

THESIS

CONNECTING CHILDREN AND FAMILIES TO NATURE:
TARGETING WILDLIFE AGENCY EDUCATION INITIATIVES

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ABSTRACT

CONNECTING CHILDREN AND FAMILIES TO NATURE: TARGETING WILDLIFE AGENCY EDUCATION INITIATIVES

The following thesis presents two manuscripts that explore how information on barriers to participation in nature-based programs and wildlife value orientations (WVOs) could be used to enhance the reach and effectiveness of wildlife agencies in connecting children to nature. Strengthened by proven physical, social and cognitive benefits as well as potential impacts upon the development of life-long environmental values and attitudes, wildlife agencies have an interest in addressing the human-nature disconnect in order to maintain and/or increase support for future conservation initiatives and secure future funding sources.

The primary purpose of the first manuscript was to explore how information about WVOs, barriers to participation in nature-based programs and program topic preferences might be integrated to improve targeting of wildlife agency education initiatives for specific audiences. Data were collected via a mail survey administered to residents of Helena, Montana. Results indicated that there are significant differences in both barriers to participation and program topic preferences across WVOs. Although significantly different, limited barriers to participation were found for the relatively homogenous population surveyed indicating a need for further research to determine if findings can be applied to other populations and geographic locations.

The second manuscript identified the specific program preferences and barriers for a group of teachers in Rapid City and Spearfish, South Dakota. A case study approach examined the barriers to both integrating EE into classrooms and incorporating programs taught by informal EE providers into curriculum. Focus group discussions provided valuable insight into how a local wildlife agency could most effectively target education efforts in order to overcome barriers and adapt programming for both students and teachers at a new education center in Rapid City, South Dakota. Results of focus group discussion provide recommendations for the design and marketing of school-based EE programs for Rapid City area teachers.

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I. INTRODUCTION

Across the nation, local and state agencies, schools, nonprofits, community organizations, and parents' groups have joined a burgeoning international movement to address a change in our relationship with nature. This movement, sparked in large part by the seminal book, *Last Child in the Woods* (Louv, 2005), seeks to address the negative effects that a dramatic decline in time spent outdoors is having on communities, families and individuals, particularly children. Stemming from a variety of societal trends including changes in population and the physical environment (Cordell, Bergstrom, Betz & Green, 2004; Rivkin, 1995), increased dependence on technology (Clements 2004; Pergams & Zaradic, 2006, 2007), and a parental culture of fear (Veitch, Bagley, Ball, & Salmon, 2006; Pain, 2006), this decrease in opportunities for children to connect with nature has significant implications for health, physical and emotional development, academic achievement and the development of future stewards of the natural world (Burdette & Whitaker 2005; Taylor & Kuo 2006; Chawla 1988, 1998, 1999; Wells & Lekies 2006).

Societal Trends Reduce Connection to Nature

While anecdotal evidence of the relationship change between children and nature can be seen in our everyday lives, a growing body of research indicates that this change is likely due to a number of interconnected societal factors. As urban populations have grown and urban development has expanded, children's use of space and time has changed dramatically. Studies of urban families show that children spend less time playing outdoors due to decreasing access to public play spaces (Wridt, 2004; Gaster, 1991) and increasing constraints upon the range in which they are allowed to play (Karsten, 2005; Tandy, 1999). Parent-induced constraints upon outdoor play in urban, suburban and rural communities are often the direct result of a culture of fear, "fear of traffic, of crime, of stranger danger and nature itself," (Louv, 2005, p. 123) and play a significant role in decreasing time spent outdoors.

Amplified by demographic changes in family structure (e.g., single parent households and increase in maternal employment) this fear has led to a decline in average discretionary time (e.g., time not spent in school) (Hofferth & Sandberg, 2001; Hofferth & Curtin 2006). Studies show that during this limited

discretionary time, children are spending more time in the car on their way to structured activities (e.g. organized sports and youth programs) or plugged into electronic media, often more than one medium at a time (e.g. television and computer). A longitudinal study conducted by the Kaiser Family Foundation found that the average child today spends more than six hours a day plugged-in to electronic media (Roberts, Foehr, & Rideout, 2005; Rideout & Hamel, 2006). Excessive media use further exacerbates the child-nature disconnect by potentially influencing an epidemic of overweight and obese children (Jordan & Robinson, 2008) and contributing to declines in U.S. national park attendance (Pergmans & Zodiac, 2006).

Benefits of Connection to Nature

Despite societal trends, the movement to connect children to nature has been empowered by increasing evidence of the myriad of physical, social, emotional, and cognitive benefits derived from both structured and unstructured time in nature. While physical play outdoors has strong implications for a healthy, active lifestyle, studies show that children who play regularly in natural environments demonstrate more advanced motor skills, including coordination, balance and agility (Fjortoft, 2001). In addition, play in natural environments stimulates creativity and social interaction between children (Bixler, Floyd, & Hammitt, 2002). On an emotional level, researchers have found that exposure to nature can have direct impacts on children's ability to deal with stress and adversity (Wells & Evans, 2003). Studies also show that exposure to nature has the potential to improve cognitive development including awareness, reasoning and observational skills (Pyle 2002). In particular, results indicate that children with attention deficit symptoms are able to function better than usual after activities in natural settings (Taylor, Kuo, & Sullivan, 2001).

In addition to physical, social and cognitive benefits, childhood experiences in nature have the potential for fundamental and lasting impacts upon the development of both a connection to nature and life-long environmental attitudes and values. Research by David Sobel (2008) suggests that, "regardless of socioeconomic status, ethnicity, or ecosystem, children play in similar ways when they have safe free time in nature" (p. 19). While the places can vary from fields, forests and streams to patches of grass in city parks or roadside ditches, nature play allows children to experience the awe of feeling at one with the natural world and make meaningful connections that are often not realized or expressed until adulthood. In fact, research has shown that time spent outdoors playing, bird watching, hunting, camping, or being with a

special person can be associated with adult environmental attitudes and behavior (Wells & Lekies, 2006). With this in mind, future stewardship of the world's natural resources depends upon opportunities for children to connect with the natural world.

Strengthened by this growing body of research supporting the benefits of connecting children to nature, wildlife agencies have an opportunity to address what Louv (2005) describes as "nature deficit disorder," through effective targeting of education initiatives. As the demographic and geographic composition of society continues to change, improved agency response will require efforts to overcome socio-demographic barriers in order to reach children from diverse backgrounds (Bruyere, Teel & Newman, 2009). The growing disconnect between children and nature is a concern that resonates across geographic, demographic and cultural segments of society. However, segmented groups based upon geographic or demographic characteristics are far from homogenous in their fundamental values and motivations. Therefore, in order to reach diverse audiences, wildlife agencies must tailor education initiatives to narrower groups sharing common characteristics (Bruyere et al., 2009). Addressing both barriers to participation in nature-based programs and values towards wildlife will provide a useful framework for agencies to create more targeted education initiatives.

Wildlife Value Orientations

The theory of wildlife value orientations (WVOs) builds upon the widely applied value-attitude-behavior framework (Homer & Kahle, 1998) in which individual behavior is guided by a series of cognitions, each of which builds upon the others in a hierarchical fashion. At the base of this hierarchy are values, which underlie value orientations or patterns of basic beliefs that serve to give strength and meaning to fundamental values relating to a specific domain (Vaske & Donnelly, 1999). These value orientations are predicted to directly influence attitudes (Homer & Kahle, 1998).

Research suggests that individual behavior towards wildlife is driven by specific attitudes, which are directed by WVOs (Manfredo et al., 2009; Teel & Manfredo, 2009). Studies have shown that different value orientations have significant implications for responses to wildlife issues and participation in wildlife-related recreation. In fact, WVOs have proven to help practitioners gauge support for or opposition to management policies, estimate demand for wildlife-related activities, and disseminate information about

wildlife policy and recreation opportunities (Bright, Manfredo, & Fulton, 2000; Whittaker, Vaske & Manfredo, 2006).

Thesis Organization and Purpose

Although the movement to connect children to nature is developing a national and international presence, significant societal factors, such as urbanization, population growth and increasing dependence on technology, which contributed to the deficit, remain. As society changes and children spend less time outdoors, wildlife agencies stand to lose public support for conservation initiatives and funding due to decreasing park visitation and participation in recreation activities such as hunting and fishing (Pergams & Zeradic, 2006). Given the significant implications of a connection to nature for health, physical and emotional development, academic achievement and the development of future stewards, this loss of support is merely a window into the much larger issues facing society if children continue to expand their distance from the natural world. Furthermore, agency education initiatives not only face a growing human-nature disconnect, but must also combat a myriad of barriers that limit the participation of both families and formal educators.

As stand alone concepts, both barriers to participation and WVOs have significant implications for improving the reach of wildlife agency efforts. While a number of studies have addressed barriers to program participation in relation to socio-demographic characteristics (Allison & Hibbler, 2004; Hong & Anderson, 2006), the diversity of program constraints may not be sufficiently represented by this type of segmentation. Similar to the role of the barriers concept in explaining variability among segments of the population, research on the WVO concept has revealed variation in how different audiences relate to wildlife and how an understanding of these differences can inform wildlife conservation and decision-making (Manfredo et al., 2009; Teel & Manfredo, 2009). However, the WVO concept has not been applied in the context of developing targeted nature-based education programs.

Therefore, the following study is part of a broader project with the unique goal of enhancing the ability of state wildlife agencies to effectively target education initiatives to reach diverse audiences. Chapter I provides a review of current literature with regard to both barriers to participation in nature-based programs and the WVO concept. Meanwhile, Chapter II builds upon earlier project efforts, which sought to expand the utility of the WVO concept for utilization in agency education and outreach by determining

how wildlife value orientations and barriers to participation might be integrated to create more targeted agency programs for connecting children and families to nature in Raleigh, North Carolina (McCoy, 2010).

In an effort to continue to address a gap in the literature, Chapter II identifies the relationships between WVOs, barriers to participation and program topic preferences for children and families in the Helena, Montana area. This chapter was guided by the following research question: *how can wildlife agencies integrate WVOs, barriers to participation and program topic preferences to target education initiatives?*

While earlier project efforts focused primarily on programs designed to connect children and families to nature, previous research excluded the field of formal education. Given the body of research demonstrating benefits gained from integrating the environment into formal education programs, Chapter III focuses on addressing barriers to participation and program preferences in order to develop targeted programs for teachers. Chapter III takes a more qualitative approach to identify the program preferences and barriers to participation for teachers' use of environmental education specifically in Rapid City and Spearfish, South Dakota.

