Georgia State University
ScholarWorks @ Georgia State University

Early Childhood Education Dissertations | Early Childhood Education Department

10-24-2006

Effect of a Wildlife Conservation Camp Experience in China on Student Knowledge of Animals, Care, Propensity for Environmental Stewardship, and Compassionate Behavior Toward Animals

Sarah Marie Bexell

Follow this and additional works at: http://scholarworks.gsu.edu/ece_diss

Recommended Citation
Bexell, Sarah Marie, "Effect of a Wildlife Conservation Camp Experience in China on Student Knowledge of Animals, Care, Propensity for Environmental Stewardship, and Compassionate Behavior Toward Animals." Dissertation, Georgia State University, 2006.
http://scholarworks.gsu.edu/ece_diss/1

This Dissertation is brought to you for free and open access by the Early Childhood Education Department at ScholarWorks @ Georgia State University. It has been accepted for inclusion in Early Childhood Education Dissertations by an authorized administrator of ScholarWorks @ Georgia State University. For more information, please contact scholarworks@gsu.edu.

ACCEPTANCE

This dissertation, EFFECT OF A WILDLIFE CONSERVATION CAMP EXPERIENCE IN CHINA ON STUDENT KNOWLEDGE OF ANIMALS, CARE, PROPENSITY FOR ENVIRONMENTAL STEWARDSHIP, AND COMPASSIONATE BEHAVIOR TOWARD ANIMALS, by SARAH MARIE BEXELL, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree Doctor of Philosophy in the College of Education, Georgia State University.

The Dissertation Advisory Committee and the student's Department Chair, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty. The Dean of the College of Education concurs.

_____
Olga S. Jarrett, Ph.D.
Committee Chair

_____
Barbara Meyers, Ph.D.
Committee Member

_____
Yali Zhao, Ph.D.
Committee Member

_____
Molly H. Weinburgh, Ph.D.
Committee Member

_____
Rebecca J. Snyder, Ph.D.
Committee Member

_____
Olin G. Myers, Ph.D.
Committee Member

_____
Date

_____
Barbara Meyers, Ph.D.
Chair, Department of Early Childhood Education

_____
Ronald P. Colarusso, Ed.D.
Dean, College of Education

AUTHOR'S STATEMENT

By presenting this dissertation as a partial fulfillment of the requirements for the advanced degree from Georgia State University, I agree that the library of Georgia State University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote, to copy from, or to publish this dissertation may be granted by the professor under whose direction it was written, by the College of Education's director of graduate studies and research, or by me. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this dissertation which involves potential financial gain will not be allowed without my written permission.

_____

Sarah M. Bexell

NOTICE TO BORROWERS

All dissertations deposited in the Georgia State University library must be used in accordance with the stipulations prescribed by the author in the preceding statement. The author of this dissertation is:

Sarah Marie Bexell
1049 Eden Avenue SE
Atlanta, GA 30316

The director of this dissertation is:

Dr. Olga S. Jarrett
Department of Early Childhood Education
College of Education
Georgia State University
Atlanta, GA 30303-3083

VITA

Sarah Marie Bexell

ADDRESS: 1049 Eden Avenue SE
Atlanta, Georgia 30316

EDUCATION:

Ph.D.	2006	Georgia State University Early Childhood Education
M.Ed.	1998	Georgia State University Science Education
M.A.	1995	Northern Illinois University Physical Anthropology
B.A.	1991	Augustana College Major: Biology Minor: Environmental Studies

PROFESSIONAL EXPERIENCE:

2006-Present	Director of Conservation Education Chengdu Research Base of Giant Panda Breeding
2004-2005	Manager of China Conservation Education Programs Zoo Atlanta
2003-2005	Biobus NSF Fellow Georgia State University
1999-2004	Field Conservation Education Specialist Zoo Atlanta
1997-2001	Golden Lion Tamarin Conservation Program Coordinator Zoo Atlanta
1998-1999	Biology and Ecology Teacher The Howard School High School

PROFESSIONAL SOCIETIES AND ORGANIZATIONS:

1996-Present	Association of American Zoos and Aquariums
2000-Present	International Zoo Educators Association
2000-Present	North American Association for Environmental Education
2001-Present	The Association for the Study of Play
2003-Present	Society for Conservation Biology
2004-Present	International Society for Anthrozoology
2005-Present	Society for Human Ecology
2005-Present	American Psychological Association

SELECTED PRESENTATIONS AND PUBLICATIONS:

Bexell, S. M., Jarrett, O. S., Luo, L., Hu, Y., Sandhaus, E., & Maple, T. L. (Accepted with revisions.). Observing panda play: Implications for zoo programming and conservation efforts. *Curator*.

Bexell, S. M., Snyder, R. J., Luo, L. & Sandhaus, E. (2005, October). *Understanding giant panda behavior and applying it to conservation education: From recognizing to knowing giant pandas*. Symposium presentation at the Society for Human Ecology's 20th Anniversary Conference, Salt Lake City, UT.

Bexell, S. M., Lakly, M. B., Jarrett, O. S., Luo, L., Yu, J., & Atkinson, S. L. (2005, August). *Fostering care: can cross cultural research lead to a truly effective conservation education curriculum?* Symposium presentation at the annual meeting of the American Psychological Association, Washington, D.C.

Bexell, S. M., Jarrett, O. S., Yang, J., & Tan, N. N. (2005, April). *Children and animals: Exploring empathic feelings with animals in four year olds in China and the United States.* Poster presentation at the biennial meeting of the Society for Research in Child Development, Atlanta, GA.

Bexell, S. M., Luo, L., Hu, Y., Maple, T. L., McManamon, R., Zhang, A., & Zhang, Z. (2004). Conservation Education Initiative in China. In D. Lindburg and K. Baragona (Eds.). *Biology and conservation of the giant panda.* Berkeley, CA: University of California Press.

Bexell, S. M. (2004, March). *Mixed-method approach to evaluating preschool environmental education programs.* Presentation at the Environmental Education Alliance of Georgia's Annual Conference in Cordele, GA.

Bexell, S. M. (2004, February) *What happens when Scruffy wants to play? Children's bonds with animals.* Presentation at The Association for the Study of Play annual conference, Atlanta, GA.

Lukas, K. E., Stoinski, T. S., Burks, K., Snyder, R. J., Bexell, S. M., & Maple, T. L. (2003). Nest building in captive *Gorilla gorilla gorilla*. *International Journal of Primatology*, *24*(1), 103-124.

Bexell, S. M., Jarrett, O. S., Snyder, R. J., Sandhaus, E., Luo, L., Hu, Y., & Maple, T. L. (2003, February) *Interpreting and understanding animal play: Implications for conservation*. Paper presented at The Association for the Study of Play, Charleston, SC.

Jarrett, O. S., Bexell, S. M., Turner, S., French-Lee, S., Lan, L., & Hu, Y. (2002, February). *Play in university related child development centers: A cross-cultural comparison.* Paper presented at the annual meeting of The Association for the Study of Play, Santa Fe, NM.

Zhang, Z., Luo, L., McManamon, R., & Bexell, S. M. (2001). *For Giant Panda*. Chengdu, China: Chengdu Giant Panda Breeding Research Foundation.

Bexell, S. M., Luo L., Hu, Y., & Maple, T. L. (2000, October) *Conservation Education Initiatives in China: A Collaborative Project between Zoo Atlanta, Chengdu Zoo, and Chengdu Research Base of Giant Panda Breeding.* Paper presented at Panda 2000: Conservation Priorities for the New Millennium, San Diego, CA.

ABSTRACT

EFFECT OF A WILDLIFE CONSERVATION CAMP EXPERIENCE IN CHINA ON STUDENT KNOWLEDGE OF ANIMALS, CARE, PROPENSITY FOR ENVIRONMENTAL STEWARDSHIP, AND COMPASSIONATE BEHAVIOR TOWARD ANIMALS

by

Sarah M. Bexell

The goal of conservation education is positive behavior change toward animals and the environment. This study was conducted to determine whether participation in a wildlife conservation education camp was effective in positively changing 8-12 year old students': (a) knowledge of animals, (b) care about animals, (c) propensity for environmental and wildlife stewardship, and (d) compassionate behavior toward animals. During the summer of 2005, 2 five-day camps were conducted at 2 zoological institutions in Chengdu, China. The camp curriculum was influenced by theory and research on the following: conservation psychology, social learning theory, empathy and moral development theory, socio-biological theory, constructivist theory, and conservation science. Camp activities were sensitive to Chinese culture and included Chinese conservation issues. Activities were designed to help children form bonds with animals and care enough about them to positively change their behavior toward animals and the environment.

This mixed methods study triangulated quantitative and qualitative data from six sources to answer the following:

1. Did camp increase student knowledge of animals?
2. Did camp increase student caring about animals?

3. Did camp increase student propensity for environmental and wildlife stewardship?
4. Did camp affect student compassionate behavior toward animals?

A conservation stewards survey revealed significant increases on pre-post, self-report of knowledge, care, and propensity. Pre-post, rubric-scored responses to human-animal interaction vignettes indicated a significant increase in knowledge, and stable scores on care and propensity. Qualitative data from student journals, vignettes, and end-of-camp questionnaires demonstrated knowledge, caring, and propensity, and revealed the emergent theme empathy. To address question 4, instructors tallied campers' behavior toward animals using a student behavior ethogram. Occurrence of positive behaviors was inconsistent, but negative behaviors decreased, indicating campers were more conscious of behaviors to avoid. Field notes helped determine that camps were implemented as planned, therefore not interfering with goals of the camp. This study contributes to an emerging and critical knowledge base of effective strategies to promote conservation behavior.

EFFECT OF A WILDLIFE CONSERVATION CAMP EXPERIENCE IN CHINA ON STUDENT KNOWLEDGE OF ANIMALS, CARE, PROPENSITY FOR ENVIRONMENTAL STEWARDSHIP, AND COMPASSIONATE BEHAVIOR TOWARD ANIMALS

by
Sarah M. Bexell

A Dissertation

Presented in Partial Fulfillment of Requirements for the
Degree of
Doctor of Philosophy
in
Early Childhood Education
in
the Department of Early Childhood Education
in
the College of Education
Georgia State University

Atlanta, Georgia
2006

Copyright by
Sarah M. Bexell
2006

ACKNOWLEDGEMENTS

I am deeply indebted to Dr. Terry L. Maple and Dr. Rebecca J. Snyder who first sent me to China in 1999. Without their trust in me, none of this work would have been possible. Additionally, my thanks go to Zhang Anju, Zhang Zhihe, Tian Yu Shong, and Fei Li Song, all visionaries, colleagues, and friends who believed in me, education, and conservation of wildlife. I thank them for welcoming me back to China year after year to help make conservation education an integrated part of the mission of their institutions.

