nature to meet their needs, but in order to do this, humans must help nature by maintaining healthy forests free from invasive plants and animals (Figure 3.28). When asked

about the most valuable thing she learned and what she planned to do with the knowledge she gained from the program, Lehua replied:

“How to preserve the forest and how to bring it back...definitely be more conscious of the plants like the native plants and help out with different programs too.”



Figure 3.27. Lehua’s photograph of a water catchment tank

“The catchment tanks and how, like, that’s a lot of what we learned in this program is how the water flows from the top of the canopy...to give us water.”



Figure 3.28. Lehua’s photograph of a fence

“Fence because kind of everywhere we stayed at there was, like, a fence that protected, um, like, all the different areas from animals coming in and destroying it.”

In a similar vein, Napua reported an interest in becoming more aware of the plight of Hawai`i’s native plant and animal species, and a subsequent interest in preserving these species so that they may be available for future generations to learn about and enjoy. For Napua, increased knowledge led to awareness, which resulted in a desire to commit to future stewardship of Hawai`i’s native ecosystems. As she reflected on what she learned during the program, Napua wrote:

“Some of the things I learned were the names of different native plants and birds. My favorite thing I learned was about watersheds. How the forest is the most important factor of a watershed. Nothing taught was unimportant but I guess my least favorite thing was learning how endangered the `alala is...My view has changed by wanting to be more aware of the native species growing here and I want to protect them. I feel that preserving

is important for future learners. I would want to be like someone who plants native plants. I think if I did not do this program than I wouldn't have been informed of the danger our native species are in and how close some are to."

In addition, learning cultural stories from respected Hawai`ian elders added another dimension to her knowledge of this reciprocal relationship. For example, she reported that her favorite part of Day 7 was "hearing the different stories about different places from Aunty Kuhea". Similarly, what she liked most about Day 8 was "working with the different groups and learning from Aunty Alamea and Uncle Oke." As a result of this kind of verbal transmission of cultural knowledge through place-based education, Napua was able to recall, in writing, the following story relating to the cultural significance of a place at the end of the program:

Keaukaha – used to be named Pu`u o milo. There was a fresh water pond with a he`e (octopus) living inside and it would take keiki (children). The wise kapuna found that it was a he`e and had the pond covered.

Kaikea

Kaikea was a male participant who seemed to develop a friendship with Pomai during the program, and the two were often seen working together during out-planting service projects. Social connections helped to enhance Kaikea's program experience, leading him to realize that learning about cultural uses of natural elements (e.g., traditional uses of plants) could be fun.

Social connections were important to Kaikea; at the beginning of the program, the memorable experience in nature he was able to recall in writing included individuals who were important to him. Similarly, when he shared some of his favorite memories from the program, they included new social connections with a trusted adult.

"When I went to Milolii I went on a boat it was really cool cause we saw dolphins but there were far away. I went with my godparents I caught a aku but I lit it go cause it was too small and went to a place in Kona and we was swimming with dolphins on ower family reunion."

“My favorite activities is when we plant with Uncle Kaleo. I don’t have a least favorite lessons or activity it was all fun.”

As Kaikea shared his thoughts on the meaning of nature, he emphasized cultural connections to plants, and particularly, traditional uses of plants. For example, several of Kaikea’s photographs represented new knowledge about plants such as mamake and ohelo as well as connections between the land and the sea (Figures 3.29, 3.30 and 3.31). In addition, he was able to recall a cultural story about particular place the group visited during the program in his program journal toward the end:

“In a land there were a farmer that always work on his farm and there were shark attack the people...and he found out the farmer was the shark and if the farmer ashes ever touch water he will be back alive so they put it in a imu...”



Figure 3.29. Kaikea’s photograph of a mamake plant.

K: “ I think that’s the one you can make tea out of.”

I: “Did you know that this plant could be used to make tea before you came to this program?”

K: “No.”



Figure 3.30. Kaikea’s photograph of ‘ohelo berries.

K: “Yeah, I never know you could make dye.”



Figure 3.31. Kaikea’s photograph representing connections between the land and the sea.

K: “I’m pretty – that’s the shark tooth one I think.”

I: “ Yeah”

K: “Yeah, I never know that.”

For Kaikea, it seems that learning about Hawai’i’s environment within a cultural context helped to facilitate a different kind of understanding beyond rote memorization of biological

facts. As Kaikea was explaining his pictures and responding to interview questions, he ended his sentences with inflection in his voice, making it seem as if he wasn't sure of the answer or was afraid of being wrong. However, when reflecting in writing about how much he had learned, Kaikea may have surprised himself in terms of his ability to remember and understand information. This may be primarily attributed to the service learning and experiential learning components of the program, which helped learning to come alive for Kaikea, and as a result, he reported that learning was fun. The program also seemed to create memories for Kaikea, which he may be able to link in hindsight to the cultural and biological teachings he was exposed to during the program. In fact, at the time during which the learning occurred, Kaikea may not have realized how much he was actually learning. For example, when asked about his favorite part of the day, Kaikea responded on several occasions that he enjoyed working, and that the program was creating memories:

Day 2: "I like the digging part..."

Day 4: "I like when we was planting ohia and kolea."

Day 5: "I like when we was planting and when we saw all type of plants."

Day 7: "I like it cause it was wet and we were soak and it was hard to walk."

Day 8: "I like planting cause it was easy and only a little while."

Day 9: "I like when we went to bring down the tent. It was fun."

Kaikea's different view of nature at the end of the program could be attributed to the knowledge he gained by participating in service learning projects. When asked to comment on his experiences planting different species over the last few weeks, Kaikea reported through both verbal interviews and written program documents that although it was hard work, he had learned a lot, and this seemed to cultivate a sense of pride within him:

“Ha! It was hard work...I never know nothing about plants. Now I know a lot.”