Although this research focuses on different populations than earlier project efforts and looks at the additional component of program preferences, the overall aim of the following manuscripts and the larger project is to provide recommendations for state wildlife agencies on how to target education initiatives to reach diverse audiences and address the human-nature disconnect.

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II. TARGETED AGENCY EDUCATION INITIATIVES IN HELENA, MONTANA: INTEGRATING WILDLIFE VALUE ORIENTATIONS, BARRIERS TO PARTICIPATION & PROGRAM TOPIC PREFERENCES

Summary

The following study seeks to address the impacts of the recent decline in time spent outdoors on communities, families and individuals, particularly children. The primary purpose of this study was to explore how information about wildlife value orientations (WVOs), barriers to participation in nature-based programs and program topic preferences might be integrated to improve targeting of wildlife agency education initiatives for specific audiences. Data were collected via a mail survey administered to residents of Helena, Montana. Results indicated that there are significant differences in both barriers to participation and program topic preferences across WVOs. Although significantly different, limited barriers to participation were found for the relatively homogenous population surveyed. Further research is needed to determine if findings can be applied to other populations and geographic locations.

Key words: wildlife, values, value orientations, barriers to participation, diverse audiences, program topic preferences

Introduction

Across the nation, local and state agencies, schools, nonprofits, community organizations, and parents' groups have joined a burgeoning international movement to address a change in our relationship with nature. This movement, sparked in large part by the seminal book, *Last Child in the Woods* (Louv, 2005), seeks to address the negative effects that a dramatic decline in time spent outdoors is having on communities, families and individuals, particularly children. Stemming from a variety of societal trends including changes in population and the physical environment (Cordell, Bergstrom, Betz & Green, 2004; Rivkin, 1995), increased dependence on technology (Clements 2004; Pergams & Zaradic, 2006, 2007; Roberts, Foehr, & Rideout, 2005; Rideout & Hamel, 2006), and a parental culture of fear (Veitch, Bagley, Ball, & Salmon, 2006; Pain, 2006), this decrease in opportunities for children to connect with nature has significant implications for health, physical and emotional development, academic achievement and the development of future stewards of the natural world (Jordan & Robinson, 2008; Burdette & Whitaker 2005; Taylor & Kuo 2006; Chawla 1988, 1998, 1999; Wells & Lekies 2006).

In addition to proven physical, social and cognitive benefits (Fjortoft, 2001; Bixler, Floyd, & Hammitt, 2002; Wells & Evans, 2003; Pyle, 2002), childhood experiences in nature have the potential for fundamental and lasting impacts upon the development of both a connection to nature and life-long environmental values and attitudes. Research has shown that time spent outdoors playing, bird watching, hunting, camping, or being with a special person can be associated with adult environmental attitudes and behavior (Wells & Lekies, 2006). Additionally, a handful of studies compiled by Louise Chawla (1988, 1998, 1999) suggest that most environmentalists attribute their commitment to a combination of “many hours spent outdoors in a keenly remembered wild or semi-wild place in childhood or adolescence, and an adult who taught respect for nature” (Sobel, 2008, p. 9). With this in mind, future stewardship of the world's natural resources depends upon opportunities for children to connect with the natural world.

Wildlife agencies have an opportunity to address what Louv (2005) describes as “nature deficit disorder” through effective targeting of education initiatives, especially strategies for connecting children to nature. Making these connections has particular implications for wildlife agencies, which stand to lose both funding and support for future environmental and conservation initiatives, as park visitation and recreation participation decreases (Pergams & Zeradic, 2006).

However, as the demographic and geographic composition of society continues to change, improved agency response will require efforts to overcome socio-demographic barriers to participation in order to reach children from diverse backgrounds (Bruyere, Teel & Newman, 2009). While previous research has focused on the relationship between specific barriers to participation and socio-demographic characteristics (Allison & Hibbler, 2004; Borden, Perkins, Carleton-Hug, Stone & Keith, 2006; Hong & Anderson, 2006), this type of segmentation is broad and may fail to capture the diversity of barriers *within* groups. In fact, segmented groups based upon geographic or demographic characteristics are far from homogenous in their fundamental values and motivations. Therefore, in order to reach diverse audiences, wildlife agencies must tailor education initiatives to narrower groups sharing common characteristics (Bruyere et al., 2009). While recent research shows that socio-demographics tend to be weak correlates of human values and behavior in a wildlife or natural resource context (Teel & Manfredi, 2009), the development of the WVO concept provides a useful segmentation tool presenting a more in-depth understanding of diverse public interests in relation to wildlife that can assist in targeting programs and addressing barriers to participation (Manfredi, Teel & Henry, 2009; Teel & Manfredi, 2009).

Barriers to Participation in Nature-based Programs

Research suggests that regardless of ethnicity or income level, children and parents in the United States have an interest in programs about nature (Bruyere, Billingsley, & O'Day, 2008). However, many children and families encounter barriers that prevent or limit their participation in nature-based programs. Throughout the literature, a number of practical and cultural barriers for participation identified include: time constraints, cost, transportation, safety, language barriers, lack of awareness of opportunities, and potential discrimination (Allison & Hibbler, 2004; Borden et al., 2006; Bruyere et al., 2008; Bruyere, Gobbs-Hill & Paulding, 2010; Hong & Anderson, 2006). Some of these barriers may require additional explanation. Safety, in many ways, could refer to the parental fears of stranger danger, but could also relate to fear of natural elements, such as snakes and insects, or a lack of familiarity with program staff (Rideout & Legg, 1999). Time constraints could refer to competition from other out-of-school enrichment activities or family responsibilities, work and studying (Borden, Perkins, Carleton-Hug, Stone, & Keith, 2006).

While a number of the barriers identified could be addressed by state wildlife agencies, there are some that require individual and societal adaptation. For instance, adapting to time constraints may be

outside the agency scope, but addressing language barriers and lack of awareness through hiring bilingual staff and providing bilingual marketing and educational materials is well within the realm of agency control. Additional research focused upon the role that each barrier plays in limiting child and family participation in agency education initiatives is needed in order to better understand specific barriers and target future educational initiatives, particularly for diverse audiences.

Wildlife Value Orientations

The theory of wildlife value orientations (WVOs) builds upon the widely applied value-attitude-behavior framework (Homer & Kahle, 1998) in which individual behavior is guided by a series of cognitions, each of which builds upon the others in a hierarchical fashion. At the base of this hierarchy are values, which underlie value orientations or patterns of basic beliefs that serve to give strength and meaning to fundamental values relating to a specific domain (Vaske & Donnelly, 1999). These value orientations are predicted to directly influence attitudes (Homer & Kahle, 1998).

Research suggests that individual behavior towards wildlife is driven by specific attitudes, which are directed by WVOs (Manfredo et al., 2009; Teel & Manfredo, 2009). Through research application, a four-group typology of WVOs was identified based upon broad, cultural ideologies. The four types (Table 2.2) are identified based on the degree to which they emphasize two primary value orientations: domination and mutualism. Utilitarian's are characterized by a domination orientation, reflecting a utilitarian ideology and human mastery over wildlife. Mutualists are defined by a mutualism orientation reflecting an egalitarian ideology and a desire for animal companionship. Pluralists reflect both domination and mutualism views, which surface at varying degrees depending on context. Finally, distanced individuals lack a well-formed value orientation and have limited interest in wildlife issues (Teel & Manfredo, 2009).

Studies have shown that these different value orientations have significant implications for responses to wildlife issues and participation in wildlife-related recreation. In fact, research shows that knowledge of WVOs has helped practitioners gauge support for or opposition to management policies, estimate demand for wildlife-related activities, and disseminate information about wildlife policy and recreation opportunities (Bright, Manfredo, & Fulton, 2000; Whittaker, Vaske & Manfredo, 2006). In addition, recent studies identified an intergenerational shift away from a domination wildlife value

orientation and a simultaneous rise of a mutualism orientation due to societal trends associated with modernization (Manfredo et al., 2009; Teel & Manfredo 2009).

Study Purpose

The ability to monitor changes in WVOs and to identify different wildlife-related interests has important implications for agency efforts to communicate with stakeholders and address conflicts. In addition, the extent to which wildlife agencies are able to relate to different value orientations will greatly impact their ability to target communication and education initiatives in order to reach diverse audiences. This study builds upon previous project efforts (McCoy, 2010) to expand the utility of the wildlife value orientation concept for wildlife agency education efforts by focusing on the relationship between WVOs and both barriers to participation in nature-based programs and specific program topic preferences. Two hypotheses were tested to examine these relationships among Helena, Montana residents:

H₁: Respondents will differ by wildlife value orientation with regard to barriers to participation in nature-based programs.

H₂: Respondents will differ by wildlife value orientation with regard to nature-based program topic preferences.

Methods

Sampling Approach

Data were collected via a mail survey administered to a subset of randomly selected residents in Helena, Montana. The targeted study population consisted of parents with children under the age of 18 who resided in the Helena area (identified by zip code). Our agency partner, Montana Fish, Wildlife, & Parks, identified this specific population due to interest in targeting the audience in this geographic area for future programs offered by a new wildlife education center in the area. Samples were purchased from a commercial sampling firm, using a stratification scheme to ensure that only residents within the zip code region were included.

A modified Dillman (2006) approach, consisting of multiple mailings, was used to maximize response to the mail survey administered in May and June 2010. The first mailing consisted of a survey, postage-paid return envelope, and a cover letter requesting participation of a parent (18 years or older) in the household. A reminder postcard was mailed two weeks later to those who had not yet responded. Approximately four weeks after the first mailing, a second complete mailing of the survey and a modified

cover letter was sent to those who had not yet responded. A sample of non-respondents was contacted via phone in September 2010 to answer a small subset of questions from the mail survey, which allowed for basic comparisons between respondents and non-respondents. The phone survey included items to assess WVOs, barriers to participation in nature-based programs, and socio-demographics.

Measurement of Key Concepts

Wildlife value orientations. Domination and mutualism orientations were measured using a set of 14 statements designed to elicit basic beliefs about wildlife and wildlife management (Table 2.1). Identified by prior research, a set of specific “belief dimensions” was examined to reflect core areas of thought for each wildlife value orientation (Teel & Manfredi, 2009). Two belief dimensions designated a domination orientation: appropriate use of wildlife and hunting. A mutualism orientation was also designated by two belief dimensions, caring and social affiliation. Respondents rated their level of agreement with the wildlife belief statements on a scale from 1 (strongly disagree) to 7 (strongly agree).