I continue to be amazed by my colleagues, Luo Lan and Hu Yan who worked diligently through four years developing conservation education departments in Chengdu. I could never fully express my admiration and love for these amazing, pioneering women.

I thank Feng Rui Xi, Xu Ping, Yang Xiao Yi, Tang Ya Fei, Zhao Hui, and Yu Jinping who made these camps possible through their love for both animals and children.

I am deeply indebted to my dear advisor and friend, Dr. Olga Jarrett, who gives of herself unconditionally both professionally and personally. I also acknowledge her husband Bob who helped edit this project. I have learned more than I deserve from them.

I admire each of my committee members and wish I could say more. I thank them for their care about my work and for the hours they invested in the project and in me.

I wish I could thank every single friend for supporting and loving me. I want to especially thank Rebecca Richardson, Amy Johnson, Tara Stoinski, Rebecca Snyder, Richard Hezlep, Julie Lee, Kristen Clements, and Scott Paul.

None of this would have been possible without my parents, Sharon Nandzik and Luther Bexell who fostered my love for animals and provided their love and support. My step parents John Nandzik and Mary Bexell stood by me and their spouses who supported their dedication to me and my life mission.

To the man I met in the mountains of China, sharing a passion for wildlife and nature, Brook Edwards, I thank him for his patience, love, and understanding through a process that has kept us apart for far too long.

And last but not least, I thank my beloved canine friends Kodi, Kino, and Da Hei who have loved me unconditionally, provided respite from complete self-absorption, taught me about their minds, and reminded me of the important things in life.

I dedicate this work to the animals, throughout my life I will strive to be a voice for them.

TABLE OF CONTENTS

Page

List of Tables v
List of Figures vi

Chapter
1 Statement of the Problem 1
The Global Dilemma 2
The Chinese Dilemma 4
Personal Involvement 6
Background and Elements of Curriculum 7
Pilot of Camp and Curriculum 10
Why Young Children 12
Research Design 13
Human as Instrument 15
Assumptions 16
Summary 16

2 REVIEW OF LITERATURE 18

3 METHODS 57
Participants 57
Conservation Stewards Camp Experience 58
Documentation of Camp Implementation 66
Student Data Instruments 69
Analysis of Student Data 76
Summary and Significance 81

4 RESULTS 83
Organization of Chapter 84
The Campers 84
Documentation through Field Notes 86
Student Journals 92
Data Analysis 92
Research Question 1: Did Camp Increase Student Knowledge of Animals? 96
Summary of Findings on Knowledge 116
Research Question 2: Did Camp Increase Student Care about Animals? 117

Summary of Findings on Care 128
Research Question 3: Did Camp Increase Student Propensity for Environmental and Wildlife Stewardship? 129
Summary of Findings on Propensity.....143
Emergent Theme Empathy 144
Summary of Findings on Empathy 147
Research Question 4: Did Camp Affect Student Compassionate Behavior toward Animals and the Environment?.....147
Summary 149

5 DISCUSSION 150
Field Notes 150
Research Question 1: Did Camp Increase Student Knowledge of Animals? 151
Research Question 2: Did Camp Increase Student Care about Animals? 165
Research Question 3: Did Camp Increase Student Propensity for Environmental and Wildlife Stewardship? 176
Research Question 4: Did Camp Affect Student Compassionate Behavior toward Animals and Nature? 182
Strengths and Weaknesses of the Study.....184
Implications for Conservation Education 185
Implications for Teacher Education.....187
Future Research 188
Personal Reflections.....189
Summary 190

References 194

Appendices 218

LIST OF TABLES

Table Page

1 Conservation Stewards Survey means and standard deviations of knowledge by camp 96
2 Conservation Stewards Survey Analysis of Variance for knowledge 97
3 Conservation Stewards Survey means and standard deviations of individual knowledge questions.....98
4 Vignette means and standard deviations by camp of knowledge statements by camp.....99
5 Vignette Analysis of Variance table for knowledge.....100
6 Sub-themes and descriptive quotes for knowledge.....102
7 Conservation Stewards Survey means and standard deviations of care about animals by camp.....117
8 Conservation Stewards Survey Analysis of Variance for care 118
9 Conservation Stewards Survey means and standard deviations of individual care questions.....119
10 Vignette means and standard deviations by camp of care statements by ..... Camp 120
11 Sub-themes and descriptive quotes for care.....121
12 Conservation Stewards Survey means and standard deviations of propensity for environmental stewardship by camp 129
13 Analysis of Variance for propensity for environmental and wildlife stewardship on the Conservation Stewards Survey 130
14 Conservation Stewards Survey means and standard deviations of individual propensity questions 131
15 Vignette means and standard deviations by camp on propensity 132
16 Sub-themes and descriptive quotes for propensity 133
17 Vignette means and standard deviations by camp on empathy 145

LIST OF FIGURES

Figure Page

1 Results of student behavior data from the Research Base used to determine whether positive behaviors increased and negative behaviors increased throughout the camp experience 148
2 Results of student behavior data from the Chengdu Zoo used to determine whether positive behaviors increased and negative behaviors increased throughout the camp experience 148

CHAPTER 1

INTRODUCTION

Statement of the Problem

The current rate of loss of wildlife in China is staggering (Elvin, 2004), and the general public is unaware of actions they can take to alleviate the losses (L. Luo & Y. Hu, personal communication, May 2000). One possible way to inform the public of the need for wildlife conservation is to begin educating the children. Arising out of an eight-year partnership between Zoo Atlanta and colleagues in Chengdu, a wildlife conservation camp had been piloted and was ready for further implementation in Chengdu. Having been responsible for the development of the camp concept and as an author of its curriculum, I am well aware of the goals of the camp: to increase student knowledge about the needs of animals, develop care and empathy with animals, and give students the motivation and tools to become good environmental and animal welfare stewards. The curriculum in question was designed to be a core component for a training academy that was requested by the Chinese Association of Zoological Gardens to expand the education-programming model from Chengdu throughout Chinese zoological institutions. It had to be determined if the camp concept and its curriculum are effective, with initial testing in Chengdu. It was also necessary to develop effective evaluation tools for assessing success at other zoological institutions throughout China in the future.

The Global Dilemma

Until recently, biodiversity on Earth seemed limitless, and the effects of human activities were remedied once humans left an area (Fien, 1995; Gil-Perez, Vilches, Edwards, Praia, Marques, & Oliveira, 2003). As the human species population grows and perpetuates, loss of biodiversity has acquired global proportions (Dirzo & Raven, 2003). This calls for educational programs devised on a global basis, with local implementation of strategies for local problems that have global ramifications. The situation is so worrying that, at the Conference of the United Nations for Environment and Development held in Rio de Janeiro in 1992, policy makers asked for a plan of action from the educational system to make children aware of the problems and prepare them for well-founded decision-making (United Nations, 1992). Over a decade later, there is still almost a complete absence of research and strategies to implement educational programs that result in wildlife and environmental stewardship (Kruse & Card, 2004). David Orr (1995), one of the leading experts on education for sustainability, laments that we still educate young people, for the most part, as if there were no planetary emergency. This is a disservice to the youth of the world as it threatens their health and well-being. Without awareness, there will be no concern, and without concern and action skills, there will be no action.

The loss of biodiversity is the only truly irreversible global environmental change the Earth faces today (Dirzo & Raven, 2003). For the past 300 years, recorded extinctions for a few groups of organisms reveal rates of extinction at least several hundred times the rate expected on the basis of the geological record. Social scientists and educators must work with conservation biologists to find a way to inform and effectively influence

humanity in order to preserve the life support systems that sustain us and all living things (Mascia, Brosius, Dobson, Forbes, Horowitz, McKean, & Turner, 2003).

Past concerns regarding biological extinction have been mostly ethical, involving humanity's responsibility for Earth's biological heritage, and economic impacts, focusing on potential losses of economically valuable products such as medicines, fibers, herbs, and foods (Dietz & Adger, 2003). Recently, scientists (Costanza & Daly, 1992; Smil, 1993; Mannion, 2000; Tilman, 2000; Dietz & Adger, 2003) have begun to assess biodiversity according to Earth's ability to provide ecological services, such as clean air and water, fertile soil, recycling of organic wastes, and biological pest control. Also recently, scientists have provocatively begun to assess biodiversity according to an innate human need to understand and associate with nature (Wilson, 1984; Kellert & Wilson, 1993; Kellert, 1997).

As concerns over the health of the planet escalate, educators are asked to contribute to public awareness of the problems the planet faces in order to enable citizens to participate in well-grounded decision-making (Gil-Perez, et. al., 2003). In spite of appeals, attention paid by teachers in China (Wu, 2002) (and in most nations) to the present and future state of the world is still scarce (Ham & Sewing, 1988; Shuman & Ham, 1997; McKeown-Ice, 2000). This probably represents a serious missing link in teacher and public education and therefore, public knowledge. The world lacks effective conservation education programs for all ages. The research presented here focuses on a conservation education curriculum delivered through five-day camps in zoological parks in Chengdu, Sichuan Province, China.

The Chinese Dilemma

The factors behind choosing to target conservation education planning in China are many. One is that the current rate of wildlife loss within China is devastating (Elvin, 2004). Also, old and deeply ingrained cultural consumptive patterns by the Chinese of species such as turtles (Van Dijk, P. P., Stuart, B. L., & Rhodin, A. G. J., 2000), sharks (Clarke, 2004), snakes (Zhou, Z. H. & Jiang, Z. G., 2004), and many others (Song, 2005) is draining wildlife from all over the globe, making this country particularly critical as a focus for conservation education. Another is that China is currently experiencing newfound wealth (ICA, 2005) and an emerging middle class. With this, there has been a major shift to consumerism from a more subsistence level style of living. With consumerism comes increased destruction of natural habitats, increased pollution, and further detachment from the natural world. While consumerism is accelerating among citizens of Chengdu, it has also been found that they are widely accepting of conservation ideas presented to teacher and parent groups over the past five years (personal observation, 2000-2005). This is possibly because of the pervasiveness of environmental deterioration in China and the resulting health and aesthetic effects citizens face on a daily basis. Also, with the implementation of the one-child law in 1979, major changes in child rearing occurred that have resulted in dangerously high levels of spoiling, and indoctrinating children with consumer habits previously unseen in China (E. Grinspoon, personal communication, November 1999; L. Luo & Y. Hu, personal communication, Fall 2000). While no one would want to deny people of a higher standard of living, with a human population of 1.3 billion and rising, this raises high risks for the natural resources of the country itself and the countries from which China purchases natural resources.