(Interview)

“I don’t know what to change cause I could understand everything. I like when I saw stuff I don’t know but I do know now...” (written response)

Broad Themes Common to All Participants

Although unique themes were reported for each individual based on analysis of portfolios containing previously-mentioned elements during and after the program, several broader themes emerged across all participants. These themes are presented in order to better highlight the overall outcomes of the 2011 Imi Pono no ka Aina program in Ka`u, Hawaii as well as to draw conclusions about the participants’ reported connections to nature as experienced through a cultural lens. These broader themes included the role of the novel experience, the importance of mentorship through social connections and the importance of transmission of cultural information, which served as a thread that stitched together experiences and social connections to generate a deeper understanding of both nature and culture for participants.

Novel Experience. All of the participants mentioned that they particularly enjoyed special moments during the program in which they were able to see something novel for the first time. Central to the novel experience was a sense of privilege that came as a result of *seeing* something (e.g. seeing an endangered plant or animal, going to a special place) that most of the general public would not have the opportunity to see.

This sense of privilege was expressed through shared excitement with family members and fellow program participants. For example, Ke`ali`i told one of the program leaders that his mother did not believe him when he told her about his experience seeing the “grandmother” koa tree at Kona Hema. In fact, many of the participants reported that hiking to and seeing the 300-year-old koa tree (*Acadia koa*) located at a site with restricted public access was their favorite

part of the second day of the program. The following statements about novel experiences from participants' program journals reveal some of their favorite novel experiences as recorded at the end of the day during which the activity occurred, in addition to statements recorded at the end of the program in the form of a verbal interview response and/or a written response that are reflective of favorite activities and most valuable things learned during the entire program experience:

Ha`a

Day 1: "It was my first time seeing a koa tree @ 300 to 500 years old.

Day 10: "We got to see a `alala and it was fun to see."

Interview: "...it's really amazing that I did this, cause it's my first time out, in like, an open area where I never been. I'm seeing other plants that...I didn't see in my life, so that's what I think.

Ke`ali`i

Day 2: "What I like about today was...we even got to see the oldest koa tree."

Day 10: "We got to see indangered bird's today..."

Moana

Day 2: "I liked when we went to see the grandmother tree."

Day 5: "I really liked that we went hiking and saw some endangered birds and plants."

Written reflection: "If I had to pick a favorite activity or lesson it would probably be looking and learning about the birds. They were cute and fun to look at."

Interview: "I think it (view of nature) is different now because...I've been seeing how many of these plants are endangered like that and they can be saved..."

Kula

Day 2: "...the last thing I like about today was looking at the huge koa tree."

Day 10: "I liked looking at the birds."

Photo Interview: "It's rare...like most of our native plants." (in reference to her photo of the yellow hibiscus)

Pomai

Day 4: "...seen for my first time a `apapane."

Day 10: "when we seen the birds."

Written response: "...I seen things I did not see before."

Interview: "(view of nature is) different...cause I see things that I never did see before."

Auli`i

Day 2: "...seeing the big koa tree and the rocks look like Mars."

Day 6: "Seeing native plant."

Ka`iu

Day 5: "Today was the best day because we got to see a lot of birds and how fascinating they are."

Kainani

Day 10: "That we got to see endanger birds that Keauhou has helped give them life."

Written reflection: "...Going to this program made me realize that this island of Hawai`i has a lot of beautiful places to go to, but a lot of people don't get to go to some of these places."

Lehua

Day 4: "I liked when we got to take picture with the big and nice ohia tree..."

Day 5: "I liked when we got to see the `apahe (`apapane), elepaio and the mom koa tree."

Day 10: "We got to learn about the Maui Parrotbill and go to see how the animals are taken care and feed."

Written reflection: "...I really loved it because I never see a big `okai that big in my life."

Nakoa

Day 2: "I liked that we got to plant native plants and we got to see a big koa tree."

Day 5: "I liked that we got to see the I`iwi, `apapane, and other native birds."

Day 10: "I liked that we seen endangered birds."

Napua

Day 2: "I liked...being able to hike down to the big koa tree."

Day 5: "I liked the hike and...plants and birds we were able to see. I also liked being able to eat lunch in the forest and see the birds without binoculars."

Day 10: "I liked seeing all the different birds here at KBCC."

Kaikea

Day 2: "I like...we saw the oldest koa tree ever."

Day 5: "I like when we...saw all type of plants."

Day 6: "I like when we saw so many different plants."

Day 10: "I like to look at of the birds."

Written reflection: "I like when I saw stuff I don't know but I do know now."

These findings suggest that novel experiences contributed to an understanding and appreciation of Hawai`i's natural and cultural resources. Students had the opportunity to see endangered plants and animals in addition to learning how these species are significant to

Hawai`ian culture, effectively linking these novel experiences to knowledge gain. For example, students learned that the elepaio (*Chasiempis sandwichensis*) helped native Hawai`ians to select an appropriate koa tree to be used for making a canoe; if the elepaio was spotted on the tree, this indicated that the tree contained insects and rendered it unfit for canoe construction. Seeing the elepaio both in its natural habitat at Hakalau National Wildlife Refuge and in captivity at the Keauhou Bird Conservation Center coupled with planting koa trees and seeing the grandmother koa tree constituted novel experiences that became salient for participants during the program.

Social Connections. Nearly all of the participants drew upon social connections with program leaders and other adults they encountered who were working in the conservation field. Learning from the wisdom and knowledge of these adult mentors was, in fact, a highlight of the program experience for many participants. Others were able to recall cultural stories they learned from these individuals.

For instance, several male participants particularly enjoyed meeting Uncle Kaleo on the second day of the program, and many other participants enjoyed learning cultural stories from Aunty Kuhea on the eighth day of the program, and they were able to recall these stories at the end. Several participants reported an increase in their knowledge of both Hawai`ian culture and a different understanding of nature that could be partially attributed to the influence of these adults. In addition, many participants also enjoyed connecting with other peers who shared the same interest in Hawai`ian nature and culture. The following statements about adult mentors who shared information about nature and culture with the kids and peer-to-peer interaction support this theme.

Ha`a

Day 8: "I liked that we got to plant and meet other people. Also when we got to share our thoughts with others."