Barriers to participation in nature-based programs. Barriers to participation were measured using a set of statements relating to specific barriers with regard to nature-based program participation. Items were adapted from prior research on barriers to participation in informal science education programs (Bruyere et al., 2008) and included time, cost, transportation, safety, awareness of opportunities, concerns about leaving children alone and with unfamiliar staff, and trust in the wildlife agency (Table 2.2). Respondents rated their level of agreement with the barriers statements on a scale from 1 (strongly disagree) to 7 (strongly agree). These values were recoded into a -3 (strongly disagree) to +3 (strongly agree) scale for ease of subsequent interpretation. To further explore potential barriers that may not be captured by these statements, respondents were asked to identify their primary benefits and concerns associated with having children participate in programs about nature in an open-ended format. Specifically, respondents were asked: “What is the best benefit you can think of for your children to participate in programs about nature?” and “What is the greatest concern you have about your children participating in programs about nature?” Responses were coded by two researchers and collapsed into thematic categories prior to analysis.

Program topic preferences. Following a state agency inventory of current program topic offerings in the Helena area, a list of 21 potential program topics was chosen to include on the mail survey

(Table 2.3). Respondents rated their level of interest in each program topic on a scale from 1 (not at all interested) to 7 (extremely interested). These values were recoded into a -3 (extremely uninterested) to +3 (extremely interested) scale for ease of interpretation. In addition, respondents were asked to list their top 3 program topics. A comparison between most frequently mentioned program topic preferences and current program offerings was completed to determine gaps and areas of growth.

Analysis Strategy

The internal consistency of the WVO and belief dimension scales was examined by conducting a reliability analysis (Table 2.1). This analysis assessed the extent to which consistent results were obtained across multiple items measuring a given belief dimension or value orientation. WVO scores were computed in a two-stage process. Respondents were given a score for each belief dimension (e.g. caring), computed as the mean of all items within that dimension. Value orientation scores (e.g. mutualism) were then assigned by computing the mean of corresponding belief dimension scores. Respondents were then segmented into “wildlife value orientation types” by comparing their scores on domination and mutualism simultaneously. Based on an approach used in previous studies (Manfredo et al., 2009; Teel & Manfredo, 2009), four categories of people were identified based on the extent to which they scored high or low on the domination and/or mutualism orientations: a) high-domination, low-mutualism was categorized as utilitarian; b) low-domination, high-mutualism was categorized as mutualist; c) high-domination, high-mutualism was categorized as pluralist; and d) low-domination, low-mutualism was categorized as distanced (Table 2.2). High was defined by a score >4.50 (scale midpoint for each mean composite), while low was defined by a score <4.50 .

Table 2.2 about here

The relationship between WVOs and both barriers to participation and program topic preferences was examined using analysis of variance (ANOVA) with Dunnett’s T3 post-hoc test (used because of a violation of the equal variances assumption). A $p < .05$ designates statistical significance in our analyses and effect size measures (Eta) provided an indication of the strength of any differences. An effect size of .1 suggests that the relationship between two variables is minimal; .3 indicates a typical relationship and .5 suggests a strong relationship (Vaske, Gliner, & Morgan, 2002).

Results

A total of 3,379 surveys were mailed, of which 980 were returned completed (29% response rate). A follow-up phone survey of 61 individuals was conducted to determine differences between respondents and non-respondents. Although non-respondents appeared to differ minimally from respondents expressing a slightly less utilitarian and more mutualist or pluralist orientation, the data were not weighted on the basis of these comparisons due to marginal variation and a large sample size representing the diversity of value types.

Reliability results indicated high internal consistency for wildlife belief dimension and value orientation scales (Table 2.1). The Cronbach alpha for basic belief dimensions were all $\geq .74$ and all item total correlations were $\geq .40$. Deleting any item from their basic belief dimension did not improve the overall Cronbach alpha, except in one instance in which it improved slightly from .77 to .79. With prior research and these figures in mind, composite indices were created for “domination” (Cronbach alpha = .75) and “mutualism” (Cronbach alpha = .85). Based upon the extent to which respondents scored high or low on these indices, results indicate that 53% of respondents were identified as utilitarian, 13% as pluralist, 19% as mutualist, and 15% as distanced.

Table 2.1 about here

Wildlife Value Orientations and Barriers to Participation

ANOVA results revealed that mean scores for six of the eight barriers to participation items differed significantly among wildlife value orientation types (Table 2.3) with p-values ranging from .014 to $<.001$. Two of the barriers items (*program cost* and *concerns about unfamiliar staff*) did not differ significantly. The magnitude of effect size values suggests minimal relationships and a lack of practical significance ($\text{Eta} < .155$). Mean responses to barriers items indicate that overall respondents did not perceive any major barriers to participation in nature-based programs. With one exception (awareness of programs), means for all significant barriers items were below the scale midpoint of zero, indicating that the differences that do exist for barriers to participation among wildlife value orientation types are not practically significant among Helena residents. The mean barriers score for “awareness of programs” was .26 and .21 respectively, for the utilitarian and mutualist value orientations suggesting a minimal barrier for these individuals.

Table 2.3 about here

Descriptive analysis of open-ended benefit/concern questions revealed that the most frequently mentioned benefits of having children participate in nature-based programs were acquiring knowledge and developing appreciation for nature. Meanwhile the most frequently mentioned concerns about having children participate in nature-based programs were safety and teaching of biased or inappropriate content. Although results of comparisons did not reveal significant variation across groups, certain differences were noted among the value orientation types on responses to the open-ended benefit/concern questions. While the greatest number of respondents considered acquiring knowledge a primary benefit across WVOs (utilitarian 34%, pluralist 35%, mutualist 33%, distanced 36%), wildlife value types seemed to differ slightly with regard to the benefit of appreciation for nature (utilitarian 22%, pluralist 18%, mutualist 31%, distanced 23%). In addition, wildlife value orientation types seemed to differ with regard to concerns as well. The greatest number of respondents identified as pluralist (22%), mutualist (31%), and distanced (19%) mentioned safety as their primary concern, while the greatest number of utilitarian's (24%) identified the teaching of biased or inappropriate content. Example comments included (C=comment):

C₁: "That someone with "extreme views" on those programs would provide counterproductive info."

C₂: "Being taught an opinion or point of view instead of fact."

C₃: "Biased liberal views of nature/conservation."

C₄: "Opinions of others different than mine being forced on my children."

Wildlife Value Orientations and Program Topic Preferences

Mean program topic interest scores varied significantly among the wildlife value orientation types on all 21 of the program topic items (Table 2.4) with p-values $\leq .001$. The magnitude of effect size values suggests minimal to typical relationships ($\eta^2 \leq .386$, in all cases). While there was no consistent pattern with regard to differences between wildlife value orientation types and interest in each of the program topics, some results could have practical significance. For instance, the lowest mean interest score for mutualists was found for the topic "hunting" ($M=.10$). The highest mean interest scores for the utilitarian and pluralist wildlife value orientation types were found for the same topics ("fish and wildlife" and "fishing"). Amongst mutualist and distanced individuals, the highest mean interest scores were also seen for the same topics ("fish and wildlife" and "outdoor skills").

Table 2.4 about here

Analysis of respondents' top three program topic preferences revealed that the greatest number of respondents rated programs focused on fishing (38%) and hunting (39%) most highly. Respondents also placed programs with a focus on fish and wildlife (35%) and outdoor skills (35%) highly. According to the program inventory, conducted by Montana Fish, Wildlife, & Parks, the greatest number of programs include content focused on fish and wildlife (76%), followed closely by habitat for fish and wildlife, forest/trees/plants, and outdoor skills (65%). Given the program topic preferences expressed, the current focus upon fishing (38%) and hunting (24%) programs appears to be aligned with the interests of Helena area residents.

Discussion

The primary purpose of this study was to explore how information on WVOs, barriers to participation in nature-based programs and program topic preferences might be integrated to improve wildlife agency initiatives to connect children and families to nature. Research has shown that as stand alone concepts, both barriers to participation and WVOs have significant implications for improving the reach of wildlife agency efforts. Barriers to nature-based program participation have been extensively researched and applied in the context of informing program design for diverse ethnic and socio-demographic audiences (Allison & Hibbler, 2004; Borden et al., 2006; Bruyere et al., 2008; Bruyere, Gobbs-Hill & Paulding, 2010; Hong & Anderson, 2006). Similar to the role of the barriers concept in explaining variability among segments of the population, research on the wildlife value orientation concept has revealed variation in how different audiences relate to wildlife and how an understanding of these differences can inform wildlife conservation and decision-making (Manfredo et al., 2009; Teel & Manfredo, 2009). However, the value orientation concept has not been applied in the context of developing targeted nature-based education programs.

Results of this study somewhat supported the hypothesis that individuals with different WVOs would differ with regard to barriers to participation. Specifically, respondents across WVO types differed with regard to six of the eight barriers tested. However, because respondents were relatively homogenous with respect to a lack of major barriers to participation, limited conclusions can be made with regard to differences seen across the four value orientation types. The general lack of barriers and limited differences

between WVO types could be attributed to a relatively homogenous socio-demographic sample. Therefore, future research focused on the relationship between WVOs and barriers to participation should be conducted within a more diverse geographic and socio-demographic population. Notably, the only barrier with a mean above the scale midpoint of zero was “awareness of programs,” a barrier identified in previous studies (Bruyere, Gobbs-Hill & Paulding, 2010; McCoy, 2010). In this study, utilitarian’s and mutualists identified this barrier, suggesting that they simply did not feel aware of opportunities to participate in nature-based programs. However, awareness is a barrier that could easily be addressed by wildlife agency staff through efforts to better understand how and where audiences learn about opportunities.

Meanwhile, results supported the hypothesis that individuals with different WVOs would differ with regard to nature-based program topic preferences. While previous research has demonstrated that WVOs are good predictors of a person’s preference for wildlife related services and activities (Manfredo et al., 2009; Teel & Manfredo, 2009), this project is the first to apply this concept to nature-based programs. This study found significant differences in program topic preferences across the four WVO types, revealing important implications for agency program offerings. Lending credibility to the WVO survey instrument, findings indicated that utilitarian’s in Helena, would prefer programs oriented towards hunting or hunter-education, while mutualists would prefer programs related to wildlife viewing. These results are not surprising, but provide support for targeting programs for specific audiences.

Overall, program topic preferences differed significantly across WVOs for all 21 program topics, but there was no distinct pattern of association between WVOs. However, program topic preferences for the pluralist group were significantly different from the utilitarian group in all cases. This indicates that within the context of program topic preferences pluralists in Helena do not align with utilitarian’s, but with mutualists or distanced individuals. In addition, though one might expect overall program interest for distanced individuals to be lower than other WVO groups, this was only seen in a small number of cases (fish and wildlife, habitat, outdoor skills, and career opportunities in science).