Another reason to focus on China is that recently, the Chinese National Environmental Protection Agency (NEPA), [renamed the State Environmental Protection Administration (SEPA) in March 1998], the Communist Party, and the Department of Education jointly launched an “Action Plan for Environmental Publicity and Education”, which emphasizes environmental knowledge in regular curricula (CCICED 1997, p. 2). However, the infrastructure (teacher training, materials, and support) to accomplish this has not been put in place (Wu, 2002). Because of this action plan, administrators contacted over the past five years by the Chengdu project team have been receptive to discussions of environmental programming and curricula, possibly because of lack of training and materials otherwise available to fulfill this governmental demand. Teachers have almost no training in conservation issues and solutions, but capacity building workshops to correct this deficit have been successfully piloted.

A special circumstance made this research possible. That is, Zoo Atlanta and colleagues in China had a well-established eight-year partnership, which made for unprecedented trust and collaboration to create and test a wildlife conservation curriculum designed to change knowledge and behavior, and foster empathy toward and care for animals. Without this foundational trust and friendship, this research would not have been possible. The sustained contact with Chengdu colleagues and citizens of Chengdu has created a foundation for the potential expansion of this program throughout China. With proven success, in 2003, the Chengdu Education Bureau named both the Chengdu Zoo and the Chengdu Research Base of Giant Panda Breeding (Research Base) as conservation education sites. With that designation, the Chinese partners asked for Zoo Atlanta’s help in the creation of programming for the school system of Chengdu. In

November of 2003, Zoo Atlanta was also approached by partners in Beijing at the Chinese Association of Zoological Gardens to create and implement a training program for educators from zoos and aquariums across China. In 2002, at the Annual Conference of Zoo Leaders in Nanjing, Jiangsu Province, China, the vice-director of the Chengdu Zoo and the researcher presented the work developing conservation education departments in Chengdu, as well as conduct of conservation education programming throughout the United States. Since then, leaders from zoos throughout China have been requesting training to implement similar programs at their institutions. This request presents a tremendous amount of responsibility and Zoo Atlanta needs to determine which aspects of conservation education programming are most successful. Zoo Atlanta needs to ensure these components work, will translate, and bring success to other institutions across China where they will not have the ability to give the level of support they have to Chengdu.

Personal Involvement

Zoo Atlanta is a leader in conservation, research, and education. Toward that end, they combine research and education in the field for successful conservation programs. In 1999, I was sent to collect behavioral data on giant pandas for Zoo Atlanta's ongoing behavioral research program. While there, I was also asked to investigate the possibility of collaborating with Chinese colleagues on conservation education programming. Zoo Atlanta's former director and CEO, Dr. Terry L. Maple, and research associate, Dr. Rebecca J. Snyder had traveled to China many times and experienced the lack of understanding of animals, and in many cases blatant abuse of animals. More than 100 countries have established laws against animal abuse, but China has not yet created such

a law (Shi & Zhang, 2005). Because of a combined background in animal behavior and informal and formal science education, both Maple and Snyder felt my background could prove beneficial in the establishment of conservation education programming in China. After spending five months in China, seeing the lack of understanding of animals, I wanted to find a way to connect people and animals so that these problems might be alleviated. It is hoped that if children (and adults) are enabled to truly see animals as individuals they may feel and behave differently. Once one has a glimpse into an animal's mind, life, and family, one starts to see them as individuals, and not mere objects of speculation, entertainment, food, or medicine. It is much harder to cause harm directly or indirectly to those with whom one identifies (Bandura, 1977; Joy, 2005) or especially see as a friend. In 2000, I was sent back to China to develop a memorandum of understanding to create the first functioning conservation education departments in zoological facilities in China. Since then, education departments and programs have been established at the Chengdu Research Base of Giant Panda Breeding (Research Base) and Chengdu Zoo.

Background and Elements of Curriculum

The foundation of the wildlife conservation camp and curriculum is based on many fields of inquiry, as well as four years of observations, investigations and pilot programs in schools and informal science settings in both China and the United States (Bexell, Luo, Hu, Maple, McManamon, Zhang, & Zhang, 2004). Investigations into what children and families need to learn and be exposed to in order to develop a caring attitude toward animals and the environment underlies the creation and testing of this program. The rate of loss of wildlife and natural places on Earth demands that adults start taking

responsibility for fostering the next generation's attitudes and beliefs about the natural world to promote reverence and preservation.

The curriculum is rooted in constructivism (Piaget, 1929/1969; Vygotsky, 1978) and many diverse and relevant academic fields, including conservation psychology (Brook, 2001), social learning theory (Bandura, 1977), socio-biology (Wilson, 1984), conservation science (Primack, 1998), and empathy and moral development (Hoffman, 2000), and it is sensitive to Chinese culture and education practices. Because of the constraints of the traditional classroom, and lack of teacher preparation in China to teach about wildlife conservation issues, teachers and administrators in Chengdu seek information and educational experiences for themselves and their students at the Chengdu Zoo and Research Base. The camp and curriculum allow these facilities to provide education programs that offer content and learning modes that a traditional classroom environment cannot provide. They also provide intensive training for the instructors, some of whom are classroom teachers, who then take their new knowledge and most importantly, attitudes, back to the classroom.

Informal conservation education programs are uncommon in China (personal observation, 1999-2006). Evidence from the United States suggests that informal education programs such as those conducted in zoological facilities offer educators the opportunity to positively contribute to children's knowledge and conception of nature, animals, and the environment (Braverman & Yates, 1989). These programs are offered in unique environments that cannot be replicated in the traditional classroom. According to Braverman and Yates (1989), informal education experiences are useful and meaningful to students. However, as a researcher interested in developing and testing conservation

education programs that will change student behaviors toward animals, this is not sufficient. To justify the claim that *conservation* education is being conducted, it is necessary to demonstrate that behavior is changed through the educational experiences provided. Ultimately, what must be demonstrated is that behavior change that results in preservation of biodiversity is created through conservation education programming. While this is out of the scope of this project, it is imperative to the wildlife conservation and conservation education fields to use this as our guiding principle.

The camp program, builds upon compassion to get participants to be able to provide complete care for animals, know animals are sentient beings, and not harm animals. Students also observe and understand individual animal behavior; realize how intelligent animals are, and recognize how caring animals are to each other and in some cases to people. Students learn that animals should be treated with respect. Students also learn that they can have a mutually satisfying and life enriching relationship with an animal, and how to make informed pet decisions. It is also imperative that students learn how to make informed personal eating and consumption decisions. Concern is taken to the next level and fosters students' understanding of issues animals face in the wild and helps them understand that their actions can impact animals in the wild. A key premise is that each person on Earth has a moral responsibility toward the health and happiness of animals, as well as for the health and happiness of the next generation.

Also, just as young urban people in the U.S. today rarely play outside in natural areas (Louv, 2005) outdoor play in natural areas is even more rare in China (personal observation, 1999-2006). Many researchers feel that if children never have the opportunity to experience and play in nature that they may never develop a love and

stewardship toward the natural world (Wilson, 1996; Ottman, 1998). The camps are hosted by zoological facilities that provide opportunities for outdoor play and exploration.

Pilot of Camp and Curriculum

The curriculum and camp program were initially piloted in September/October 2004. One four-day instructor training session and two, three-day camps for 12-16 year olds were held over China's National Holiday to work out issues with the training, curriculum, and camp logistics. Pre and post training (on instructors) and camp (on students) quantitative data were collected with an assessment survey. Overall, little change was found in participants' (instructors and students) knowledge and attitude pre and post their camp experiences (Atkinson, 2005). Both groups came into the experience seeming to understand most knowledge concepts and expressing positive attitudes toward animals and nature. It cannot be determined whether this was because of the design of the survey, social desirability, or actual knowledge and attitude level of the students. However, instructor journal entries and conversations with instructors and students showed that the curriculum was better geared toward a younger audience because students between the ages of 12-16 had already learned most of these concepts. Review of classroom science curriculum content shows that the high level of knowledge is to be expected. Attitudes are less easy to assess. Prior observations have revealed that people express knowledge and even express a positive attitude toward animals and nature, but actions do not match knowledge and positive attitudes. There is a disconnect that needs to be remedied.

In 2004, qualitative data were also collected in the form of instructor and student journals, and end-of-camp semi-structured questionnaires. These data (Bexell, Yu, Feng, Yang, & Xu, 2004) were extremely helpful in guiding revision of the camp curriculum, as well as providing evidence of the efficacy of the camp experience. Some of the main changes made based on the qualitative data include the following: (a) addition of considerably more background information for instructors (they felt unprepared to answer student questions and facilitate discussions about many topics), (b) elimination of some of the activity sheets for students (they highly disliked them and said it made camp seem like school), (c) more activities on how to actually provide proper care of animals (while instructors and students said prior to camp that they knew how to care for animals, it was found through observation and the qualitative data that they had no true idea of proper care and treatment of animals and stated how much they had learned about this through camp), and (d) longer lesson and sharing time about feelings that students are developing toward animals throughout their camp experiences (instructors and students did not feel that they had enough time to process new knowledge and feelings, that we were always rushing into the next activity).

There were also enlightening findings of the efficacy of the camp experience found in the qualitative data, which are evidenced in the following translations of quotations in the original translated English:

> Some people think animals are lower classed being. When they like the animals, things are OK, but when they get tired, they give away the animals. People have this kind of attitude because they never put themselves in animals' shoes. They didn't realize that animals are like us, they are equal members of nature. They have feelings, they can think, they need to be loved. Therefore, I think those who don't have the ability to take good care of animals should never own a pet. (Instructor 9, 9/25/04)

> In the past, I only know that we need to love animals and protecting animals, but lacked of true experience. Through today's study, I understand that we should think about things and feel things from animal's stand (in one's shoes). You will deeply feel that loving animal and saving animals are not just a few slogans. It should translate into really thought and action of a person. We should treat animals as persons, as friends. We should respect and love them. This means our feelings toward animals have reached a new milestone. (Instructor 13, 9/25/04)

> I think animal behavior is a very interesting science. Through this kind of studies, the distance between human and animals is going to be shortened. Animals can express their feeling through their various behaviors. This will let me be more careful in taking care of my pets in future. I will try to put myself in their shoes to think about things. (Instructor 9, 9/26/04)

> My friends or students think that animals are low-class living organisms. They have no happiness, anger, sadness, and joy; no thought and feeling. This is because they didn't put themselves in animals' shoes to think about things. They have such a thought because they don't think for others. (Instructor 4, 9/26/04)

> Meanwhile, I also further understand "respect animals". First we must look at animal with equal mind, not to make subjective comments or judgment. Animals have feelings and friendship. For example, when "San Mao" runs out of the cage, the other two siblings will wait for his return, when he returns, they will greet him warmly. (Instructor 5, 9/26/04)

The quotations were taken from instructor journals and not from the campers themselves, it is these sentiments that were then passed to the campers (and hopefully friends and family after camp) in the following two camp sessions. Through modeling their new understanding of animals during camp, instructors exposed young and open minds to correct understanding of, and behavior toward animals.