Written reflection: “Also...when we went to Pu`uwa`awa`a and meet other people and when our Aunty Ku`uley told two story about the pu`u we were sitting on and telling us that there was a man eating shark. It was really interesting and it was lovely. That’s what I learned and I will share with my family.”

Figure 3.4: “I took it is because once something comes up then I – Auntie Malia said thorns – don’t grab the tree because it has funky stuff on it. You get hurt and one – like – you can use it as a tree to cover things.”

Interview: “...the people, like, they know what it means, they know how to explain it, they know how to plant it, and during this program, we learned how to plant things.”

Ke`ali`i

Day 1: “What I like about today was...we all went hiking. We learned about the three places in Punalu`u.”

Day 7: “Today it was very fun with Ka`iu. She is the bestest friend I ever had. Kemps!” [Kemps refers to a card game]

Photo Interview: “ (I enjoyed) meeting new people...we should all, like, sort of have a day when we all come together and plant trees and things like that. “

Moana

Photo Interview: “I felt like I was helping the planet...doing all that hard work. And I see what my mom is like when she’s gardening.”

Kula

Day 2: “I liked that we did a hand on project. I also like how we all worked in groups and planted olomea and mamaki.”

Day 3: “I like how we learned about the different place of Keaukaha. I also like meeting other people from Hilo side.”

Day 4: “I like that we worked as a group and worked fast together...”

Day 8: “I liked learning about the different dryland plant. I also liked meeting new people and learning how they do thing.”

Pomai

Day 2: “We got to meet Kaleo...”

Day 3: “The cost line walk when I met other people.”

Written reflections: “My favorite thing I like was when we met Kaleo and when we was planting with the o’o bar...”

Photo interview: “Planting was good because I met different people and when I was planting it felt like I was doing something good...”

Auli`i

Day 3: “Is seeing Uncle Honua’s and the plants and tasting the berry.”

Day 8: “Seeing all the other groups, planting with the other group.”

Day 9: “Working with the YCC (Youth Conservation Corps).”

Ka`iu

Day 8: "Today I had lots of fun because I got to learn about land. We got to work with another group called YCC and Nakahawoku."

Day 10: "Was fun because today was our last day and we all became closer than our first day."

Written response: "My leaders Auntie Malia, Auntie Anela, Auntie Heanu, Auntie Becky and Auntie Aulani has been such a great family to me, because of them and this program imi pono noka aina I am always gonna look forward to community service and service projects for the forest. When people talk about forest I will know have a different point of view of the meaning forest. This program means so much to me. I will miss everyone here and wish them the best."

Photo Interview: "I liked how Auntie Malia said you could use a dye out of this berry and how colorful it looks."

Kainani

Kainani did not mention any social connections that contributed to her enjoyment of the program or her ability to understand the material.

Lehua

Day 3: "Uncle Keahi was telling about the kid that the octopus. Uncle Honua was telling us about the mulen the 'toilet paper'."

Day 8: "We got to meet new people. It was fun to see more people and getting along with each other."

Written reflection: "I really want to say thank you a lot to Auntie Malia, Auntie Mily, Auntie Heanu and Auntie Becky. I wanted to say mahalo to all the Aunties."

Nakoa

Day 3: "I liked the coastline walk with Uncle Keai and the summer enrichment students."

Day 8: "I liked that we got to plant endangered plants and learn more about them and I liked that we worked with other groups."

Written reflection: "...I liked when we got to use the o`o bar with Uncle Kaleo..."

Photo Interview: "I picked that one because Auntie Malia talked about the sharks...and they aggressive..."

Napua

Day 3: "I liked going on a coastline walk with the kaumeke or summer enrichment students."

Day 4: "Today I liked all the plants that we had to plant. I also like being able to reflect as a group about what we liked so far."

Day 7: "I liked hearing the different stories about different places from Auntie Kuhea."

Day 8: "I liked working with the different groups and learning from Auntie Alamea and Uncle Oke."

Photo Interview: "That was the, uh, ali`i, which Auntie Kamalani explained was kind of the flower that represents Ka`u because it has strong roots and it's like, deep in

the earth...I think this was the other one that Auntie Malia was telling us at the cabin.”

Kaikea

Written response: “My favorite activities is when we plant with Uncle Kaleo...”

Imi Pono no ka Aina facilitated social connections that contributed to an understanding of nature and culture on the Big Island of Hawai`i. Due to the well-documented shift in how children are receiving information about the natural world (Kahn & Kellert, 2002), and more specifically, the changes in transmission of TEK within cultural groups (Butz, 1996; Chinn, 2007; Cristancho & Vining, 2009), these findings address current gaps in the literature with regard to how incorporating transmission of TEK into environmental education programs can lead to positive outcomes for participants in unique cultural contexts.

These findings suggest that participants were able to form unique bonds with program leaders during a short time frame, and were able to recall cultural stories shared by these individuals. In addition, working together with other students helped participants to develop a common bond surrounding their interest in helping the environment. Therefore, social connections were vital to both the overall program experience for participants as well as knowledge gained through participation.

Cultural Knowledge. Cultural knowledge, along with the novel experience and social connections, was the third theme that contributed to participants’ increased knowledge of and understanding of nature and culture in Hawai`i. Analysis of participant workbooks and written responses pertaining to favorite parts of the program, interviews and photographs revealed that learning more about Hawai`ian culture was also an important component of participants’ enjoyment of the 2011 Imi Pono no ka Aina program.

Participants drew upon cultural knowledge when discussing what they liked about the program as well as describing the meaning of nature to them. Most participants failed to share a story about the cultural significance of a place at the beginning of the program, but they were all able to do so at the end. Mentors transmitted cultural knowledge to program participants verbally and engaged in conversations with participants about this knowledge continually throughout the program. Findings are summarized for each participant, both indicating the importance of this knowledge to the individual and demonstrating specific knowledge that was shared and learned by all participants.