Nearly every program topic was of some interest across all value orientation types, excluding anthropology, which received a mean score below the scale midpoint of zero for the utilitarian group. Though there were significant differences in level of interest across WVO types, there were some program topics, such as fish and wildlife, habitat for fish and wildlife, fishing, non-fishing/hunting outdoor

recreation activities, and outdoor skills that were relatively popular across the board for all four WVO groups. With the universal appeal of these program topics in mind, agencies should consider adapting the educational content or framing of programs to meet a wide variety of audience preferences.

Results of a comparison between the current program topic inventory and Helena area resident preferences suggests that an increase in programs focused on hunting and fishing could encourage increased program participation at the new education center. However, programs focused on hunting may not appeal to a mutualist audience and could be targeted toward utilitarian audiences. Meanwhile, programs focused on fishing may appeal to a broad range of WVOs and should be designed to meet a diversity of audience values and needs. Overall, the ability of agencies to adapt programs and messages for different target audiences has significant implications for generating broad-based support for future conservation initiatives.

Study Limitations and Need for Future Research

Generally, the findings of this study align with previous research (McCoy, 2010) and support researcher theories with regard to the relationships between WVOs, barriers to participation and program topic preferences. While limited conclusions could be made about the relationship between WVOs and barriers to participation, there are reasons that could explain the failure to detect a strong relationship beyond the possibility that the concepts are unrelated. For instance, limited variation in responses and a general lack of barriers indicated that respondents, on average, did not appear to be affected by practical and cultural influences identified in previous studies as barriers to participation in nature-based programs. In addition, the general lack of barriers identified across all respondents could be attributed to a relatively homogenous sample, given that socio-demographics have been identified as significant predictors of barriers (Borden et al., 2006; Bruyere et al., 2008; Hong & Anderson, 2006). Therefore, the homogenous nature of the sample population may be a limiting factor in determining whether barriers to participation in nature-based programs are differentially experienced by people with different wildlife related interests. Future research focused on the relationship between WVOs and barriers to participation should be conducted within a more diverse geographic and socio-demographic population.

In addition, the limited relationship found between WVOs and barriers to participation could be attributed to the way in which respondents were asked about programs. Given that the questions and

supporting research focused on barriers to participation in programs about nature as opposed to programs more specifically about *wildlife*, one could argue that a strong relationship with WVOs would not necessarily be expected. Future research should focus on determining whether findings in Helena, MT can be generalized to other populations/regions and whether a refined focus on programs, which emphasize connections to wildlife rather than nature, would result in different conclusions. Meanwhile, additional research is also necessary to assess the strong relationship found between WVOs and program topic preferences. Future research could focus on determining whether the findings of this study can be generalized to other populations or regions.

This research is part of a broader project conducting similar assessments in collaboration with state wildlife agencies across the United States. Continuation of this project will include further examination of the relationships between WVOs, barriers to participation in nature-based programs and program topic preferences in other parts of the country. These assessments and parent focus group data will inform the design of a series of small-scale pilot programs which will be evaluated based upon their potential for appealing to diverse audiences and connecting children and families to nature.

Table 2.1.
Reliability results for value orientations and basic belief dimensions from 2010 survey of Helena, Montana residents

Wildlife value orientations, basic belief dimensions, and basic belief item ¹	Item Total Correlation	Alpha if Item Deleted	Cronbach alpha
Domination Wildlife Value Orientation			.75
Appropriate Use			.74
Humans should manage fish and wildlife populations so that humans benefit.	.572	.643	
The needs of humans should take priority over fish and wildlife protection.	.548	.671	
Fish and wildlife are on earth primarily for people to use.	.570	.645	
Hunting Beliefs			.77
We should strive for a world where there's an abundance of wildlife for hunting and fishing.	.423	.785	
Hunting is cruel and inhumane to animals. ²	.646	.668	
Hunting does not respect the lives of animals. ²	.644	.669	
People who want to hunt should be provided the opportunity to do so.	.597	.709	
Mutualism Wildlife Value Orientation			.85
Social Affiliation Beliefs			.81
We should strive for a world where humans and fish and wildlife can live side by side without fear.	.567	.783	
I view all living things as part of one big family.	.629	.752	
Animals should have rights similar to the rights of humans.	.618	.758	
Wildlife are like my family and I want to protect them.	.673	.733	
Caring Beliefs			.73
I care about animals as much as I do other people.	.496	.716	
I feel a strong emotional bond with animals.	.626	.554	
I value the sense of companionship I receive from animals.	.546	.655	

¹Item response scale range: 1 (strongly disagree) to 7 (strongly agree).

²Item was reverse coded prior to analysis.

Table 2.2.

A four-group typology of wildlife value orientations (adapted from Teel et. al., 2010)

		Domination	
		High	Low
Mutualism	Low	<p>Utilitarians. Have a domination orientation, believing that wildlife should be used and managed primarily for human benefit. They are more likely to prioritize human well-being over wildlife in their attitudes and behaviors. They are also more likely to find justification for treatment of wildlife in utilitarian terms and to rate actions that result in death or harm to wildlife as acceptable.</p>	<p>Distanced. Do not have either a mutualism or a domination orientation. As their label suggests, they tend to be less interested in wildlife and wildlife-related issues.</p>
	High	<p>Pluralists. Have both a mutualism and a domination value orientation toward wildlife. The influence of the two value orientations is believed to be situationally-contingent, meaning that which of the orientations plays a role is dependent upon conditions of the given issue or situation (Tetlock, 1986). For certain issues, Pluralists are likely to respond in a manner similar to that of Traditionalists, whereas for other issues they may behave more like Mutualists.</p>	<p>Mutualists. Have a mutualism orientation, viewing wildlife as capable of relationships of trust with humans, as if part of an extended family, and as deserving of rights and caring. They are less likely to support actions resulting in death or harm to wildlife, more likely to engage in welfare-enhancing behaviors for individual animals, and more likely to view wildlife in human terms.</p>

Table 2.3.
 Mean² scores for barriers to participation in nature-based programs by wildlife value orientation type from 2010 survey of Helena, Montana residents

Barriers Items ¹	Wildlife Value Orientation				F-value	p-value	Eta
	Utilitarian	Pluralist	Mutualist	Distanced			
My family is too busy to participate in programs about nature.	-.62 ^a	-1.13 ^b	-.86 ^{ab}	-.99 ^b	5.24	.001	.127
The cost of programs about nature is usually not a problem for my family. ³	-.62	-.87	-.80	-.80	1.22	.300	.062
Transportation to programs about nature is difficult for my family.	-1.10 ^a	-1.17 ^{ab}	-1.11 ^a	-1.62 ^b	3.85	.009	.109
Participation in programs about nature is safe. ³	-1.56 ^a	-2.02 ^b	-1.76 ^{ab}	-1.56 ^a	5.69	.001	.132
I am uneasy about having my child in a program where I do not know the staff.	.01	-.36	.01	-.31	2.56	.054	.089
I am unaware about programs about nature in my community.	.26 ^a	-.23 ^b	.21 ^{ab}	-.07 ^{ab}	3.53	.014	.104
I am comfortable having my child at a program about nature without me there. ³	-.78 ^a	-1.35 ^b	-.96 ^{ab}	-1.10 ^{ab}	4.98	.002	.124
Montana Fish, Wildlife & Parks is a trustworthy source for programs about nature. ³	-1.64 ^a	-2.10 ^b	-2.03 ^b	-1.92 ^{ab}	7.94	<.001	.155

¹Item response scale coded on 7-point scale ranging from -3 (strongly disagree) to 3 (strongly agree).

²Means with different superscripts across each row are statistically different at p<.05 using Dunnett's T3 post-hoc tests.

³Item was reverse coded prior to analysis.

Table 2.4.
Mean interest in program topics by wildlife value orientation type from 2010 survey of Helena, Montana residents

Program Topics ¹	Wildlife Value Orientation				F-value	p-value	Eta
	Utilitarian	Pluralis t	Mutualis t	Distance d			
Fish and Wildlife	1.82 ^a	2.31 ^b	1.93 ^a	1.59 ^a	9.74	<.001	.172
Habitat for Fish and Wildlife	1.44 ^a	2.12 ^b	1.70 ^a	1.33 ^a	11.85	<.001	.189
Insects	.17 ^a	.96 ^b	.98 ^b	.41 ^{ab}	7.82	<.001	.209
Forests/Trees/Plants	.82 ^a	1.56 ^b	1.40 ^{bc}	1.06 ^{ac}	16.03	<.001	.219
Water Resources (e.g., lakes, rivers, streams)	1.10 ^a	1.85 ^b	1.58 ^b	1.15 ^a	15.41	<.001	.215
Fishing	1.80 ^a	2.26 ^b	1.36 ^c	1.40 ^c	15.06	<.001	.212
Hunting	1.65 ^a	2.08 ^b	.10 ^c	.41 ^c	56.04	<.001	.386
Non-Fishing/Hunting Outdoor Recreation Activities (e.g., hiking, wildlife viewing)	1.27 ^a	1.77 ^{bc}	2.01 ^c	1.68 ^b	17.85	<.001	.229
Outdoor Skills	1.71 ^a	2.18 ^b	2.01 ^b	1.61 ^a	8.28	<.001	.159
Restoration (e.g., restoring natural habitats)	.49 ^a	1.56 ^b	1.48 ^b	.88 ^c	33.13	<.001	.307
Anthropology (e.g., the study of human beings, cultures)	-.07 ^a	1.22 ^b	.98 ^b	.50 ^c	36.81	<.001	.321
Paleontology (e.g., the study of plant and animal fossils)	.38 ^a	1.45 ^b	1.30 ^b	.61 ^a	26.69	<.001	.277
Geography	.73 ^a	1.49 ^b	1.28 ^b	.81 ^a	14.2	<.001	.206
Astronomy (e.g., stars, planets)	.61 ^a	1.27 ^{bc}	1.53 ^c	.81 ^{ab}	19.77	<.001	.241
River/Stream/Water Ecology	.71 ^a	1.53 ^b	1.38 ^b	.83 ^a	18.78	<.001	.236
Technology	.41 ^a	1.11 ^b	.71 ^{ab}	.52 ^a	8.22	<.001	.159
Physical Sciences (e.g., physics, chemistry)	.27 ^a	.87 ^b	.71 ^b	.43 ^{ab}	7.18	<.001	.148
Geology (e.g., rocks, minerals)	.82 ^a	1.56 ^b	1.30 ^{bc}	1.01 ^{ac}	11.19	<.001	.184
Agriculture/Gardening	.96 ^a	1.59 ^b	1.21 ^{ab}	1.06 ^a	6.89	<.001	.145
Meteorology (e.g., weather, atmosphere)	.59 ^a	1.29 ^b	1.07 ^b	.64 ^a	11.41	<.001	.186
Career Opportunities in Science	.75 ^a	1.26 ^b	1.11 ^b	.65 ^a	5.75	.001	.133

¹Item response scale range: -3 (extremely uninterested) to 3 (extremely interested).