Why Young Children

Rachel Carson, the famous scientist and mother of the environmental movement, has been very influential in my career path and work with children and animals. Carson cared passionately about how to maintain in children a sense of wonder about the natural environment and believed the battle was won or lost in childhood (Carson, 1956). In her

book, *The Sense of Wonder*, Carson (1956), sought to inspire adults and children to experience the sensory and emotional aspects of nature, and felt that if they did, they would have less appetite for activities that threaten the living world. With inspiration from her and support from research on children's bonds with animals (Shepard, 1996; Myers, 1998; Melson, 2000), I pursued a PhD in early childhood education with a cognate in conservation sciences. It is hoped that through the study of how young children learn and develop, and the embracing of young children's seemingly innate interest in and love for animals, that programs can be created to foster that compassion and understanding in young people anywhere in the world, in turn creating new stewards of the Earth. At the same time, it is hoped that the programs will enhance the lives of children growing up in a world perpetually dominated by humans and our creations.

Research Design

This study was designed to attempt to determine whether participation in a wildlife conservation education camp, designed by a team from Zoo Atlanta, the Research Base, and the Chengdu Zoo is effective in positively changing students': (a) knowledge of animals, (b) empathic caring about animals, (c) propensity for environmental and wildlife stewardship, and (d) compassionate behavior toward animals. During the summer of 2005, two five-day camp sessions, one at the Research Base and one at the Chengdu Zoo were conducted using the wildlife conservation education curriculum. Camp activities were designed to help children form bonds with animals and care enough about them that they would positively change their behavior towards animals and the environment. To assess what actually happened during camp and whether the

curriculum was implemented as planned, the researcher took field notes and documented daily discussions with instructors.

In this mixed methods study, quantitative and qualitative data from a variety of sources were triangulated to answer the following questions about the wildlife camp experience:

1. Did it increase student knowledge of animals?
2. Did it increase student empathic caring toward animals?
3. Did it increase student propensity for environmental stewardship?
4. Did it affect student compassionate behavior toward animals?

To analyze the first three questions statistically, students responded to the following at the beginning and end-of-camp: surveys employing seven-point Likert Scales and rubric-scored responses to vignettes. Student daily journals, vignettes, and end-of-camp questionnaires were analyzed qualitatively to assess changes in knowledge, caring and propensity, as well as emerging themes. To address question four, instructors tallied student behaviors toward animals and the environment using an ethogram of student behavior. This study will contribute to an emerging and critical knowledge base of effective strategies for conservation behavior change.

The mixed-methods approach was used because of the sensitivity of the topic at hand, and complexity of developing a valid quantitative assessment of development of caring and propensity for environmental stewardship. Development of a valid and reliable survey instrument is a desired product to facilitate reliable, efficient evaluation when the camp program and curriculum are taken to other institutions. Triangulation of the findings between the data sources in this study provides reinforcement and a clearer

understanding of student answers on the survey instrument. The qualitative data also allowed emergent themes to be examined which could not be obtained from the quantitative survey. Another reason for the qualitative data was to try to alleviate problems involved with social desirability in responses to the survey questions. While people can respond in socially desirable ways with almost any instrument, it was hoped that the qualitative instruments would aid gauging individuals' thoughts about animals based on their experiences at camp through their freely written, anonymous responses to the qualitative instruments.

Data from the two sites were first analyzed separately, because of the significant differences in the settings. The data was then combined to look at overall changes in students as a result of the camp curriculum. The sample size was 60 students (23 from the Research Base and 37 from the Chengdu Zoo) and a pre-test, post-test design was employed.

Human as Instrument

In the analyses of qualitative data, the researcher became a data collection instrument and interpreter. In this investigation, a Chinese colleague and the researcher served as the data interpreters. Together they assessed the qualitative data collected with the instrument tools. The researcher coded, categorized, and analyzed all collected data after translation into English. The researcher worked closely with the Chinese colleague to ensure clarity of the translation and interpretation. The researcher's years of experience working in China and studying the culture with Chinese friends and colleagues allowed for better interpretation of the findings than would be possible for a person who had not had the ability to acquire previous experience in China.

Assumptions

It is admitted that personal biases exist in this research. I am admittedly intellectually, and most importantly emotionally, attached to this work and therefore present it to be examined through scholarly discipline. The research into creating effective conservation programs needs rigorous examination to make certain of its efficacy and future use, outside of personal desires to help animals. It was, however, critical for me to remain as neutral as possible during this research. Assumptions I had to explore without being biased were the following: that it is possible to provoke empathy with animals in participants; that increasing empathy with animals effectively motivates participants to behave more compassionately toward animals; that the content and skills provided through the camp experience can overcome traditional uses and treatments of animals and the natural environment in China; and that people can be motivated to care about animals and the natural environment.

Logistical assumptions in this investigation are:

1. The sample size of 60 students was adequate for assessing the efficacy of the camp and curriculum.
2. The coded data obtained from the surveys, vignettes, student journals, researcher field notes, and student behavior ethogram allowed for the accurate assessment of changes, or lack of changes, in student knowledge, caring, propensity for environmental stewardship and compassionate behavior toward animals.

Summary

The purpose of this investigation was to assess the effectiveness of the wildlife conservation camp in positively changing student knowledge of animals, empathic care

about animals, propensity for environmental and wildlife stewardship, and compassionate behavior toward animals. The participant researcher attempted to determine the effectiveness of the conservation camp and curriculum. It is hoped that this research will contribute to the important initiative for conservation institutions worldwide to create programming that is effective in creating behavior change for the preservation of global biodiversity. It is also hoped that this program will add to the well-being and happiness of the students and animals it will reach.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

This literature review covers many diverse fields of theory and research that documents the need for programs designed to protect animals and their environment and to support key elements of a conservation education curriculum and a camp experience in China designed to promote knowledge of animal needs, a caring attitude toward animals, propensity for action, and behavioral change. Specifically, this chapter reviews the literature documenting the loss of biodiversity worldwide, the need for environmental work in China, research on the efficacy of informal education (especially environmental and wildlife stewardship camps), and the choice of age group to be addressed. This chapter then presents the literature that supports why the camp curriculum and operations were designed the way they were. Included are: (a) the importance of good role models documented in social learning theory and research, (b) active collaborative involvement documented in constructivism literature, (c) learning in outdoor environments including the Biophilia hypothesis, (d) cultural sensitivity, and (e) the need for multiple points of contact, or experiences, between children and animals. Lastly, this chapter discusses the literature supporting the importance of assessing this particular camp experience, including: general challenges in assessment of environmental/wildlife conservation programs and the need for a mixed methods design, interactions among knowledge,

caring, and action in both program design and assessment, and problems with assessing action as especially documented in the literature on the theory of planned behavior.

Underlying Problem: Extent of Loss of Biodiversity on Earth

Worldwide Loss of Biodiversity

As explained in chapter one, the biodiversity crisis that Earth is facing today is the rationale for the development and assessment of the Chinese conservation camps studied in this dissertation research. Beyond ethical reasons, which in the past were thought to be the most important reason to preserve animals and natural systems (Dirzo & Raven, 2003), scientists (Pimentel and Wilson, 1997; Dirzo and Raven, 2003) state that biodiversity loss may pose the greatest direct threat to human survival because as biodiversity declines the biosphere can become destabilized and interfere with the recycling of vital elements such as carbon, nitrogen, and phosphorus. The result of accelerating and irreversible extinctions could be ‘wholesale ecosystem collapse’ (Brown, 2006). Another concern is the misconception held by many humans that science and technology can overcome the environmental degradation experienced today. However in 1992, the U.S. National Academy of Sciences and the Royal Society of London issued a joint statement warning against this idea (Atiyah & Press, 1992). Humans today do not seem able to grasp what is at stake (Cassils, 2004), and it is hoped that sound education programs can be developed and implemented to affect behavior.

Biodiversity is a term that encompasses the total amount of living organisms on Earth at the genetic, species, and ecological levels. The biodiversity humans enjoy and depend on today is at risk due to extreme levels of degradation caused by humans. Loss of biodiversity is the only truly irreversible global environmental change the Earth faces

today (Dirzo & Raven, 2003). Major concerns regarding biological extinction have included ethical issues, involving questions about human responsibility for Earth's biological heritage (Dirzo & Raven, 2003). They have also included economic ones, focusing on the potential loss of such economically valuable products as medicines, fibers, herbs, and foods. Recently, scientists (Costanza & Daly, 1992; Smil, 1993; Mannion, 2000; Tilman, 2000; Dietz & Adger, 2003) have begun to assess biodiversity according to Earth's ability to provide ecological services, such as clean air and water, fertile soil, recycling of organic wastes, and biological pest control. Also of concern is the intrinsic value of organisms and their right to exist, as well as human mental health needs for natural places (Kellert, 1993).

The common ancestors of present day humans first appeared on Earth about 500,000 years ago (Raven & McNeely, 1998). As early hunter-gatherers moved across the planet, they began to exterminate many of the large mammals and birds they hunted for food (Martin & Klein, 1984). After the development of agriculture 11,000 to 6,000 years ago, a human population estimated at five million people began to increase rapidly. With extensive land clearing and grazing, non-domesticated species became extinct at rapidly increasing rates (Dirzo & Raven, 2003). The coincidence of human presence and evidence of human proficiency at hunting with the selective loss of large animals, in what is geologically and evolutionarily a very short time period, strongly suggests that humans played a causal role in this wave of extinctions (Lovei, 2001).