Ha`a

Initial written description of cultural significance of a place: “Punalu`u it is a black sand beach and it is open to the public. Another thing is that it was made to see how beautiful Ka`u is.”

Final written description of cultural significance of a place: “There was once a farmer who lived by the ocean and he will always grow his own food. One day 3 girls was going to the beach and they asked the farmer if he wanted to go to the beach the farmer said no. So they left then he and the man eating shark was really close. The farmer went to the ocean and changed to a man eating shark. Then one day came they putted the farmer, to the imu the farmer was the man eating shark.”

Day 7: “Learned about storys about the place we are on.”

Written reflection: “This pass two weeks I learned a lot. I mean a lot because I did not know anything about this island and our ‘ahupua’a...when we went to Pu`uwa`awa`a and...Aunty Kuhea told two story about the pu`u we were sitting on and telling us that there was a man eating shark.”

Photo interview: “I took that picture because people can make dye out of it, and some eat it, it tastes sweet, some eat it, tastes sour, um, it might – you can make a dye out of it and make a shirt...I took it because – my Aunty loves turtles and it really does look like a shell of a hawksbill...I picked this tea leaf because is because in our culture we can use nature it as...like, a lot of different things and you can also use it in the imu...I picked that because it’s our state flower...I also picked this one because the texture and like how it will become our leis and how you can do things with that, I think this is can make leis out of that, can make different shapes and stuff...I picked because...or like a bowl, like how you can just combine all those leafs and make it as a bowl and then, it’s really good...I plan to do is, to show other people...show other people and make them realize that oh, this native tree relates to culture.”

Ke`ali`i

Final written description of cultural significance of a place: “There once was a man called Kumuhea he married (married) a girl. So every time he brought her up for dinner she kept on getting skinny. So her brother’s started to worry about her, so they put Kumuhea in a cave and killed him. But they found out that he was a spirit.”

Photo Interview: “I took that because I learned that when that is blooming, sharks are mating, it’s like their mating season...well, sometimes you need a cup of tea to cool down.” (after mentioning the tea, Ke`ali`i shook his head no when asked if he knew before the program that the leaves of the mamake plant could be used to make tea.)

Moana

Photo Interview: In response to her picture of the yellow hibiscus, or halapepe, Moana said, “It looks pretty.” When asked if she remembered what was important about that flower to the state of Hawai`i, she responded, “It’s the state flower?”

Kula

Day 1: “What I like about today was learning about the different old Hawai`ian place. I also like that we learned more about where we live.”

Photo Interview: “State flower...it looks like a turtle shell...mamane or mamake? Mamake, um, tea! Tea. (Have you had mamake tea before?) Yes. (Is it good?) Yes. Sweet...Uki uki tree! It’s just, I don’t know. It’s – cool because you can use the berries for dye. The leaves to make kapua...(What made you want to do the program?) I wanted to learn more about the Hawai`ian culture and stuff like that...”

Pomai

Final written description of the cultural significance of a place: “Punalu`u is none for divieing spring water back den when the Hawai`ians was walking the land they use to go to Punalu`u for get water.”

Day 1: “When we learned about all the heauai.”

Photo Interview: “Koa tree – I chose that tree because, that tree was known for, like, canoes because it could float and it was king of strong...oh, the mamake is known for making tea...(Pomai shook his head no when asked if he had ever had mamake tea before)..oh, this is sandalwood. The Hawai`ians used to use it for...um, I forget...tea leaf was made for food, for making lau lau and shooflies, and it kind of helped for drink water, the way it was, and it was used for, for the leis and – for slippers...it (ohelo berry) was just for dye, and it could be eaten, I don’t know.”

Auli`i

Final written description of the cultural significance of a place: “Kauila it’s about a girl that’s in a pond and she can turn into a turtle and if kids go out too far she will help them.”

Day 1: “Learning about the pu’us and native plants around me and I never knew that they have names and lots of good story’s.”

Photo Interview: “This one I took, uh, the picture of it because it’s also native, and you can make something natural out of it like tea, mamake makes tea (Have you ever had mamake tea before?)...no, I was hoping we’d have some...this is the, the is the kolea. You can tell by how smooth it is, it feels like the leather and it looks like a turtle shell (...so this one relates to how we talked about the connections between the land and the sea...) – yeah, and I liked that story (Do you think that learning about the stories helps you to remember the names of some of these plants?) Yeah...lehua – you can tell by the smell and the flowers and cause like at programs you can see like some girls and boys wear it like, um, graduation.”

Ka`iu

Final written description of the cultural significance of a place: “Pu`uehuhe the cattipillar hill. The cattipillars would migrate from the mountain to the sea and when the cattipillar would reach the highway they would close school, work and more. These cattipillars that were crossing would last several days or hours. It was said that two lovers the guy lived in the mountain he would bring his lover kalo and feed it to her everytime and everytime she would become skinnier. The brothers of the girl noticed that there sister was coming skinny so they followed the guy all the way to the mountain and pushed him into a cave. So everytime you see a cattipillar going to the sea it’s the guy’s spirit that is going to visit her.”

Day 1: “I liked about today was learning about Ka`u. I didn’t know how beautiful Ka`u was and how much ahupua`a there is. Learning about Ka`u and visiting those sights makes a really good impression of Ka`u and what Ka`u used to be before land development. I wish Ka`u would have know more constructions and more conservations.”

Day 3: “Today I liked was how we...got to learn the different names of Keaukaha when it was passed to generations to generations.”

Day 7: “We got to go on the Pu`uwa`awa`a hill it was the nicest view I ever seen I got to see Waikalou and anai hoomahi Auntie Kuhea also shared moololo with us (stories).”

Written reflection: “Learning about my culture and the difference of all places has a special something in them.”

Photo Interview: “Um, I liked how Auntie Malia said you could use a dye out of this berry and how colorful it looks (Have you ever seen anything dyed with this berry?) No. (Did you know before this program that you could use those berries to make dye?) No....A hibiscus is our state flower! (Did you know that this was the state flower and not the red one before the program?) No.”