²Means with different superscripts across each row are statistically different at $p < .05$ using Dunnett's T3 post-hoc tests.

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III. TARGETED AGENCY EDUCATION INITIATIVES IN RAPID CITY AND SPEARFISH, SOUTH DAKOTA: FACTORS ASSOCIATED WITH TEACHERS' USE OF ENVIRONMENTAL EDUCATION

Summary

While a large body of research has focused on the general barriers or constraints teachers must overcome to integrate environmental education (EE) into the classroom, this study aims to identify the specific program preferences and barriers for a group of teachers in Rapid City and Spearfish, South Dakota. A case study approach examines the barriers to both integrating EE into classrooms and incorporating programs taught by informal EE providers into curriculum. Focus group discussions provide valuable insight into how a local wildlife agency could most effectively target education efforts in order to overcome barriers and adapt programming for both students and teachers at a new education center in Rapid City, South Dakota. In addition, given that the majority of EE professional development opportunities for teachers are currently provided by wildlife agencies, this study identifies opportunities for improvement in the focus and design of professional development and teacher trainings. Results of focus group discussion provide recommendations for the design and marketing of school-based EE programs for Rapid City area teachers.

Key words: environmental education, teacher, barriers to participation, professional development, teacher training, program design

Introduction

In a time when issues such as global climate change and an increased frequency and severity of natural disasters have gained significant attention, the need for the development and empowerment of an environmentally responsible generation, capable of making informed decisions and positive actions, seems ever more crucial. At the same time, however, a culture of fear keeps people indoors, technology and the virtual world reign supreme, and modern trends in education “seek to standardize the experience of students from diverse geographical and cultural places so that they may compete in the global economy,” all of which has inevitably resulted in a disconnect between human livelihoods and the natural world (Gruenewald, 2003, p. 7). Research has shown that the resulting disconnect between humans and nature has significant implications for health, physical and emotional development, academic achievement and the development of future stewards of the natural world (Burdette & Whitaker 2005; Taylor & Kuo 2006; Chawla 1988, 1998, 1999; Wells & Lekies 2006).

In addition, a growing emphasis on accountability, state curriculum standards, and testing in formal education has serious implications for informal environmental education (EE) providers such as nature centers, museums, zoos and wildlife agencies. In many schools, the accountability emphasis has led to teaching subjects in isolation, a textbook-oriented curriculum and a tendency to abandon programs viewed as extra, despite the valuable learning opportunities they may provide (Franklin, 2004). Given that teachers and students are a key audience for informal EE providers, it is concerning that these demands have resulted in program revision and a decreased demand for field trips and classroom-based EE presentations (Ernst, 2007b). With this in mind, local and state wildlife agencies have an opportunity to address what Louv (2005) describes as “nature deficit disorder,” through effective targeting of education initiatives, especially strategies for addressing the barriers teachers must overcome to integrate EE into the classroom and to get students outside. While a large body of research has focused on the general barriers or constraints teachers must overcome to integrate EE into the classroom, the following study aims to identify the specific program preferences and barriers for a group of teachers in Rapid City and Spearfish, South Dakota.

Benefits of Environmental Education

Structured nature-based learning opportunities in both informal settings and the classroom demonstrate significant benefits with regard to academic achievement. Environmental education programs at science and nature centers, museums, zoos, and botanical gardens, often referred to as Informal Science Education (ISE) programs, emphasize cooperative learning, critical thinking and discussion, hands-on activities and a focus on action strategies with real world applications (Falk, 2001). ISE is typically characterized as learner-motivated, guided by learner interests, voluntary, personal, contextually relevant, and collaborative (Griffin, 1998). These experiences are believed to encourage inquiry, enjoyment and a sense that science learning can be personally relevant and rewarding. In addition, participants in ISE programs tend to be more diverse, including learners from a variety of ages, cultures and socioeconomic backgrounds (Bell, Lewenstein, Shouse & Feder, 2009).

Meanwhile, traditional school-based EE can be defined as programs and approaches aimed to foster environmental literacy, which usually supplement existing courses or lessons. Teachers often rely on programs and materials developed and/or delivered by informal EE providers such as field trips, field investigations, classroom presentations delivered by environmental educators, and supplemental activities from EE curriculum guides (Ernst, 2007b). In classroom settings, research shows that the use of interdisciplinary environmental education results in higher performance on standardized tests and in classroom activities (Glenn, 2000). Students in schools that utilize the environment as an integrating context (EIC) in their curriculum performed at higher levels in math, science, language arts, and social studies than schools using standard curriculum. In addition, levels of student and teacher engagement, enthusiasm and interest are reportedly higher in classrooms that used EIC in their curriculum (Lieberman & Hoody, 1998).

Although a recent study found that EE programs focused primarily on the provision of knowledge do not necessary lead to stewardship action (Hungerford & Volk, 1990), there is hope that the combination of knowledge and a connection to the natural world will have strong implications for the development and empowerment of an environmentally responsible generation, capable of making informed decisions and positive actions.

Barriers to Participation in Nature-based Programs

The positive impacts on health, physical and emotional development, and academic achievement that come from EE opportunities are critical for all children, from rural communities to urban and suburban neighborhoods. Unfortunately, there are a number of barriers that limit participation in ISE programs and discourage formal educators from integrating nature and EE content into curriculum. A review of the literature presents significant barriers to participation in nature-based programs for formal educators. Early research by Ham and Sewing (1988) identified four major categories of barriers for educators, which are continually supported in recent literature: conceptual, logistical, educational and attitudinal.

Conceptual barriers.

As the field of EE has grown, there has been a lack of agreement with regard to the definition of EE, its purpose and focus. While a focus on science within EE has played a significant role in the success of current programs, this emphasis limits both integration of EE into other aspects of curriculum and opportunities to teach value and respect for the environment (Ham & Sewing, 1988). This conceptual barrier is strengthened by findings that the majority of teacher training in EE falls within the scope of science (Wade, 1996).

Safety concerns are also an important barrier to the implementation of EE in formal education. A study conducted by Simmons (1998) explained teacher reported fears related to getting lost and encountering dangerous animals or plants in natural settings. In addition, teachers in this study also demonstrated strong opinions with regard to the appropriateness of certain outdoor settings, such as urban parks, as learning environments.

Logistical barriers.

Logistical barriers tend to be the most visible challenges to incorporating EE into the classroom. Strong evidence in the literature demonstrates that time constraints are considerable for educators. Limited instructional time with students, lack of planning time and ultimately, a curriculum crowded with educational standards were cited as challenges (Ham & Sewing 1988; Christenson, 2004). Teachers often feel pressure to meet both school district benchmarks and statewide proficiency testing requirements. In addition, many educators express frustrations with a lack of environmental education materials and the

narrow focus of most materials within the realm of science (Ham & Sewing, 1988; Benetti & Marcelo de Carvalho, 2002).

While teachers struggle to integrate EE into their classrooms, they also face a number of challenges in taking their students out of the classroom for field trips. Transportation and program costs are huge limiting factors, which are often influenced more by school district funding than by teachers themselves (Mayeno, 2000; Ham & Sewing, 1988). In addition, teachers often feel a lack of support from school administration and colleagues, which can stifle their resolve to get kids out of the classroom for EE-related activities (Benetti & Marcelo de Carvalho, 2002).

Educational barriers.

Although numerous studies support the positive educational benefits and relevance of integrating EE into formal education (Lieberman & Hoody, 1998; Glenn, 2000), many teachers express concerns regarding a lack of both content and pedagogical knowledge, training and confidence needed to effectively utilize EE (Simmons, 1998, Kim & Fortner, 2006). Professional development can play a significant role in influencing teaching practice and classroom culture (Supovitz & Turner, 2000). Studies of pre-service teacher training programs show limited EE content instruction and a narrow focus, often placing EE within science methods courses (Ernst, 2007a). Supporting evidence for a lack of content knowledge, studies of pre-service teachers show a general lack of knowledge of environmental issues (Campbell, Medina-Jerez, Erdogan, & Zhang, 2010).

In addition, there are limits on professional development for in-service teachers. Recent studies supporting conceptual barriers, found that teacher trainings in EE are primarily conducted by state natural resource agencies, not education agencies, and are often focused more on science than on the interdisciplinary use of the environment across the curriculum (Simmons, 1998). Teachers also express a lack of awareness of both available training in EE and local EE programs that might provide field trip opportunities and instructional support (Mayeno, 2000; Ham & Sewing, 1988).

Attitudinal barriers.

Although teachers generally demonstrate positive attitudes towards EE, many lack the commitment to teach EE (Ham & Sewing, 1988). While the logistical and educational barriers are certainly deterring, studies show that teachers are often more motivated to overcome these barriers and utilize EE

based upon their own personal interest in environmental issues. In fact, Shuman and Ham (1997) suggest that teachers' commitment to including EE could be influenced by their own significant life experiences, such as time spent in the natural world. In addition, teachers are sometimes hesitant to tackle value laden and complex environmental issues (Kim & Fortner, 2006). One study found that teachers were concerned about developmentally appropriate topics and wanted to avoid controversial issues in order to prevent conflict with school administrators, parents, or the larger community (Christenson, 2004).

With these barriers to participation in mind, a recent study identified three influences on teachers' decisions and abilities to implement traditional school-based EE: knowledge of ecological concepts and environmental issues, personal interest in nature and comfort in the outdoors, and grade level or subject area taught (Ernst, 2007b). Findings of this study suggest the potential for taking different approaches to program marketing and professional development for those educators currently implementing EE and those who are not implementing EE into their curriculum.

Study Purpose

While a large body of research has focused on the general barriers or constraints teachers must overcome to integrate EE into the classroom, this study aims to identify the specific program preferences and barriers for a group of teachers in Rapid City and Spearfish, South Dakota. A case study approach seeks to understand the barriers to both integrating EE into classrooms and incorporating programs taught by informal EE providers into curriculum. Focus group discussions provide valuable insight into how a wildlife agency could most effectively target education efforts in order to overcome barriers and adapt programming for both students and teachers at a new Outdoor Campus in Rapid City, South Dakota. In addition, given that the majority of EE professional development opportunities for teachers are currently provided by wildlife agencies, this study seeks to identify opportunities for improvement in the focus of professional development and teacher trainings. Ultimately, the aim of this research is to provide recommendations for the design of a series of small-scale pilot programs, which will be evaluated based on their potential for appealing to diverse audiences and connecting children and families to nature.