In recent times for which more exact estimates of extinction are available, the situation has become far more drastic, as indicated by the International Union for the Conservation of Nature (IUCN) list of threatened species (Hilton-Taylor, 2004). The list

includes 11,167 threatened species facing high risk of extinction in the near future, resulting both directly and indirectly from human activities. The total *recorded* extinctions for the past 500 years are 811 species, including 331 vertebrates, 388 invertebrates, and 92 plants. Although these numbers are small relative to the total number of known species (i.e., less than 1%), it includes 24% of all mammals and 12% of all birds. Also, it can be assumed that the real figures are much higher, due to the fact that only a small percentage of species have yet been discovered and recorded (McKinney, 1999; J. Mendelson, personal communication, February 3, 2005). Because of the interdependency of life on Earth, as any species goes extinct, the populations of other species that depended on that organism also suffer and possibly become threatened.

Current rates of species extinction are greater than anything the Earth has experienced for the past 65 million years (Leakey & Lewin, 1995; May, Lawton, & Stork, 1995; Raven & McNeely, 1998; Dirzo & Raven, 2003). The ongoing problem of biodiversity loss on Earth is considered by some to be so acute as to be called the sixth extinction (Leakey & Lewin, 1995; May, et. al., 1995) comparing this loss to mass extinction events of similar magnitude from five previous biological crises that occurred during geological time. The strength of global biodiversity today is the result of 3.5 billion years of organic evolution (Dirzo & Raven, 2003) and even with unique human ingenuity those processes cannot be replicated. Eminent scientists have proposed many estimates of the current rate of species extinction (Wilson, 1986; Ehrlich & Wilson, 1991; Reid, 1992; Smith, May, Pellew, Johnson, & Walter, 1993). The most recent and comprehensive effort to define the number of species on Earth overall found the best estimate for the total of eukaryotic (possessing cells that have a distinct, double

membrane-bound nucleus) organisms possibly lies in the 5-15 million range with a best estimate of around seven million the overwhelming majority of which are insects and micro-organisms (May, 2000). Only about 1.5 million of these have been described by science (Heywood, 1995; Raven & McNeely, 1998; Levin, 2001). Some scientists consider far higher numbers to be credible (Erwin, 1982; May, 1990). In looking at the current rates of publications of new species, about 13,000 animal species per year (Hammond, 1995), it can be concluded that discovering and describing the total number of species on Earth will not be completed for many decades. This is assuming all species can be collected and put in the hands of appropriate experts before going extinct. Also, as noted, these estimates refer only to eukaryotic organisms. Estimates of the types of microorganisms, as well as their extinction rates, are nonexistent (Raven & McNeely, 1998). Because microorganisms are integral to the functioning of any healthy ecosystem, form the foundation of life on Earth, and are highly susceptible to environmental fluctuations (Primack, 1998), this lack of knowledge of possible extinctions of microorganisms is a concern for conservation biologists.

Marine ecosystems have not escaped human influence (U.S. Commission on Ocean Policy, 2004). Oceans drive and moderate weather and climate, provide food, transportation corridors, recreational opportunities, pharmaceuticals, and other natural products, and serve as national security buffers. Humans have severely degraded this life system with pollution, depletion of fish and other marine resources, habitat destruction and degradation, and the introduction of invasive non-native species, with the extent of the costs in terms of depleted resources, lost habitat, and polluted waters only recently recognized (Jenkins, 2003; U.S. Commission on Ocean Policy, 2004).

An example of wildlife extinction is the case of tigers. Three of the eight tiger species that existed in recent times have already been exterminated. In 2004, findings were published alerting the scientific community that a yearlong Sino-American field survey found no evidence of the existence of the South China tiger in the wild (Tilson, Hu, Muntifering, & Nyhus, 2004). While the team cannot definitively state that the South China tiger is extinct in the wild, they concluded that continued efforts to locate any remaining South China tigers are necessary, along with an assessment of the possibility of eventual recovery and restoration of wild tiger populations from existing captive populations. However, in a follow up conversation with a Chinese expert on South China tigers, it was learned that there are only 72 South China tigers in captivity and their inbreeding coefficient is dangerously high (Z. Zhang, personal communication, June, 2005), indicating extremely low chances of overall survivability. Also, the reintroduction of top carnivores is highly risky and controversial. There is much human resistance and very few reintroduced carnivores survive (Primack, 1998). Other examples including decimations of the entire amphibian class (Alford & Richards, 1999; Houlahan, 2000), and order of freshwater turtles (van Dijk, 2000), are well documented in scientific journals. However, the general public still seems to be under the impression that this is not an emergency, partly due to media portrayal that “there is still time.” Because urgency is not made clear, people are not motivated to take action. Lastly, in cases when people have been made aware, often a component of their learning situation did not include action strategies (Uzzell & Rutland, 1993), causing sadness and frustration that can lead to denial or apathy.

If two thirds of living species are lost over the course of the next century, the proportion will be more or less equivalent to that which disappeared at the end of the Cretaceous period. It took more than 5 million years for the world to regain its current ecological equilibrium, more than 10 times the length of human history (Raven & McNeely, 1998). This loss is of poignant concern because scientists do not have a clear understanding of how biodiversity assists in the regulation of a healthy environment and how the loss of biodiversity may greatly limit future human options (Mannion, 2000; Tilman, 2000; Jenkins, 2003). There is a general lack of awareness of the loss of biodiversity (McVay, 1993; Raven, 1997; Donohoe, 2003; Gil-Perez, Vilches, Edwards, Praia, Marques, & Oliveira, 2003; Coyle, 2004). If the majority of people are not aware of a problem, gathering an organized collective to address it is nearly impossible. Researchers from diverse fields have suggested that an international initiative is needed to make humans aware of this loss of biodiversity (Raven, 1997; Gil-Perez et. al., 2003; Cassils, 2004).

Environmental Issues in China

In an environmental history of China, Elvin (2004, p. xvii) states: “Chinese culture was as hostile to forests as it was fond of individual trees.” This quotation summarizes the paradox of environmental problems in China.

China is transitioning from a centrally planned economy to a socialist market economy within which millions of people have been lifted out of poverty, but these benefits have caused extraordinary environmental damage (Ma & Ortolano, 2000). The state of China’s natural environment today is extremely sobering. Environmental degradation at the cost of supplying the world with cheap resources, goods, and labor in

unsafe, polluting factories is dramatic (Ma & Ortolano, 2000). However, Elvin (2004) states that the origin of the environmental crisis in China predates modern times. China's history has been intimately interwoven with its environment, and citizens have garnered a living from nature just as other societies have (Elvin, 2000). Recently, urbanization and commercialism have allowed citizens to live far from the Earth, and traditional land ethics have been lost. Also, in the nearly three-decade long era of Mao Zedong, policies were instituted that resulted in such massive environmental degradation that China will suffer long into the future, even with current conservation measures (Shapiro, 2001).

Problems such as desertification, salinization, acid rain, climate change, and river damming have long plagued China (Edmonds, 2000). Today, pollution's effects on human and environmental health are pervasive problems. Rapid development combined with the exponential growth in China's human population is a root problem affecting China's environmental and biological health, including human health (Edmonds, 2000). Recent trends in forestry and biodiversity conservation in China reveal threats to wildlife conservation (Harkness, 2000). Harkness states that nature reserves are expected to produce enough revenue to provide a profit, as well as pay for their management. This is quite difficult because they are already in a depleted state. Reserves are often viewed as a drain on local resources rather than as a source of pride, tourism, or sites with biodiversity value. As a result, protected areas often exist only in name and continue to be exploited (Harkness, 2000).

According to Edmonds (2000) and Palmer (2000), one issue facing the Chinese populace is that many people are not aware of, and participating in, environmental issues facing their country. Public involvement in environmental preservation is a relatively new

phenomenon in China. China's current environmental problems are also still linked to repression of expression and other intellectual freedoms (Shapiro, 2001). China's urgency to achieve material progress, suppression of local traditions, and disruption of connection to the land has taken a toll on the human and natural world. Much information on the environment has been suppressed, so many people are not aware of the severity of the issues. However, as China becomes more global, Chinese citizens are obtaining information, and pursuing action (Elkington & Lee, 2005). The impact of population growth on the environment and the resulting impact of environmental degradation on China's people are being investigated (Banister, 2000). Although the one-child policy was implemented to raise individual economic prosperity, not because China's ecological carrying capacity had been exceeded; this policy is seen as having many benefits, including environmental and individual health (Banister, 2000). While Chinese are not as likely to complain about issues as Westerners (Vermeer, 2000), due to fear of political reprimand, this is changing (Ross, 2000). As awareness increases and Non-Governmental Organizations (NGOs) and conscientious media become more prevalent, politicians are forced to address citizen concerns (Economy, 2004).

The institutional framework for environmental protection in China includes key organizations SEPA (State Environmental Protection Administration), EPBs (Environmental Protection Bureaus), other units of the government, enterprises, citizens, NGOs, and the media (Economy, 2004). The formal rules in the framework include environmental laws and regulations. Informal rules include Chinese customs and unwritten codes of behavior. Economy (2004), states that informal rules and codes of behavior may be the hardest obstacles to overcome in protecting China's environment.

The issue of law enforcement is also problematic, and noncompliance to rules occurs frequently. Noncompliance occurs due to many complicated issues, including: informal codes of behavior, rapid changes in ownership of an industry, or unfeasible monitoring and assessment of environmental impact, mainly due to lack of proper staff training (Economy, 2004).

China is an ancient and civilized country possessing a profound cultural influence from Buddhism that insists on no killing and the idea that all life should be treated with kindness (Elvin, 2004; Song, 2004a, 2004b). Also, traditional beliefs lying in neo-Confucianism and Taoism, teach compassion for all living things (Tu, 1998). Yet this is not the frame of mind of most citizens in China (Song, 2004a; 2004b). Few people in China care about the feelings of animals or possess a concept of animal welfare (Song, 2004a). From the start of a child's life, children are taught to fear rather than love animals. Even common Chinese children's songs describe animals as dangerous or malicious, which may become ingrained in children as fear and possibly even disdain, creating a wide gap between animals and children (Song, 2004a). Song (2004a) believes that this disdain may lead to cruelty toward animals, including common atrocities perpetrated on bears (Ratloff, 2005) and countless others. Song (2004a) asks for serious thought into why such atrocities occur and why citizens of his country do not address them. He states that while many countries have enacted animal welfare laws, China is behind in this area. He contends that humans need to "absorb the essence" of animals so they can more easily incorporate a universal love of animals that may make such laws less necessary.

Global animal welfare and conservation will be greatly improved once it is embraced in China, a country that holds one fifth of the world population. No solution to Earth's environmental problems is possible without involvement from China (Shapiro, 2001; Elvin, 2004). To be culturally fair, Americans are also instigators of tremendous animal abuse and death, but shelter themselves from emotional discomfort by ignoring large inhumane factory farms for meat, dairy and egg products, and the effect of paving over natural areas on the animals that once called those areas home. Psychologists are being asked to help investigate the psychological factors that enable people to harm animals for human benefit (Plous, 1993).