Kainani

Final written description of the cultural significance of a place: “Here on the black sand beach of Punalu`u there was a turtle egg that hatched and out came a special turtle named Kauila. Kuaila’s parents took her to a fresh water pond at Punalu`u ware Kuila made fresh water for people to drink. When Keuila see children

playing on Punalu`u's beach she takes here human form to play with the children and to protect the people and kids of Ka`u safe from danger.”

Day 1: “What I like learning about today was about the site of Punalu`u.”

Day 2: “I learned how koa was used back in the older days. I liked planting mamaki and olomea.”

Day 7: “Today I liked when we went up on top of Pu`uwa`awa`a and listening to the storys Antey Kuhea stories...”

Written reflection: “The thing I learned in this program over the past two weeks were how the ocean and mountain could relate to each other. I also learned more Hawai`ian words and there meanings that I new knew...”

Photo Interview: “This one you could make dyes to color things, right? (And did you know this before doing this program?) No....this one, it's good to make a lot of tools – with the bark – and back then you needed tools, now you have trees...this one, we were able to make a tea out of (Have you ever had the mamake tea before?) No. (Did you know that you could use it to make tea?) No. (Do you think maybe you'll try some?) Yeah...this one actually it does look like a turtle shells – uh, just caught my eye – cause of the different colors and how it can relate to turtles (So we talked a little bit over the last couple weeks about the plants that have, like a connection to the sea. Was that something new for you?)

Yeah...(What do you think is the most valuable thing you learned from the program?) how the trees and stuff in the mountain connects to the ocean, like the fish in the sea, turtles, all down below can relate to the mountains...(Do you think that learning about...cultural uses helps you to remember the type of plant?)

Yeah.

Lehua

Initial written description of the cultural significance of a place: “Punalu`u is were my grandma and grandpa were growing up...”

Final written description of the cultural significance of a place: “Punalu`u is the diving spring. Punalu`u is the nice place to swim and fish...”

Day 1: “We learned about the 3 ahupua`a: 1st ahupua`a Ninole, 2nd ahupua`a Wailau, 3rd ahupua`a Punalu`u.”

Day 2: “I learned about the natural trees is mamake tree.”

Day 3: “Uncle Keahi was telling about the kid and the octopus. Uncle Honua was telling us about the mulen the ‘toilet paper’.”

Photo Interview: “The dye – the berries you can make a dye in blueberries and it's gonna come brown (Did you know this before the program?) No, Auntie Malia told us...tea leaf – tea leaf, and – tea leaf is like you can make lau lau even with the leaf. This is lau lau leaf and that's a tea leaf...it's a pretty flower, we can use it for parties.”

Nakoa

Final written description about the cultural significance of a place: “There was a lot of story's told about the heiaus and all the spots where different fishes would be. They also used fire in the heiaus to signal other heiaus. Kaiholena – Uncle Ku`ike talked about the ahupua`a.”

Day 1: “I liked that we got to hike and learned about the ahupua’a and learning about the different story’s about it. “

Day 7: “I liked that we learned about the story’s that Kuhea talked about.”

Photo Interview: “That is koa, yeah? I picked, took a picture of this, make canoes out of it...I picked that one because Auntie Malia talked about the sharks – and they aggressive...I liked how you could make tea with it...that one is, it is in Ka`u, it represents how strong the root is.”

Napua

Final written description about the cultural significance of a place: “Keaukaha – used to be named Pu`u o milo. There was a fresh water pond with a he`e (octopus) living inside and it would take keiki (children). The wise kapuna found that it was a he`e and had the pond covered.”

Day 1: “I liked hiking to the different ahupua`a. And learning about the different stories about it. My favorite was the sacrificial stone.”

Day 7: “I liked hearing the different stories about different places from Aunty Kuhea.”

Photo Interview: “That was the, uh, ali`i, which Auntie Kamalani explained was kind of the flower that represents Ka`u because it has strong roots and it’s, like, deep in the earth.”

Kaikea

Final written description of the cultural significance of a place: “In a land there were a farmer that always work on his farm and there were shark attack the people...and he found out the farmer was the shark and if the farmer ashes ever touch water he will be back alive so they put it in a imu...”

Photo Interview: “I think that’s the one you can make tea out of – yeah and then there’s bushes (Did you know that this plant could be used to make tea before you came to this program?) No (Do you think maybe you’ll try some of that tea in the future?) Yeah...I’m pretty – that’s the shark tooth one I think – yeah, I never know that...Yeah, I never know you could make dye.”

Participants particularly enjoyed learning about traditional cultural uses of plants and animals. This speaks to the utilitarian wildlife value orientation of the area as identified through previous research. Cultural teachings also contributed to participants’ understandings of the interconnectedness of ecosystem elements. Learning about Hawai`i’s environment through a cultural lens helped to contribute to increased knowledge about natural resources.

DISCUSSION

The objectives of this study were to learn about how incorporating cultural heritage values into a formal youth environmental education program in Ka`u affected how participants view Hawai`i's environment and to document a methodological approach for studying youth in a culturally sensitive community. Based on the results from this basic interpretive qualitative study of the 2011 Ka`u cohort of Imi Pono no ka Aina, the program was successful in cultivating a deeper understanding of nature and culture, and a subsequent change in how Ka`u youth viewed nature occurred based on a tripartite foundation of novel experiences, social connections and transmission of cultural knowledge. In addition, the mix of qualitative methodologies employed in this study was successful in yielding a holistic understanding of how the 12 participants perceived nature before, during and after participating in the program.

In order to ensure that future environmental education programs affect positive changes in how youth view the environment, conservation organizations and agencies should focus on creating novel and memorable experiences for participants. Findings from this project show that the participants were able to recall information that was learned through a novel experience. Many of the stories participants shared near the beginning of the program in response to a written question that asked about a memorable experience participants had in nature included novel experiences which involved seeing, doing or learning something for the very first time in such a way as to create a lasting memory. Novel experiences that occurred during the program were recalled by participants either at the end of the day during which the experience occurred in response to the prompt, 'What did you most like about today', on the second to last day of the program in response to the prompt asking what participants most liked about the entire two week

experience, or during the close-out interview and corresponding discussion of photographs taken by participants.