Methods

Sampling Approach

A case study approach, as defined by Creswell (2007), was used to explore current teacher efforts to integrate nature education into their classrooms, barriers that they face, and their preferences for programming opportunities. Our agency partner, South Dakota Game, Fish, & Parks, identified this specific population due to interest in targeting this audience for future programs offered at a new Outdoor Campus in Rapid City. Data were collected via focus group discussions with 12 educators from the greater Rapid City and Spearfish school districts and local pre-school programs. Participants were recruited through flyers and personal interactions with agency education staff. As an incentive to participate, teachers attending the focus groups were provided with food and a monetary reward.

Two one-hour focus groups were conducted: one with teachers from Spearfish and Belle Fourche and one with teachers from Rapid City. Discussions were facilitated by a researcher and supported by a note-taker. Based on the purpose of the research, four open-ended questions were developed (Table 3.1). Focus group discussions were recorded with permission from participants and transcribed. It should be noted that the focus group methodology is qualitative and exploratory in nature. Focus group results provide an overall understanding of the level of interest in EE from the point of view of the participants, outline the barriers that participants face, and describe the ideal student and professional development program.

Table 3.1 about here

Analysis Strategy

Open-ended questions. Analysis of the focus group discussion followed a two-step process of open and axial coding for each of four discussion questions (Table 3.1). In open coding, the researchers read the transcripts and organized participants' responses based on major themes grounded in the data. For example, the demands of state standards were repeatedly identified as a constraint or barrier for teachers. Therefore, segments of transcriptions that alluded to this theme were coded as "State Standards". In axial coding, the researchers organized and categorized themes into more abstract concepts. For example, barriers related to state standards, scheduling, and testing were combined under the larger category of "Time"; a process referred to in qualitative research as subsuming particulars into general themes (Miles &

Huberman, 1994). Finally, open-ended responses and themes are used to develop recommendations for program design and implementation. Multiple researchers independently coded transcripts to verify accurate coding and preliminary findings were sent to selected focus group participants for member checking to ensure the credibility and integrity of results.

Results

Key Findings from Focus Group Discussions

Analysis of focus group transcripts was naturally divided into four categories based upon the open-ended questions: a) Interest in utilizing EE, b) barriers to participation in nature-based programs, c) program preferences, and d) professional development. Main themes in each of these categories are demonstrated by quotes drawn from each of the focus groups (SF=Spearfish; RC=Rapid City).

Strong Teacher Interest in EE.

Participants in both focus groups expressed a strong interest in integrating science and nature into the student learning experience for a number of reasons: support for curriculum and completion of state educational standards, facilitation of student learning, and a focus on local issues.

Supports curriculum and meets standards.

Given that the recent accountability movement puts pressure on teachers to meet state standard requirements, a common theme throughout discussions was how EE programs can both meet state standards and be incorporated to enhance lessons already being taught. A number of comments focused on state standards, particularly in science.

SF: "...it goes with our science standards..."

SF: "...it's wonderful to have those presentations in our room and those programs at places where we can take kids to support that curriculum."

RC: "So I really think that there are a lot of ways that what goes on out at that outdoor campus could probably help out with what I am doing and correlate with it."

Facilitates students' learning.

Across both focus groups teachers expressed interest in utilizing nature and science in their teaching because of the engaging and hands-on activities characteristic of EE programs, which keep students interested. A number of teachers mentioned the knowledge gained through these activities as well.

SF: "I think we are at the point where we use nature and the outdoors to generate interest in school subjects."

SF: “The kids are very engaged and they learn a lot and it shows what they know.”

RC: “...wonderful activities for the kids and the hands-on things...”

Focus on local issues.

In both focus groups, teachers expressed an interest in utilizing science and nature in their teaching because it provides a connection to local issues, particularly those related to wildlife.

SF: “.how rare kids know about the different animals that you can find around here or like the mountain lion, what happens when you come across a mountain lion...”

RC: “...there are some pretty hot local issues with deer populations, mountain lion populations...so there are things that they hear about and it’s in the news a lot, so even though we are in kind of an urban area, there are a lot of wild areas around here and they relate to that stuff.”

Barriers to participation in nature-based programs.

Educators from both Spearfish and Rapid City universally expressed the following practical barriers (Bruyere et al., 2010) as limiting factors for integrating more nature and science in their lessons and attending programs at the new Outdoor Center: time (due in part to State Educational Standard requirements), funds (for field trips), and transportation (specifically the cost of busing). Many educators expressed concern with regard to losing classroom visits from SD Game, Fish and Parks staff.

Time.

Time was identified and discussed in both focus groups with particular emphasis on the demands of state education standards. Teachers expressed a need to focus on subjects and content that will be tested, which limits the amount of time available for implementing EE.

RC: “Time.”

RC: “I was going to say standards, the things we need to cover, the standards. Time would probably cover that.”

SF: “ we have so many more demands as far as testing and meeting state standards anymore...it seems like I need to focus more on reading and math because that is what our standards are saying.”

SF: “Scheduling.”

Cost.

Cost was mentioned in both focus groups with particular reference to nature-based field trip programs. Some mention was made with regard to the cost of the programs or entrance fees for a facility, but the greatest amount of discussion focused on the cost of getting the kids to and from the field trip

location.

RC: "I've got about \$600 in my budget to play with for the year and that's for printing and almost everything you do...you can't afford to spend half of that in one afternoon."

RC: "It's almost cost prohibitive to go places unless you can get the kids and the parents to pay for it and you can't do that all the time."

SF: "The cost to get in. Like we don't go to the wildlife sanctuary because it's expensive."

SF: "Money is a big one."

Transportation.

With regard to cost, transportation seemed to be a universal concern across both focus groups. The cost of busing was a recurring emphasis in the discussion of barriers to participation in nature-based programs.

RC: "I think that...a real obstacle to overcome in having the kids learn is transportation."

RC: "...just the cost of putting kids on a bus, cause you pay for that out of a very small classroom budget and you can spend half your budget for the year just taking your kids somewhere for half a day."

RC: "...that is a transportation thing again. You can't afford to spend a half an hour getting there and a half an hour getting back and \$300 just to spend an hour there. You'd have to spend at least a half a day just to make it worth your while.

RC: "...the thing would be to have them have a bus, you know that they could come and get the kids."

SF: "I am thinking that busing for us is going to be an issue."

SF: "We take all fourth grade students to Pierre, our state capitol every year and just the charter bus for the day trip last year was \$950 ...and that's two classes per bus."

SF: "One concern that I have...if we are talking the outdoor campus in Rapid and Spearfish goes and Belle Fourche goes...we aren't going to be the only schools to use it. We are looking at a few months there for transportation and so forth and it could be a little congested."

Loss of classroom visits.

With the above practical barriers in mind, many of the educators in both focus groups expressed concern with regard to the new Outdoor Center and its potential impact upon classroom visits from South Dakota Game, Fish and Parks staff. Many of the teachers described positive experiences with classroom visits in previous years and how these visits helped them to overcome the practical barriers to implement EE. In addition, a number of teachers had concerns with regard to supplies and materials. Many requested

that the agency provide some kits or materials that teachers might use in the classroom if visits from agency staff were limited.

SF: "So if this facility is in Rapid, you are looking at maybe we can visit it once during the school year, not multiple times."

RC: "Lori (South Dakota Game, Fish & Parks staff) coming in, it triggers ideas that I can do maybe with some other things..."

SF: "...if we can't have her (South Dakota Game, Fish & Parks staff) and we can't go there, then can there be a check-out system so we can get some of those materials?"

RC: "I think that with this site, we are going to lose our availability with Lori coming, so that worries me. And the other choice is to go out there and I just don't know how often we can do that."

RC: "It would be really nice to have all those observational tools..."

Ideal program descriptions.

In order to determine teachers' perspectives about how they could best utilize the new Outdoor Center, educators in each focus groups were asked to describe the ideal program to meet their needs.

Student programs.

Focus group participants painted an ideal picture of how the new Outdoor Center could be used for student learning. For Spearfish educators, this consisted of a full-day field trip that included inquiry-based activities in which students used observation and data collection skills about a scientific topic. For Rapid City educators, the ideal consisted of a half-day program or a full-day program split between teacher-led activities and active, hands-on programming facilitated by agency staff. Further, their ideal lesson would incorporate language arts and math.

SF: "Hands-on stuff and somebody who knows what they are talking about to work with the kids."

SF: "A place to have lunch so you don't have to get back in the bus, go somewhere and then come back."

SF: "A plan B if it's raining."

SF: "It would be nice if it included some of the FOSS kits (science curriculum) that we do."

SF: "A diversity of centers or stations."

RC: "To me it looks like a variety of things, indoor and outdoor...getting the kids outside and actively engaged in various types of activities where you've got Game, Fish and Parks personnel to help lead, but the teacher is actively involved too along with the kids."

RC: "Possible a writing area, a reading area...a science. Basically a hands-on activities area for science and possible tying in some of the domains of education."

RC: "...a lot of times you have to be able to prove to your administrator that this ties in with the standard that you are responsible for. So the more they can do, for whatever programming they have to be able to specify what state standards it deals with. That is going to help teachers to justify bringing kids out there."

RC: If it were to be a full day, it could be more interdisciplinary. So maybe activities first, have lunch, then go on a walk. "

Professional development programs.

Educators from both sites expressed strong interest in professional development opportunities related to both content about nature and science, as well as instructional strategies for teaching those topics. An expressed ideal format for professional development would be at the new Outdoor Center during the summer months and would provide credit at a reasonable cost.

SF: "Nature and science, that intrigues me. So if there is a summer activity in Rapid, whether I get credit and whether my principal approves it or not, I am probably still going to want to go. I am more apt to go in the summer time than I am to go on a busy Saturday right now."

SF: "Even if they aren't science gurus or whatever, if it's hands-on and its motivating, Then with credit to boot.."

RC: "I think some teachers are just not familiar enough with some things, they hesitate, they don't have the background knowledge. So some classes that are mostly background knowledge, but some classes that are more...how do you apply that and transfer that knowledge to the kids. So probably both kinds of classes would be good."