Conservation Education

Conservation education professionals attempt to design programs to educate young people about the importance of wildlife, habitats, and behaviors in hopes they will be conservation advocates as youth and later as adults (Serrell, 1981). In a review of research on conservation programs, Zelenzy (1999) found that the most effective place to teach environmental education for behavior change was in the formal classroom rather than in nontraditional/informal settings and those interventions that actively involved young participants were most effective in improving environmental behavior. However, program duration may have been the determining factor in her findings (Zelezny, 1999). Residential environmental education programs, in comparison to other types of informal environmental education programs, provide the greatest gain in knowledge (Gilbertson, 1991), as well as attitudes (Carlson & Baumgartner, 1974; Ross & Driver, 1977-1978; Christy, 1983; Shepard & Speelman, 1986; Dettmann-Easler & Pease, 1999). Also, research evaluating increases in environmental stewardship behavior in program

participants in weeklong programs (Jordan, Hungerford, & Tomera, 1986; Dresner & Gill, 1994), found environmental behavior is positively affected. Research has shown that increased knowledge and awareness contribute to increased motivation to take action (Dresner & Gill, 1994). In a study of changes in self esteem, naturalist life skills, environmentally responsible actions and interest in the natural world, Dresner and Gill (1994) used pre-test, post-test surveys, qualitative analysis of students journals, and post camp parent surveys to assess these changes in campers after a two week residential environmental education camp. They found that all campers experienced a significant increase in self-esteem which Sia, Hungerford, and Tomera (1985) found to be a predictor of environmentally responsible behavior. Dresner and Gill (1994) also found that most campers displayed a significant increase in naturalist life skills, environmentally responsible actions, and interest in the natural world. Importantly, from surveys sent to parents after the camp experience, the researchers found that many parents reported that their children were engaging in many more environmentally responsible actions that they felt were due to the camp experience (Dresner & Gill, 1994). Using pre-test, post-test surveys, Jordan, et. al. (1986), found significant increases in environmental behavior among students who received instruction on both environmental issues and action strategies in a six-day residential environmental workshop. In her meta-analysis, Zelezny (1999) found that programs with youth that lasted 10 hours or more had significant effects on participant environmental stewardship behavior. Zelezny believes that longer programs provide more time for learning of new knowledge, emotional ties to the learning experience, and learning of skills to partake in environmental stewardship behavior.

According to Kruse & Card (2004), more research is needed on the long-term effectiveness of conservation education programs. Educators hope that conservation education is linked to environmental/wildlife conservation behavior (e.g., Cowan & Stapp, 1982; Gray, 1985; Gigliotti, 1990; Cortese, 1992; Olson, Lodwick, & Dunlap, 1992; Smith, 1992; Bowers, 1993). One of the assumptions is that education leads to an increase in awareness and positive attitude change, which ultimately improves environmental behavior (Bruvold, 1973; O'Riordan, 1976). Others (Leeming, Dwyer, Porter, & Cobern, 1993) believe the primary goal of environmental education should be to directly encourage more environmental stewardship behaviors. Many critics of environmental and conservation education argue that few programs actually encourage environmental stewardship because they do not actively involve students in the issues (Volk, Hungerford, & Tomera, 1984). Gardner and Stern (1996) found that educational programs that were successful in changing stewardship behavior presented convincing environmental information and actively involved the participants. Some researchers have found that environmental stewardship behavior is significantly related to experiences in nature, active participation in environmental activities outside the formal classroom, and duration of program (Jordan, et. al., 1986; Dresner & Gill, 1994). To establish the effectiveness of conservation education programs, more research is needed (Jordan & Seger, 2001; Kruse & Card, 2004), especially into how knowledge, attitude, and behavior are affected over time by conservation education and how these experiences are related to attitude and behavior change (Shepard & Speelman, 1985; de White & Jacobson, 1994; Mayer, 1994; Kruse & Card, 2004). It is critical that educators know the effectiveness of their programs so they can improve them, but most importantly to know if they are

helping wildlife to survive. A 2005 event that alarmed the conservation education community was the decision by one of the world's most recognized conservation organizations, World Wide Fund for Nature (WWF), to cut its entire education staff from its offices across the globe except for China (J. Braus, personal communication, October 2005). The reason given was that there was no data available that indicated their education programs actually helped wildlife survive (M. Mascia, personal communication, October 2005). Little research has looked at actual behavior change (Zelenzy, 1999; J. Heimlich, personal communication, December 2005). Zelezny (1999) found that most (16 of 18) of the studies she reviewed measured self-reported or inferred environmental behavior, not actual observed behavior. Determining the effect of programs on actual behavior would require longitudinal research. The behavioral ethogram developed for this dissertation research is an attempt to measure the effect of the camp on actual behavior within the program.

Environmental Education in China

In China, the environmental and conservation education movement is very young (personal observation, 1999-2006; Wu, 2002). Green clubs are appearing on university campuses, and non-governmental organizations (NGOs) have begun to disseminate curricula and training. In 1997, it was mandated that all schools in China would teach environmental education (CCICED, 1997); however, the infrastructure (teacher training, materials, and support) to accomplish this has not yet been put in place (Wu, 2002). Curriculum reform currently underway in China states that environmental education should become a logical and integral part of the new educational content (Poisson, 2001). The infusion of environmental and ecological education into every course and into other

non-formal methods of education in China is included as one of the six priority areas of development (Poisson, 2001).

More evidence of China's interest in promoting conservation through education is that in December 1996, the groundwork was established for the creation of Green Schools in China (Wu, 2002). The former State Environmental Protection Bureau of China and the former State Education Commission of China jointly issued the National Environmental Publicity and Education Action Essentials (1996-2010). The Essentials mandated the establishment of Green Schools to foster environmental education in schools, including kindergarten, primary, secondary, and tertiary education levels. To promote the development of Green Schools, the State Environmental Protection Bureau and the Ministry of Education gave a national award to Green Schools in 2000 and now present this recognition to National Green Schools every two years (Wu, 2002). However, system constraints hamper the implementation of environmental education in China, including pressure to pass school entrance examinations; traditional teaching methods of educators; shortages of equipment, finances, and trained teachers; low permanency of environmental education in schools; and limitations of environmental education criteria (Wu, 2002). Due to these constraints, very few schools in China even consider trying to obtain Green School status.

The mandate of infusing environmental education into the school system is commendable and the logical first step, however it is not sufficient for achieving implementation. A similar mandate was made in the United States in 1990 (National Environmental Education Act, 20 U.S.C. §§ 5501-5510, November 16, 1990), yet environmental education has yet to be mainstreamed in America. Wu (2002) and Y. L.

Zhao (personal communication, June, 2005) hope that the proposed transformation in China from examination-based to quality-oriented education will provide greater opportunity for environmental education. To make this happen requires improving environmental teaching methods and curricula, strengthening teacher preparation, and popularizing environmental education (Wu, 2002).

Two pioneering environmental activists, Tang Xiyang and Marcia Sparks established the first green camp in China in 1996 (Economy, 2004). This camp served to train future environmental activists and to draw attention to the plight of some of China's most precious natural resources and endangered species. Since then, green camps have appeared in China with a primary focus on natural history (J. P. Yu, personal communication, March 2004). It is not known whether these camps include the teaching of action strategies for campers.

Role of Zoos in Conservation Education

For decades, American zoos and aquariums have attempted to develop conservation education programs that not only awe and inspire their program participants, but also promote conservation behavior (Kruse & Card, 2004). As global biodiversity continues to decrease at alarming rates, zoos and aquariums, among the most popular leisure time and field trip sites in the world (Hancocks, 2001), are proactively investigating ways to impact those they reach. Zoos consider it a duty to the animals they care for to spread awareness and provide concrete tools for individuals to help (World Association of Zoos and Aquariums, 2003). In the past, zoos were designed to be viewing sites of the animals of the world, but zoos increasingly are designed to improve understanding of human relationships with the nonhuman world, foster positive attitudes

toward the environment and animals, and promote environmental stewardship (Hancocks, 2001; Kruse & Card, 2004). Zoos provide the public with an awareness of animals and habitats, which can lead to participation in the conservation and protection efforts needed for their survival (de White & Jacobson, 1994).

The conservation philosophy in American zoos and aquariums has been a slow-evolving process (Hancocks, 2001). In the past, conservation education was not a priority, but today is supported at the highest levels (World Association of Zoos and Aquariums, 2003). In an attempt to slow the rates of biodiversity loss on Earth, zoos are allocating more and more resources to conservation education (Schaaf, 1994; World Association of Zoos and Aquariums, 2003). Today, zoos are going a step further and sharing conservation education strategies with the countries their most critically endangered animals come from in hopes of increasing awareness in the people who have the most direct impact on those animals and their habitats (Jacobson, 1995; Conway et. al., 2001; World Association of Zoos and Aquariums, 2003).

Unfortunately, little research has been conducted on using informal settings for environmental education in developing countries (de White & Jacobson, 1994). Children growing up in an urban environment may have a hard time associating their well being with the existence of wildlife (de White & Jacobson, 1994). Education programs in zoological settings today need to be evaluated and revised to increase their effectiveness in promoting improved knowledge, attitudes, and behaviors among participants. Evaluation should be done throughout the planning and implementation stages of a program, however evaluation is seldom integrated due to a perceived lack of time, money, or expertise (Jacobson, 1991). However, inadequate training, lack of instructional

resources, and other limitations school teachers face in developing countries, added to the zoo's responsibility as a community resource, make the use of evaluation essential to provide zoo educational benefits that are more effective (de White & Jacobson, 1994).

These new ways of designing and operating zoos have not yet occurred in China, and small featureless enclosures containing animals in inhumane conditions continue to exist. The curriculum being investigated here invites students to think about the needs of animals, as well as how visitors should behave while visiting the animals' homes. The camp curriculum also provides a unique opportunity for the emerging field of conservation education in China. With the camp curriculum being the primary foundation for the future establishment of conservation education departments in zoos throughout China, the content and delivery of the curriculum is founded on forward thinking practices in conservation education. Zoological parks, nature centers, natural history museums, etc. can be valuable resources for urban environmental education in developing countries (de White & Jacobson, 1994).