Results indicate that seeing rare and endangered plants and animals constituted novel experiences during the 2011 Imi Pono no ka Aina program in Ka`u, and that these experiences have the potential to form the basis for future memories about meaningful experiences in nature. Novel experiences were most likely to be reported on Day 2, when the group had the opportunity to see a large koa tree; Days 4-5, when the group participated in birdwatching at the Hakalau National Wildlife Refuge and saw rare and endangered birds and plants that could be found nowhere else on the island; and on Day 10, when the group visited the Keauhou Bird Conservation Center (KBCC) and had the opportunity to view endangered birds up close, including the `alala, or Hawaiian crow (*Corvus hawaiiensis*), which currently exists only in captivity.

In addition, social relationships and connections are worth considering here because they were enacted through communication, and communicative action is a process through which identity formation occurs (Habermas, 1984). Documenting the enactment of these social relationships among Hawai`ian youth involved in the 2011 Imi Pono no ka Aina program in Ka`u can thus lend insight into the process of identity formation, and ultimately the formation of underlying values toward the environment, or alternatively, a shift in values as youth grapple with changing views toward nature and the impact this might have on their identities.

The importance of social relationships to these 12 youth was first demonstrated through the initial stories they recorded about past meaningful experiences in nature. Many of their stories involved other people who were close to them (e.g., family and friends). Similarly, memorable parts of the 2011 program also involved other individuals who contributed to both

learning outcomes for the students (e.g., students were able to remember a story told to them or an activity directed by a particular elder, and that elder's name was mentioned in the participant's re-telling of the story or description of the activity). This is in line with Louise Chawla's (1999) assertion that positive role models during childhood can help shape the career path of future conservation leaders. Nakoa, for example, indicated an interest in a future career in conservation, and expressed interest in learning more about the Youth Conservation Corps after spending an afternoon with this group engaging in a service project together. Many participants reported that they enjoyed learning more about Ka`u and reported a strong desire to share what they had learned with their families, thus indicating an intention to continue to draw upon social connections at home. This was likely due to the influence of positive adult role models and mentors they encountered during the 2011 program.

Cultural knowledge was transmitted to program participants through verbal stories of elders, and participants were able to understand this new knowledge by engaging in active, place-based, service-learning projects (e.g., planting trees) alongside these elders. Participants reflected on this cultural knowledge mainly through their photos, but it also surfaced as a favorite component of daily activities and overall program activities. To this end, TEK was useful as a framework for understanding how knowledge was transmitted and received during the 2011 Imi Pono no ka Aina program in Ka`u.

A mix of qualitative methodological techniques including photovoice, document analysis, participant observation and interviews proved effective in triangulating findings in order to reach a deeper understanding of the impacts of an informal environmental education program on kids' views toward nature through a cultural lens. As such, this study makes a unique contribution to the environmental education literature in that it demonstrates the utility of using multiple

methods when conducting research involving culturally diverse individuals. This conclusion is supported by literature on teaching and learning styles (Beck, 2001), and can, for example, allow students like Kaikea who may underperform in traditional written and spoken assessments to better demonstrate what they have learned.

The Need for Future Research

Continued longitudinal studies are needed in order to fully understand long-term outcomes of participation in environmental education programs. Furthermore, there is also a need for continued research that evaluates the impact of programs designed to better connect youth with nature using methodologies similar to those that were employed through this project.

Specifically, future research could focus on following this group over time to better understand the impact of the novel experience, social connections and transmission of cultural knowledge on participants' views about wildlife and nature. Land management and tenure in Hawai'i continues to generate apprehension and tension within certain communities because stakeholders including government agencies, NGOs and private landowners possess different ideas and opinions for how land should be managed in order to protect Hawai'ian plant and animal species while preserving important cultural traditions. For example, pig hunting is considered an important part of Hawai'ian culture, yet pigs are non-native ungulates that cause destruction to the forest ecosystem (Wallace & Leonard, 2011). For this reason, additional research on the effect of program teachings on participants' families and friends as a result of cultural and social sharing of information is needed to better understand the far-reaching impacts of the program. In other words, without the novel experience, can a family member or friend still learn and retain knowledge about the natural world through a child's involvement in the

program, and are family members more willing to participate in community-based conservation initiatives as a result of a child's excitement about and interest in these issues?

Understanding how the youth of Hawai'i view nature in terms of its ability to provide for humans and the role of humans in protecting nature is an important step in ensuring that Hawai'i's unique natural and cultural resources are protected for future generations to enjoy. This project revealed that reaching out to diverse and underrepresented audiences can be improved through an understanding of and attention to cultural context. Tailoring nature-based programs to individual and community values is one way to ensure that these types of programs have a broad reach and that they adequately address the emerging divide between children and nature (Louv, 2005). With the potential to impact the future involvement of youth in natural resource stewardship initiatives and decisions, the future success of conservation education organizations depends on the willingness of environmental educators to be more strategic in both understanding their audiences and developing evaluation protocols to ensure their ability to meet program goals and objectives.

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CONCLUSION

The purpose of this thesis was to explore ways to improve conservation agencies' understanding of target audiences in order to better connect youth with nature through conservation education efforts. This was accomplished by exploring how information on wildlife value orientations and cultural heritage values could be used to enhance the reach and effectiveness of nature-based programming. Furthermore, qualitative and quantitative strategies for program evaluation allowed rigorous assessment of program outcomes. Information collected through this project contributed to an understanding of specific take-away messages for environmental education program leaders in two areas. In order to better understand the impacts of program participation, the first paper was guided by theory on wildlife value orientations. The second paper built upon a theoretical framework of traditional ecological knowledge and documented a culturally sensitive qualitative research methodology for environmental education program evaluation in Hawai'i.