RC: "I think that there is going to be interest in the topic wildlife and resources, and then having a great facility to pull people into and then if you can have some sort of professional development that is available at a nice place, that is close by and there is credit at a reasonable cost, I think that there would be a lot of interest."

Discussion

While EE providers know well the value of their educational programs for formal education, the reality of today's standards-based movement often discourages teachers from overcoming practical barriers to take advantage of these programs and resources. Understanding the practical barriers and program needs that teachers face can provide insight for staff at the new Rapid City Outdoor Campus on how to ensure that teachers utilize their resources, in spite of barriers, and that their programs reach local students.

Overall, the practical barriers to implementation of EE identified by focus group participants were consistent with previous literature on barriers to EE (Franklin, 2004; Ham & Sewing, 1988; Ernst, 2007b). While time (due in part to State Educational Standard requirements), cost (for field trips), and

transportation (specifically the cost of busing) were described as significant barriers, most of the focus group teachers described some current implementation of EE. The fact that most of these teachers were currently implementing some form of EE, despite a range of grade levels and subjects taught, supports previous research suggesting that addressing barriers is more essential when targeting teachers who do not use EE than when working with teachers who have, in many ways, already overcome these barriers and are currently implementing EE (Ernst, 2007b). For instance, many of the focus group participants described overcoming the barriers of lack of funding and transportation costs by bringing programs to their school. This finding has significant implications for both program marketing and potential program design at the new Outdoor Campus in Rapid City.

Participants in both focus groups universally expressed a strong interest in integrating science and nature into the student learning experience and many described their current EE efforts. In fact, most, if not all, of the focus group participants were currently implementing some sort of traditional school-based EE and expressed some personal interest in the environment. While teachers who are personally active in the outdoors or involved in environmental issues may be more inclined to feel EE programs are worth the effort to overcome barriers, as demonstrated by the focus group participants, South Dakota Game, Fish and Parks has an opportunity to reach a critical audience of teachers and students who are not predisposed to appreciate EE programs. Given that teachers often view EE as most relevant to science curriculum (Simmons, 1993), but the focus of state standards are often in the areas of reading and math, there is a need and opportunity for targeting teachers from a wide range of subject areas and for highlighting the interdisciplinary aspects of EE programs. Many teachers would be more likely to implement EE in their classrooms and bring students out to learning centers if they understood the relevance of EE to a range of subject areas. Therefore, trainings must adapt to provide more interdisciplinary content in order to make EE more versatile and focus on improving teacher confidence in both content and pedagogical EE knowledge.

With this in mind, professional development opportunities could engage teachers both new to and experienced in implementing EE in the classroom and at the Outdoor Campus. In order to provide meaningful experiences in nature for students, educators need quality experiences themselves from which to draw. An informal learning center, such as the Outdoor Campus is well positioned to help teachers gain experience and comfort in nature and to provide them with both content knowledge and pedagogical skills.

In fact, teachers in both focus groups expressed interest in professional development opportunities at the new Outdoor Campus, which would provide credits and be held during the summer. These professional development programs could focus on overcoming barriers for teachers new to EE and supporting the positive work of teachers already implementing EE.

In addition, the Outdoor Campus staff could make great advances in overcoming barriers and recruiting new teachers by providing in-school programs, thereby eliminating transportation issues. While the new Outdoor Campus will surely provide field trip opportunities, in-school programming will not only introduce teachers to EE concepts and teaching techniques, but may provide a model and inspiration for further implementation of EE. In the end, adapting to the needs of teachers will ultimately improve the EE experiences of students and will contribute to reconnecting children with nature.

Pilot Program Recommendations

As part of a larger project, the aim of this research is to provide recommendations for the design of pilot programs at the new Outdoor Campus in Rapid City, which will be evaluated based on their potential for appealing to diverse audiences and connecting children to nature. In order to reach the students of the Rapid City area, South Dakota Game, Fish and Parks programs must address the barriers and the needs of teachers. The following pilot program recommendations are based upon focus group discussions:

1. Develop a half or full day hands-on program in which students complete inquiry or investigate a question while addressing South Dakota state educational standards in reading, writing, math and science.
2. Address barriers by providing subsidized transportation for pilot program classrooms.

When asked to describe an ideal program, teachers from both focus groups expressed the need for a half or full day experience in order to make the travel time and transportation costs worthwhile. In addition, teachers from both groups expressed an interest in developing a hands-on, interdisciplinary program that would meet state standards and complement their lessons. In addition, teachers from both groups were excited about the use of scientific tools and the opportunity for their students to learn outdoors particularly through some sort of small group stations. Many of the teachers seemed interested in a day split between agency-led and teacher-led activities and some were particularly concerned with having a contingency plan in case of inclement weather.

While ideal program descriptions varied slightly across the focus groups, barriers to participation

were universal amongst all of the teachers. Though time limitations due to standard requirements and field trip costs were mentioned, the barrier that seemed most insurmountable for both groups of teachers was the cost of transportation. With this in mind, researchers suggest providing subsidized transportation for pilot program classrooms. While this is not necessarily a permanent or sustainable solution, addressing this barrier could have significant impacts for the implementation of EE in Rapid City area schools. Further research could address the transportation issue and potential alternatives, such as in-school programs. Many of the educators expressed concerns regarding the loss of current in-school programs due to a potential push for on-site programs at the new Outdoor Campus. South Dakota Game, Fish and Parks representatives may need to consider the cost and benefits of doing programs in Spearfish and Rapid City schools.

Study Limitations and Need for Future Research

While the findings of this study are extremely important for the development of school programs at the new Outdoor Campus in Rapid City, there are some limitations inherent in the study design. Due to the recruitment methods utilized to bring teachers to the focus group sessions, certain limitations may exist with regard to generalizing findings for all teachers in the Rapid City and Spearfish school districts. Given that participants were recruited through flyers and personal interactions with agency education staff, it is not surprising that most, if not all, teacher participants were currently implementing some form of school-based EE. With this in mind, findings of this study can certainly be generalized to teachers utilizing EE, but future research is needed to determine the barriers and needs of teachers who do not currently use any form of EE in their classroom. Further research investigating teachers who do not use any form of EE could also provide more conclusive recommendations for professional development programs.

Overall, this study was conducted specifically with teachers from the Spearfish and Rapid City area school districts. The ability to generalize from these results is limited to teachers within this region of the country. While the study could give other nature-based education program providers a place from which to assess their own outreach and education for teachers, it should be recognized as capturing the perspectives of a particular group in a particular place at a specific point in time.

Table 3.1.
Teacher Focus Group Questions

Question

Describe overall what your interest is in program and lessons about nature and wildlife for the students that you teach.

Describe what if anything keeps you from doing everything that you would like to do as far as teaching about nature and wildlife.

Describe what the ideal program or field trip at the new Outdoor Center would look like.

Do you see a demand among yourselves or among your colleagues for professional development programs for formal educators provided by the new Outdoor Center? If so, what kinds of skills or knowledge would that professional development include?

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IV. Conclusions

In an effort to enhance the reach and effectiveness of wildlife agencies in connecting children to nature, this thesis addressed a gap in the literature by applying the wildlife value orientation concept to address barriers to participation and program preferences for both teachers and families. Barriers to nature-based program participation have been extensively researched and applied in the context of informing program design for diverse ethnic and socio-demographic audiences (Allison & Hibbler, 2004; Borden, Perkins, Carleton-Hug, Stone & Keith, 2006; Bruyere, Billingsley, & O'Day, 2008; Bruyere, Gobbs-Hill & Paulding, 2010; Hong & Anderson, 2006). Meanwhile, research on the wildlife value orientation concept has revealed variation in how different audiences relate to wildlife and how an understanding of these differences can inform wildlife conservation and decision-making (Manfredo, Teel & Henry, 2009; Teel & Manfredo, 2009). However, the value orientation concept has not been widely applied in the context of developing targeted nature-based education programs, which address barriers to participation. Therefore, this study was guided by the following research question: *how can wildlife agencies integrate WVOs, barriers to participation and program topic preferences to target education initiatives?*

In order to address this question, the researchers conducted focused case studies of potential participants of two new state wildlife agency education centers in South Dakota and Montana. The results are presented in two journal articles: a quantitative article focused on identifying the relationship between WVOs, barriers to participation and program topic preferences for families and a qualitative article focused on identifying program preferences and barriers to participation for teachers' use of EE. Ultimately, the aim of this research was to provide recommendations for the South Dakota and Montana wildlife agencies on how to target education initiatives to reach diverse audiences at the new education centers.

Summary of Findings

The primary purpose of the study detailed in Chapter II was to explore how information about WVOs, barriers to participation in nature-based programs and program topic preferences might be integrated to improve targeting of wildlife agency education initiatives for children and families. Data were collected via a mail survey administered to residents of Helena, Montana and potential program participants

at a new agency education center. Results indicated that there are significant differences in both barriers to participation and program topic preferences across WVO types. Although significantly different, limited barriers to participation were found for the relatively homogenous population surveyed. Further research is needed to determine if findings can be applied to other populations and geographic locations.

The study detailed in Chapter III used a qualitative approach to examine the barriers to participation and program preferences of teachers. While a large body of research has focused on the general barriers or constraints teachers must overcome to integrate environmental education into the classroom, this study identified the specific program preferences and barriers for a group of teachers in Rapid City and Spearfish, South Dakota. Results indicated that the practical barriers to implementation of EE identified by focus group participants were consistent with previous literature on barriers to EE (Franklin, 2004; Ham & Sewing, 1988; Ernst, 2007b). Notably, time (due in part to State Educational Standard requirements), cost (for field trips), and transportation (specifically the cost of busing) were described as the most significant barriers. Given these stated barriers and discussions regarding program preferences for both student programs and professional development, researchers developed a list of recommendations for the design and marketing of school-based EE programs for Rapid City area teachers. With regard to future research, given that the majority of focus group teachers were currently conducting some form of traditional school-based EE, further research investigating the barriers and needs of teachers who do not use any form of EE could provide more conclusive recommendations for programs.

Reflections

Although the movement to connect children to nature is developing a national and international presence, there is little question that a myriad of barriers continue to limit the participation of both families and formal educators in nature-based programs. Despite great efforts, the significant societal factors, such as urbanization, population growth and increasing dependence on technology, which contribute to the deficit, remain. Given the significant implications of a connection to nature for health, physical and emotional development, academic achievement and the development of future stewards (Burdette & Whitaker 2005; Taylor & Kuo 2006; Chawla 1988, 1998, 1999; Wells & Lekies 2006), I, as an environmental educator am frightened by the issues that will face society if children continue to expand their distance from the natural world.