Program Characteristics

Camp Format

There are many reasons that Zoo Atlanta chose a camp curriculum and program as its primary method of delivery of educational programming for zoos in China. The most compelling reason was extended contact with each participant (see Zelezny, 1999 for a review). It is well known that brief educational experiences do not provide the level of knowledge and gain in affect needed to change behavior; therefore, creating a curriculum and camp experience allowing for five days of contact was desired. Camps at the Research Base and Chengdu Zoo also allowed for outdoor experiences. The camp and

curriculum are designed to give participants experiences in semi-natural areas that are hoped to foster developmental needs. While camps in zoos in America are common and even expected, until now, no zoos in China offered such programs.

Outdoor Learning

It has been well documented that for children, play in nature is very important physically and psychologically (Nabhan & Trimble, 1994; Hart, 1997; Moore, 1997; Burriss & Boyd, 2005; Louv, 2005). Adult recollections of special places and preferred play areas provide testament to the importance of nature in childhood (Chwala, 1994, 1999). Natural areas have been found to satisfy some critical developmental needs of young children, and many scientists fear that without exposure to nature and outdoor play development could be hindered (Burriss, 2005; Louv, 2005). Increasingly, children have fewer opportunities to play outdoors, especially in natural or even semi-natural areas (Nabhan & Trimble, 1994; Louv, 2005). Many children never develop a personal bond with the natural world and may grow up believing they are separate from, versus a part of, the natural world (Louv, 2005). This is unfortunate because many adults claim that their most fond childhood memories are of events that took place in the outdoors (Chwala, 1994, 1999), and in fact many adults identify the most significant place in their childhood with the outdoors (Sebba, 1991). Children today also may never develop an awareness of the interrelationships that exist among all living things and may never give thought to the fact that all their food, air and water comes from the natural world (Partridge, 1984; Miles, 1986/87; Wilson, 1992; 1994). This is potentially dangerous because human health depends on the health of the natural environment.

One theory that supports the need for outdoor experiences is the Biophilia hypothesis. Biophilia is the term coined by socio-biologist Edward O. Wilson to describe what he believes is innate human affinity for the natural world (Wilson, 1984). Evolutionarily humans are connected to nature and are hardwired to be attracted to nature (for safety as well as serenity). Wilson describes how a human tendency to focus on life and lifelike processes might be a biologically based need and integral to development as individuals and as a species (Wilson, 1984; Kellert, 1993). Today, children in many countries have very few experiences in nature and with animals (Myers, 1998; Melson, 2001; Louv, 2005). Children need this exposure to sustain their interest, trust, and ultimately, concern (Myers, 1998; Louv, 2005). The camp program is designed to provide these experiences, as well as advise educators on how and why they should provide these experiences for children.

Choice of Age Level

It is widely accepted that children need to be a primary focus of conservation and environmental education programming because their morals and attitudes toward the natural world are developing (Carson, 1956; Cohen & Horm-Wingered, 1993; Wilson, 1992, 1993, 1994; UNESCO, 1997). Also, childhood leisure time interests are generally carried into adulthood (Eagles & Muffitt, 1990; Pomerantz, 1991; Basile, 2000; Kruse & Card, 2004).

> The young learners develop most of their final adult physio-neurological capacity quite early in life and therefore learning, especially of attitudes and values so important for the imaginative action in environmental problems, is vital and needs to be considered carefully in these sequences of life-long learning. UNESCO, 1977, p.88.

Young children are naturally curious, which facilitates the inquiry-based learning critical to and characteristic of good conservation education (Wilson, 1992). Young children have open minds and they are still very accepting of new information and ideas (Bredekamp & Copple, 1997). They are open to external influence and are still forming their own ideas and opinions about the world. The ideas and opinions that form potentially turn into lifelong values, ethics, and morals. Young children are fast and eager learners, and the natural world provides endless memorable learning opportunities (Burriss, 2005). Lastly, children are still fascinated by nature and science (Chaille & Tian, 2005); so positive attitudes can be developed before more formal introduction to these topics, often portrayed as difficult, or boring.

Another important consideration is that early years are significant in a child's development of his/her value system (Bredekamp & Copple, 1997). Many children are growing up in a way that provides few opportunities to consider the world of nature (Louv, 2005). Children are immersed in a way of living that shows little respect for the importance and diversity of the natural world. They are surrounded by over-consumptive automobiles, technology that keeps them isolated and indoors, disposable convenience items, and public media that claim new is always better (Schor, 1998; De Graff, Waan, & Naylor, 2001; Louv, 2005). In a review of the research, Zelezny (1999) found that environmental education was much more effective in inducing pro-environmental behavior among participants who were 18 years old or younger than among adults. It is hoped that if young people participate in an effective zoo program they may advocate for wildlife preservation in the future. In other words, these experiences may establish attitudes that form the basis of future attitudes (Marshdoyle, Bowman, & Mullins, 1982).

The ability of living things to hold children's attention should be used to help them understand the living environment, respect the appearance of the world, and take responsibility for its care (Katcher & Wilkins, 1993).

Also, young children appear to very naturally and willingly empathize with animals and feel compelled to help animals in distress (Myers, 1998; Melson, 2001; Thompson & Gullone, 2003). Child development specialists previously thought that children outgrew their affinity for, and connections to animals (Myers, 1998). Now scientists believe that something else is happening, that by children's development of distancing mechanisms, their empathy with animals diminishes and allows them to treat animals and the environment with lack of true understanding, compassion, and respect (Myers, 1998). One of the primary goals of the wildlife conservation camp is to reclaim and nurture those empathic feelings with animals in the hopes that children will be kind to animals, and in the future understand and act to preserve the natural environment for the animals they have grown to love and admire.

Camp Leadership

Rachel Carson (1956) believed that for a child to keep alive his or her inborn sense of wonder, he or she needs the companionship of at least one adult who can share it and rediscover with them the joy, excitement, and mystery of the world. A goal in the training of camp coordinators and instructors is to prepare role models for the children, models who exemplify new patterns of caring about and for animals and protecting the environment in a way that encourages children to care about animals. The nurturance of animals appears to be a universal of human nature, however appropriate nurturing does not simply appear without role models acceptable to the local community and adequate

opportunity to engage in such behavior (Irwin, 2003). People who are passionate and knowledgeable about animals and who model care, concern, and admiration for animals train camp instructors. In previous pilot training camps for instructors, the instructors were highly influenced by exposure to the trainers. They readily changed their own attitudes and behavior toward animals (personal observation, 2004; Bexell, Yu, Feng, Yang, & Xu, 2004b) and were inspired to model for their campers care and interest in animals as sentient beings. This modeling of respect and admiration for animals is critical to success in China, where the general population does not think of animals as needing respect and humane care (Song, 2004a).

The modeling component of the camp curriculum and experience is based on social learning theory (Bandura, 1977). Bandura states that most learning occurs on a vicarious basis by observing other people's behavior and the consequences that behavior has for them. Social learning theory has formed the foundation of a great deal of research into how social models influence behavior; for example, healthful eating and physical activity in urban youth (Carter, Birnbaum, Hark, Vickery, Potter, & Osborne, 2005), tobacco use (Melby, Conger, Conger, & Lorenz, 1993; Flay, Hu, Siddiqui, Day, Hedeker, Petraitis, Richardson, Sussman, 1994), alcohol use (Bahk, 1997), socially desirable behavior (Kahn & Cangemi, 1979), and most relevantly, environmental education (Horsley, 1977; Krasny & Lee, 2002). The capacity to learn by observation enables humans (and non-human animals) to acquire large, integrated patterns of behavior without having to form them by trial and error (Bandura, 1977). The overall goal of the camp curriculum and experience is behavior change. According to Bandura (1977), behavior change usually begins when someone receives extrinsic incentives for a

particular behavior, but to become incorporated into a person's repertoire, intrinsic incentives are usually necessary. Reinforcement in the form of approval by a respected model (camp instructor), acts as a prerequisite for the development of intrinsic reinforcement, formed by the developing relationships between students and animals in the program. A good deal of intrinsic reinforcement comes in the form of sensory feedback (Bandura, 1977). If that feedback is pleasant, in the case of emotionally satisfying relationships with animals, it is hoped that this new behavior serves to reinforce and maintain the performance of caring behavior toward animals.

Role models can show that behaviors have consequences. People's actions toward animals in China are stereotypical to the point of being readily predictable (personal observation, 1999-2006). Models whose behaviors differ from expected, predicted behaviors may be more influential than models that exhibit stereotyped conventional behaviors (Harris & Evans, 1973). The camp and curriculum promote innovative patterns of beliefs and actions toward animals to emerge through the modeling process of instructors, camp managers, and visiting scientists and educators.

Curriculum

Since 2000, the Zoo Atlanta and Chengdu team has developed and tested many education program methods and content. The curriculum used for this study (see Appendix B) exemplifies the best of those pilots, as well as study into the best ways that children learn. The curriculum also strives to address current wildlife conservation issues facing China today. Following are the theories and research that support elements in the curriculum and camp operations.

Active learning: Constructivism. The camp curriculum involves active engagement with animals, compatible with constructivist theory. In the United States, constructivist approaches are generally employed in informal education programs. Constructivism, or building one's understandings on prior knowledge, has been supported by the theories of Piaget (1929/1969), von Glaserfeld (1998), Dewey (1933), and Vygotsky (1978). Constructivists view learning as the process by which new information is explored, and the construction of meaning from this new information is linked to prior experiences and knowledge. Constructivism and experiential learning in China is not unheard of in theory, but is rarely put into practice (He, personal communication, October, 2001; French-Lee, Bexell, Korkmaz, Konantambigi, & Jarrett, 2003). Rote memorization of new material, without explanations of its connection to the real world, is still a common mode of teaching and learning in China (Y. L. Zhao, personal communication, June 2005). Through a pilot of our curriculum in 2004, it was learned that the instructors, mostly professional science teachers, as well as the students, deeply appreciated the constructivist and experiential style of teaching and learning employed (Bexell, Yu, Feng, Yang, & Xu, 2004b). Another pertinent development is that new science and social studies standards developed in China include learning through constructivist and experiential methods (Poisson, 2001). As with mandates for incorporating environmental education into school systems, these standards will be difficult to implement without training and practice in constructivist methods.

According to Piaget's theory of cognitive development children develop through maturation, experience with the physical environment, social transmission and "equilibration" (Piaget, 1929/69; Cowan, 1978). When children are exposed to new

information, their state of cognition is thrown into disequilibrium. By “equilibration,” making sense of the new information within their physical and social environments, the new information becomes synthesized and the child builds new understandings. Piaget (1929/69) suggests that cognitive development is fostered through playtime, inquiry based activities, and student-directed, spontaneous activities and experiments. These types of activities promote a child’s desire to question and think critically (Piaget, 1929/69).