Previous research has sought to address the implications of the emerging divide between youth and the natural environment that can be attributed to a host of societal forces associated with modernization (Burdette & Whittaker, 2005; Chawla, 1988, 1998, 1999; Jordan & Robinson, 2008; Kahn & Kellert, 2002; Taylor & Kuo, 2006). However, few studies have demonstrated how human dimensions of natural resources research could inform program design and evaluation. In order to address these gaps in the literature, this study sought to determine the extent to which the already successful Lincoln Safari program in Nebraska was, in fact, successful in attracting people who hold a diversity of perspectives with regard to wildlife, and whether incorporating cultural heritage values into a youth environmental education program in Ka'u, Hawai'i impacted participants' views toward Hawai'i's natural and cultural resources.

This information is valuable to other natural resource agencies and conservation education organizations wishing to create more targeted programs that appeal to a diverse population, both in terms of outward ethnicity and internal values. This study also demonstrated that the use of mixed methods could provide a more holistic understanding of participants' experiences during an environmental education program. In the past, diverse audiences have been underrepresented in research on wildlife value orientations, in part due to limitations in being able to adequately reach and obtain input from these audiences with traditional, quantitative survey methodologies (Manfredo, Teel & Henry, 2009; Teel & Manfredo, 2009). This points to a need for methodological flexibility in order to collect accurate information about target audiences to inform future programming.

Summary and Integration of Findings

The first study explored the possibility of a relationship between wildlife value orientations, past participation in the Lincoln Safari program and engagement in environmental stewardship behaviors. Results indicated that prior Lincoln Safari participation contributed to more frequent engagement in outdoor activities as well as participation in recycling over the past year. Results of qualitative focus groups designed to better understand fourteen families' experiences participating in the Lincoln Safari revealed that the program was attractive because it awakened a sense of adventure within participants, facilitated lifelong learning and discovery about the Lincoln area, helped families to create memories by spending quality time together, and increased mindfulness of the environmental impact of daily decisions. These findings suggest that, because the Lincoln Safari appealed to core family values, it was successful in attracting a large and diverse following, including people representative of the four primary wildlife value orientation types identified in prior research (Teel & Manfredo, 2009). Further,

results revealed that distanced individuals, who tend to be less interested in wildlife and wildlife-related issues, showed the greatest potential to change their behaviors based on conservation education programming. A critical conclusion drawn from this work is the importance of developing a program that appeals to core family values *first* and presents information on conservation stewardship *after* participants get involved.

The second study utilized a theoretical framework of traditional ecological knowledge (Berkes, 1999; Berkes, Colding & Folke, 2000) to understand cultural context when planning and implementing conservation education programs designed to reach underserved indigenous groups. Although prior research has highlighted the importance of considering barriers to program participation when working to expand participation of different ethnicities in nature-based programs (Allison & Hibbler, 2004; Bruyere, Billingsley & O'Day, 2009; Hong & Anderson, 2006; Miller, 2003), there is a gap in the current literature with respect to development of programs and evaluation methodologies that consider the unique cultural context of locations such as those that were investigated in this study in Hawai'i. This study found that integrating cultural heritage values into an environmental education program in Ka'u, Hawai'i was effective in reconnecting youth with Hawai'i's unique cultural and natural heritage. In addition, a mix of qualitative methodologies provided information-rich data (Darbyshire et al., 2005) that led to an understanding of the outcomes of program participation for 12 Ka'u youth. Central to participants' acquisition of new knowledge about nature and culture in Hawai'i were the novel experience, social relationships and cultural connections. The evaluation of the Imi Pono no ka Aina program presented through this study demonstrated the program's success in fostering knowledge about and understanding of Hawai'i's environment by program participants. These findings are particularly relevant in the state of Hawai'i, where land management,

ecological restoration and endangered species management are issues that can breed contention between government agencies and local stakeholder groups (Walters, 2006). Involving youth in conservation issues, therefore, is an important step in ensuring future stewardship of Hawai'i's natural resources.

In conclusion, as indicated by the research reported in this thesis, information on wildlife value orientations and cultural heritage values can help conservation organizations to develop and evaluate programs that attend to the diversity of values in contemporary and indigenous societies. The ability of these organizations to develop programs that attract diverse groups will determine the success of future conservation initiatives. In order to keep stride with America's changing demographics and changing thought regarding wildlife and the natural environment, it is critical to reassess traditional research methodologies that rely on a single form of measurement. Instead, organizations must consider and employ innovative ways to develop and assess nature-based programs that appeal to a diversity of interests (Bruyere, Teel & Newman, 2009).

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How well informed are you about opportunities for spending time outdoors near your home?
(Circle one number)

<i>Not at All Informed</i>							<i>Extremely Informed</i>
	1	2	3	4	5	6	7

How frequently, in the past year, have you engaged in the following types of behaviors? **(Circle one number for each behavior category)**

	<i>Not at All</i>						<i>Very Frequently</i>
	1	2	3	4	5	6	7
Spending time outdoors	1	2	3	4	5	6	7
Recycling behaviors (examples: recycling paper or plastic products)	1	2	3	4	5	6	7
“Green Consumer” behaviors (examples: buying products made from recycled materials, avoiding purchases that come in excess packaging, shopping for locally-grown foods)	1	2	3	4	5	6	7
“Reuse” behaviors (example: buying used appliances, repairing household items such as clothing or appliances)	1	2	3	4	5	6	7
“Energy Conservation” behaviors (examples: taking short showers, turning off lights when leaving a room, turning off water while brushing your teeth)	1	2	3	4	5	6	7
“Alternative Transportation” behaviors (examples: riding the bus, biking or walking to school/work, carpooling)	1	2	3	4	5	6	7
“Nature Stewardship” behaviors (examples: caring for neighborhood green spaces or wildlife in your area, planting trees, picking up litter along trails)	1	2	3	4	5	6	7