While this fear for the future could be disheartening, the opportunity to address the human-nature disconnect through my graduate research has given me hope that there are ways to address barriers and to engage individuals from all walks of life in nature-based programs. With a particular emphasis on addressing barriers to participation for diverse audiences, this research process has opened my eyes to a much wider view of what constitutes diversity. Coming from an urban background and having experience teaching nature-based programs in nature centers and science schools across the country, I had a very stereotypical concept of diversity. Before conducting this research, I would never have categorized majority Caucasian, utilitarian hunters and fishermen from Montana or South Dakota as diverse. However, examining program barriers and preferences from the lens of WVOs presented a new perspective on diversity. In general, based upon my experiences, I suppose that the majority of individuals with which I have interacted in a nature-based program setting have held a mutualism value orientation. With this in mind, utilizing the wildlife value orientation concept has given me a perspective of diversity that transcends ethnic or socio-demographic characteristics. In the future, I hope to use this perspective to reach out to individuals based upon their values and interests, adapting my teaching and presentations to address the perspectives of my audience rather than their ethnic or socio-demographic characteristics. Ultimately, I hope to work specifically with individuals in the distanced value type because this is where I see the greatest need and opportunity to make a difference.

In addition to this change in perspective, my research experience has allowed me to see the impact that Human Dimensions research can have on a practical scale. I have often thought about the challenges that researchers face in communicating their findings to practitioners and the public in order to make a difference with their research. The opportunity to take a case study approach, to combine quantitative and qualitative methods, and to work with a specific state wildlife agency toward the development of real programs that will reach children and families enabled me to make a difference with my research. With this in mind, although my future most likely entails teaching at an informal science education center, the skills that I have gained with regard to Human Dimensions research will surely have an impact on the individuals and organizations with which I work.

Ultimately, this thesis is part of a broader project conducting similar assessments in collaboration with state wildlife agencies across the United States. Continuation of this project will include further

examination of the relationships between WVOs, barriers to participation in nature-based programs and program topic preferences for both families and teachers. These assessments, combined with parent and teacher focus group data will inform the design of a series of small-scale pilot programs, which will be evaluated based on their potential for appealing to diverse audiences and connecting children and families to nature.

Overall, the most dynamic engines moving the children in nature movement forward have been community-based, regional and state campaigns. With this in mind, future research should assist wildlife agencies in providing both families and teachers from diverse backgrounds with access to targeted nature-based experiences and educational programs designed to combat the growing disconnect between humans and nature.

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Nature Survey for Helena’s Youth and Families

Montana Fish, Wildlife & Parks, in cooperation with Colorado State University, is interested in your thoughts about your family’s interest in programs designed to get children and families outdoors and better connected to nature. Information from this survey will be used to help shape the direction of programs at the Montana Outdoor Discovery Center in the Helena area. Please answer the following questions to the best of your ability.

1. To what extent do you believe your child/children are interested in nature? **(Circle one number)**

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

2. To what extent are you as a parent interested in having your child/children learn about nature? **(Circle one number)**

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

3. Please indicate your level of agreement with the following statements about children spending time outdoors in nature. **(Circle one number per statement)**

	<i>Strongly Disagree</i>			<i>Neither</i>			<i>Strongly Agree</i>
Spending time in nature is important to children’s physical health.	1	2	3	4	5	6	7
Spending time in nature is important to children’s performance in school.	1	2	3	4	5	6	7
Spending time in nature is important to children’s mental health.	1	2	3	4	5	6	7
Spending time in nature is important for children’s creativity.	1	2	3	4	5	6	7
Spending time in nature is important for fostering children’s awareness of the need to conserve our natural resources.	1	2	3	4	5	6	7

4. While your responses to the following questions may differ depending on specific circumstances, please respond based on your *general* opinion. Please note that this survey refers to programs in the community such as those that occur at parks, zoos and science or nature education centers. **(Circle one number per statement)**

	<i>Strongly Disagree</i>			<i>Neither</i>			<i>Strongly Agree</i>
IN THE PAST YEAR, my family has spent a significant amount of time in nature.	1	2	3	4	5	6	7

	<i>Strongly Disagree</i>			<i>Neither</i>			<i>Strongly Agree</i>	
In the past year, my family participated in one or more community programs about nature.	1	2	3	4	5	6	7	
My family is too busy to participate in programs about nature.	1	2	3	4	5	6	7	
The cost of programs about nature is usually not a problem for my family.	1	2	3	4	5	6	7	
Transportation to programs about nature is difficult for my family.	1	2	3	4	5	6	7	
Participation in programs about nature is safe.	1	2	3	4	5	6	7	
I am uneasy having my child in a program where I do not know the staff.	1	2	3	4	5	6	7	
I am unaware about programs about nature in my community.	1	2	3	4	5	6	7	
I am comfortable having my child at a program about nature without me there.	1	2	3	4	5	6	7	
Montana Fish, Wildlife & Parks is a trustworthy source for programs about nature.	1	2	3	4	5	6	7	
I intend for my family to attend a program about nature in the next 6 months.	1	2	3	4	5	6	7	

5. Please respond based on how the following would *generally* influence the likelihood of your child/children or family participating in a community program about nature. **(Circle one number per statement)**

	<i>Much less likely to participate</i>			<i>No effect</i>			<i>Much more likely to participate</i>	
Programs that occur on weekends.	1	2	3	4	5	6	7	
Programs in which the whole family attends.	1	2	3	4	5	6	7	
Programs designed for preschool-aged children.	1	2	3	4	5	6	7	
After-school programs.	1	2	3	4	5	6	7	
Programs that occur near my neighborhood.	1	2	3	4	5	6	7	
Programs that expose my children to future career opportunities.	1	2	3	4	5	6	7	
Programs that occur when school is out of session during the school year (e.g., on teacher workdays).	1	2	3	4	5	6	7	
Programs that occur during the summer (e.g., a summer day camp).	1	2	3	4	5	6	7	

6. Thinking about possible options for community programs about nature, please indicate the extent to which the following topics would be of interest to your family. **(Circle one number per topic)**

	<i>Not at all</i>						<i>Extremely</i>
	<i>Interested</i>						<i>Interested</i>
A. Fish and Wildlife	1	2	3	4	5	6	7
B. Habitat for Fish and Wildlife	1	2	3	4	5	6	7
C. Insects	1	2	3	4	5	6	7
D. Forests/Trees/Plants	1	2	3	4	5	6	7
E. Water Resources (e.g., lakes, rivers, streams)	1	2	3	4	5	6	7
F. Fishing	1	2	3	4	5	6	7
G. Hunting	1	2	3	4	5	6	7
H. Non-Fishing/Hunting Outdoor Recreation Activities (e.g., hiking, wildlife viewing)	1	2	3	4	5	6	7
I. Outdoor Skills	1	2	3	4	5	6	7
J. Restoration (e.g., restoring natural habitats)	1	2	3	4	5	6	7
K. Anthropology (e.g., the study of human beings, cultures)	1	2	3	4	5	6	7
L. Paleontology (e.g., the study of plant and animal fossils)	1	2	3	4	5	6	7
M. Geography	1	2	3	4	5	6	7
N. Astronomy (e.g., stars, planets)	1	2	3	4	5	6	7
O. River/Stream/Water Ecology	1	2	3	4	5	6	7
P. Technology	1	2	3	4	5	6	7
Q. Physical Sciences (e.g., physics, chemistry)	1	2	3	4	5	6	7
R. Geology (e.g., rocks, minerals)	1	2	3	4	5	6	7
S. Agriculture/Gardening	1	2	3	4	5	6	7
T. Meteorology (e.g., weather, atmosphere)	1	2	3	4	5	6	7
U. Career Opportunities in Science	1	2	3	4	5	6	7
V. Other (please specify):	1	2	3	4	5	6	7

7. For topics A through V in question 6, what are the top 3 topics you think your family would be most interested in? **(write one letter in each space below)**

Topic 1: _____ Topic 2: _____ Topic 3: _____

For questions 8-10, please provide a short answer in the space provided.

8. What is the **one best way** to inform you about nature programs for children and family in your community? _____
9. What is the **best benefit** you can think of for your children to participate in programs about nature? _____
10. What is the **greatest concern** you have about your children participating in programs about nature? _____

11. 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 residents in the Helena area feel about wildlife issues as well as to consider how future programs about wildlife may be developed or improved. **(Circle one number per statement)**

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

The following questions will be used to help make general conclusions about residents in the Helena area. Your responses will remain completely confidential.

12. How many total children under 18 do you have? Include step-children or other children if you provide at least 50% guardianship/custody. _____
13. Please indicate the ages of all of your children under the age of 18.
_____ Child 1 _____ Child 2 _____ Child 3 _____ Child 4 _____ Child 5 _____ Child 6
14. Please indicate your ethnicity/race. **(Check all that apply)**
- | | |
|--|---|
| <input type="checkbox"/> Hispanic / Latino | <input type="checkbox"/> Native American |
| <input type="checkbox"/> Caucasian | <input type="checkbox"/> Asian |
| <input type="checkbox"/> African-American | <input type="checkbox"/> Pacific Islander |
| <input type="checkbox"/> Other: _____ | |
15. What is your approximate annual household income before taxes? **(Check one)**
- | | | |
|---|--|--|
| <input type="checkbox"/> Less than \$10,000 | <input type="checkbox"/> \$35,000 – 49,999 | <input type="checkbox"/> \$100,000 – 149,999 |
| <input type="checkbox"/> \$10,000 – 24,999 | <input type="checkbox"/> \$50,000 – 74,999 | <input type="checkbox"/> \$150,000 – 199,999 |
| <input type="checkbox"/> \$25,000 – 34,999 | <input type="checkbox"/> \$75,000 – 99,999 | <input type="checkbox"/> \$200,000 or more |
16. What is the highest level of education that you have received? **(Check one)**
- | | |
|---|---|
| <input type="checkbox"/> Less than high school diploma | <input type="checkbox"/> 4-year college degree |
| <input type="checkbox"/> High school diploma or equivalent (GED) | <input type="checkbox"/> Advanced degree beyond 4-year college degree |
| <input type="checkbox"/> 2-year associates degree or trade school | |
17. Are you? Male Female
18. What is your age? _____
19. We may be interested in gathering further input from parents about nature programs for children and families in the Helena area. Toward this end, we would like to know if you would be interested in providing additional input in the future. If so, **please print your name and mailing address and/or email on a separate sheet of paper** and return it in the envelope along with your completed survey. Keep in mind that your name and contact information will never in any way be released or associated with your responses in reporting of the data from this survey.

Thank you for participating in this study!