Below are statements representing different ways that people might think about wildlife. We’re interested in knowing *your* views about wildlife. This information will be used to better understand how participants in the Lincoln Safari Program feel about wildlife issues as well as to consider how future program offerings about wildlife may be developed or improved. **(Circle one number per statement)**

	<i>Strongly Disagree</i>			<i>Neither</i>	<i>Strongly Agree</i>		
	1	2	3	4	5	6	7
Humans should manage wildlife populations so	1	2	3	4	5	6	7

that humans benefit.							
Animals should have rights similar to the rights of humans.	1	2	3	4	5	6	7
We should strive for a world where there's an abundance of wildlife for hunting and fishing.	1	2	3	4	5	6	7
I view all living things as part of one big family.	1	2	3	4	5	6	7
Hunting does not respect the lives of animals.	1	2	3	4	5	6	7
I feel a strong emotional bond with animals.	1	2	3	4	5	6	7
The needs of humans should take priority over wildlife protection.	1	2	3	4	5	6	7
I care about animals as much as I do other people.	1	2	3	4	5	6	7
Wildlife are on earth primarily for people to use.	1	2	3	4	5	6	7
Hunting is cruel and inhumane to the animals.	1	2	3	4	5	6	7
We should strive for a world where humans and wildlife can live side by side without fear.	1	2	3	4	5	6	7
I value the sense of companionship I receive from animals.	1	2	3	4	5	6	7
Wildlife are like my family and I want to protect them.	1	2	3	4	5	6	7
People who want to hunt should be provided the opportunity to do so.	1	2	3	4	5	6	7

We may be interested in gathering further input from participants in the Lincoln Safari Program about their experiences. Toward this end, we would like to know **if you would be interested in providing input in the future by way of email. Please check the box below if you are interested in this opportunity.**

Yes, I would be interested in participating in a follow-up study about the Lincoln Safari Program. (Participation would entitle my group to an invitation only Fall reception at the Lincoln Children's Zoo.)



Lincoln Safari Survey [Edit](#)

Edit Survey

[Preview Survey](#)

To change the look of your survey, select a theme below.

Spring Day

[New Theme](#)

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1.

Thank you for participating in the Lincoln Safari survey! It should take you 10 - 15 minutes to complete.

Because it is critical that we receive a complete set of data, you must complete all monthly surveys during the summer and early fall in order to be eligible to attend the fall reception at the Lincoln Children's Zoo. The same person should respond to the survey each month within two weeks of receiving the survey link. Please email safariparticipant@gmail.com with any questions.

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2. Default Section

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* 1. Enter your Group Number found on the cover of your Lincoln Safari guidebook:

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* 2. For validation purposes, please enter the last two letters of your last name and the two-digit month of your birthday (e.g. RE02).

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* 3. Please enter today's date (MM/DD/YYYY).

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*** 4. Approximately how many times have you visited Lincoln Safari sites prior to the past 30 days in the year 2010?**

- 0 times
- 1-3 times
- 3-5 times
- 5-7 times
- 7-10 times
- 11 or more times

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*** 5. Have you visited any Lincoln Safari sites in the past 30 days?**

- Yes
- No

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3.

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1. Please check the boxes of any Lincoln Safari sites you have visited in the past 30 days.

<input type="checkbox"/> 60th & Pine Lake Road Park	<input type="checkbox"/> Lincoln Children's Zoo	<input type="checkbox"/> Schoo Middle School & Fallbrook YMCA
<input type="checkbox"/> American Legion Park	<input type="checkbox"/> Lincoln Water System Xeriscape Gardens	<input type="checkbox"/> Southwest High School Wetlands
<input type="checkbox"/> Ballard Park	<input type="checkbox"/> Madonna ProActive Labyrinth	<input type="checkbox"/> Spring Creek Prairie Audubon Center
<input type="checkbox"/> Beal Slough	<input type="checkbox"/> Mahoney Park	<input type="checkbox"/> Taylor Park
<input type="checkbox"/> Bethany Park	<input type="checkbox"/> Memorial Stadium - UNL	<input type="checkbox"/> Trago Park & Spray Ground
<input type="checkbox"/> Bison Trail	<input type="checkbox"/> Mopac East Novartis Trailhead	<input type="checkbox"/> Van Dom Park
<input type="checkbox"/> Community CROPS Garden	<input type="checkbox"/> Nebraska State Capitol	<input type="checkbox"/> Victor E. Anderson Library
<input type="checkbox"/> D. A. Williams Library & Arnold Elementary School	<input type="checkbox"/> Nebraska Wesleyan University	<input type="checkbox"/> Wilderness Park
<input type="checkbox"/>	<input type="checkbox"/> Oak Lake Park Dog Run	<input type="checkbox"/> Wildwood Lake
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<input type="checkbox"/> Government Square/ Fedetal Courthouse	<input type="checkbox"/> Pioneer Park Nature Center – Prairie Bld.	<input type="checkbox"/> Wyuka Cemetary and Park
<input type="checkbox"/> Highlands Recycling Center	<input type="checkbox"/> Rudge Memorial Park	
<input type="checkbox"/> Holmes Lake Park		

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2. In 3-5 sentences, please describe your Lincoln Safari experience in the past 30 days. Specifically, describe any moments that are memorable.

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3. Were there others with you during any of your Lincoln Safari experiences in the past 30 days?

- Yes
- No

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4.

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1. What is the nature of your relationship with those who accompanied you (e.g. children, partner, scout troop, etc...)?

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person/group 2	<input type="text"/>
person/group 3	<input type="text"/>
person/group 4	<input type="text"/>
person/group 5	<input type="text"/>

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past 30 days.

Provide up to 5 examples.

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2. E.

Not at All Somewhat Frequently Very Frequently

I used alternative transportation in the past 30 days.

Provide up to 5 examples.

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3. F.

Not at All Somewhat Frequently Very Frequently

I took steps to improve natural areas in the past 30 days.

Provide up to 5 examples.

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9.

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1. Please describe any experiences (including Lincoln Safari or otherwise) in the past 30 days that have influenced the behaviors you listed in the previous section.

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