Von Glaserfeld (1998), considered a radical constructivist, claims that students construct knowledge that is personal and meaningful to them based on direct experiences and social exchange with others. New information that is deemed meaningful to the student will be incorporated, and that not found meaningful will be disregarded.

Dewey (1933) stated that children learn best by doing and experiencing the world. He believed that for cognitive growth to occur, experiences should be engaging, meaningful, continuous, and interrelated. Dewey believed that children are born with a natural tendency to explore and ask questions which lends to their interaction with the environment and other people, creating meaningful experiences. The acquisition of knowledge through interaction and experience then becomes personal, self-constructed, and more meaningful to the learner.

Vygotsky’s (1978) ideas of constructivism are similar to Dewey’s but he viewed social and cultural factors influencing acquisition of knowledge as crucial. Vygotsky (1978) stressed that culture and social environment were the basis of all learning and that teachers should tailor lessons in a way that social and cultural connections to the student are meaningful.

Collaborative learning. The curriculum offers many opportunities for children to work together. Collaborative learning is an instructional method in which students work together toward a common academic goal (Johnson & Johnson, 1986). According to Vygotsky (1978), students are able to perform at higher levels when asked to work collaboratively than when asked to work individually. Group diversity in terms of knowledge and experience contributes positively to the learning process (Gokhale, 1995). Bruner (1985) contends that cooperative learning methods improve problem-solving strategies because the students are confronted with different interpretations of the given situation. The peer support system makes it possible for the learner to internalize both external knowledge and critical thinking skills and to convert them into tools for intellectual functioning. This type of learning is in contrast to typical learning methods in Chinese schools, using drill-and-practice learning and individualized rote memorization of factual knowledge. The camp experience provides shared time between peers and with the animals. Peer interaction while learning about a new topic fosters learning and authentic development of knowledge and moral attitudes about the new issue (Bandura, 1977; Katcher & Wilkins, 1993; Piaget, 1997). When an adult teaches a new topic, students learn what that adult thinks and feels, but when learning with a peer, the students can develop ideas together, without biases that adults often inadvertently, bring to the learning situation (Bandura, 1977; Katcher & Wilkins, 1993).

In China, with an extreme emphasis on individualistic, high stakes testing (Pepper, 2000), group projects are extremely rare (Wang, 2002). Students build their knowledge base through individual memorization practices allowing for the construction of a large database of known facts, but not always an understanding of real world

applications and use of that knowledge. Chinese education from k-12 is characterized with competition. Students consider school a competition arena because of high stakes testing, especially leading up to the college entrance examination. In such a learning environment, students develop a distorted competitive sense and selfishness as a result. Many students lack collaborative awareness and basic skills to collaborate with others either in schoolwork or outside activities (Wang, 2002).

Practitioners favoring collaborative learning claim that active exchange of ideas within small groups not only increases interest among participants, but also promotes critical thinking (Gokhale, 1995). Johnson and Johnson's (1986) research found that cooperative teams achieve at higher levels of thought and retain information longer than students who work as individuals. Shared learning time gives students an opportunity to engage in discussion, take responsibility for their own learning, in turn becoming critical thinkers (Totten, Sills, Digby, & Russ, 1991). Collaborative learning also decreases the competitive aspect of the learning situation, which may be a welcome change in a culture that academic competitiveness never ceases. China has been criticized for creating a cadre of intelligent but uncreative thinkers who have difficulty with teamwork once they have joined the work force. Globally, workers today need to be able to think creatively, solve problems, and make decisions as a team. Collaborative learning is a relatively new concept in China, being introduced and studied starting in the late 1980s and early 1990s (Wang, 2002). The development and enhancement of critical-thinking skills through collaborative learning is a primary goal of Chinese education today (Poisson, 2001). In our pilot of the camp in 2004, most of our instructors were classroom science teachers and they openly embraced and expressed their interest in our curriculum and teaching and

learning strategies. They immediately recognized the effectiveness of the camp curriculum methods and expressed an earnest interest in learning how to teach this way to promote student interest and retention of knowledge (Bexell, et. al., 2004b).

Cultural sensitivity. One of the most critical and difficult aspects of working in wildlife conservation in China is cultural sensitivity (Bexell, 2003). Consumption of wildlife and wildlife parts is a deeply ingrained, rich, and widespread part of traditional Chinese culture (Song, 2004b). A firm understanding of and sensitivity to, how and why wildlife is consumed in China is crucial. Animals are used for medicine, food, clothing, decoration, and pets; and many of these uses are of cultural importance and significance (Song, 2004b). Because of the large human population worldwide, these consumptive patterns are not sustainable. In educating the public in our programs, the beauty and richness of Chinese culture is embraced. When explaining that using wildlife is no longer sustainable, citizens understand that it is human overpopulation that causes the problem, not that traditions are wrong or bad (personal observation, 2000-2006).

One key to developing and conducting successful and sensitive conservation education programs in another country is working intimately with someone of the native culture to learn about traditions and help design programs that will be well received by all citizens (Jacobson, 1995; Hoage, 1998). This program was developed with Chinese colleagues living both in China and Atlanta to ensure that it is culturally relevant as well as sensitive.

Study of animal behavior. The study of animal behavior through direct experience and anecdotally through experts and camp instructors is an important aspect of the curriculum. The awareness of an animal's behavior gives children insight into the

animal's mind and feelings. While spending extended time and making careful observations, children realize for themselves that animals have thoughts, intelligence, feelings, and behaviors similar to their own. As participants realize these similarities, their interest in and appreciation of the animal usually increases. Through what has traditionally been considered anthropomorphizing of animal behavior, children are encouraged to see similarities between humans and non-human animals. With the growth of solid scientific evidence showing qualities of animal mind and behavior akin to human animal minds and behavior (e.g., Masson & McCarthy, 1996; Mitchell, Thompson, & Miles, 1996; Darwin, 1998; Poole, 1998; Goodall, 2000; Fossey, 2000; Moss, 2000; Griffin, 2001; Bekoff, 2006) conservation educators who not long ago were highly criticized if they used anthropomorphism to describe animal behavior, can now confidently use the scientific literature to describe human similarities with non-human animals. Using the scientific literature, conservation educators can use the findings from animal behavior research to engender human respect, care, and nurturance of our non-human animal kin. The study of cognitive ethology, how animals use their minds to adapt and survive, is a young and still often resisted area of science (Bekoff, 2006). The study of animal behavior opens camp participants' eyes and hearts to the minds of animals in hopes that they will consider the feelings and thoughts of animals in future encounters with them, or in terms of protecting their habitats.

Multiple points of contact between children and animals. Another foundation of the curriculum and camp program is the provision of *multiple points of contact* with the same animal, based on the research of Dr. Gene Myers (1998) and the philosophical writings of Paul Shepard (1996). According to Myers (1998) and Shepard (1996),

children must develop trust of new animals they meet, and the animals must be allowed time to trust humans. Children acquire this trust after observing how an animal reacts in different situations. With multiple experiences, a child can see consistency of behavior, involving intentions and personality of the animal, and better predict an animal's behavior in future interactions (Myers, 1998). The camp program provides multiple points of contact with animals to provide continually repeated experiences that allow an animal to become a familiar individual, an acquaintance. This corresponds with how humans develop relationships with new people. Established human-animal connections provide the experience of attunement: two living creatures responding to the core self of each other (Lasher, 1998; Myers, 1998). Relationships with animal companions can provide a safe, responsive setting for inner growth (Lasher, 1998).

Human-animal bond. To connect with an animal it is believed that children need to first appreciate and love an animal, and not be faced with sadness caused by the plight of animals (Sobel, 1996). Our programs are designed to foster the human-animal bond in participants as well as provide concrete ways to care for animals and nature. Knowledge about animals both in the wild and in captivity is presented in appropriate contexts to develop realistic concern. However, the focus is on love and compassion for animals, and how to show care for them both in captivity and the wild.

Another way to foster the human-animal bond involves giving information about animals so the children can see the animals as individuals, not just as a species (Myers, 1998). The curriculum highlights traits that are similar between children and animals, while emphasizing special and exceptional traits of animals. This strategy is commonly used in humane education (Raphael, 1999; Weil, 2004) and the camp curriculum features

many shared aspects with humane education programming (Weil, 2004). People often are more interested in, and in turn, protective of, animals that are “intelligent,” strong, fast, cute, etc. (Hoage, 1989). All living things have special qualities that help them survive, so the camp experience makes those qualities apparent and inspiring to participants. Creating bonds between young children and animals may provide a bridge to good environmental stewardship behavior later in life (Myers & Saunders, 2002). Young children tend to have a natural affinity for animals, and are able to identify them as social others (Myers, 1998). In identifying with animals on a social level, relationships form due to consistency of behavior and expectations that confer comfort and a caring bond. When a person cares about another, human or animal, that person also tends to care about the other’s environment. It is hoped that by providing opportunities to form bonds with animals, students may begin a lifetime of care toward animals and the environment.

Cross-cultural continuity of concern. A hypothesis the researcher feels has strong merit and promise for this program is that a cross-cultural continuity of concern for animals and empathy with animals may exist in children (Turiel, 1983; Myers, 1998; Hoffman, 2000). The literature documents empathy in young children across cultural lines with most children expressing empathic feelings toward the suffering or discomfort of other people (Turiel, 1983). A study among Chinese and American children strongly suggests that such empathy for animals exists (Bexell, Jarrett, Yang, & Tan, 2005). However, as children develop cognitively, they realize there are inconsistencies in what adults say and do to animals and the environment, causing discontinuity in children’s concern (Myers, 1998). The camp curriculum is designed to promote empathy and concern.

Assessment of Camp Experience

Choice of Mixed-Methods

A mixed-methods approach was chosen because of the sensitivity of the topic at hand, and complexity of developing a valid quantitative assessment of caring/empathy and propensity for environmental stewardship. The creation of a valid and reliable survey instrument is desired to evaluate the camps' effects on participants reliably and efficiently. The triangulation of the data sources in this study will provide reinforcement and a clearer understanding of student answers on the data collection instruments. The qualitative data will also allow the finding of additional things not asked for in the quantitative survey. Another reason for the qualitative data is to alleviate problems involved with social desirability in responses to the survey questions.

Choice of Variables

The combination of variables being examined in this study is an attempt to provide more research on the connection between knowledge of conservation issues and attitudes toward issues, and subsequent action for animals or environmental issues. According to Kruse & Card (2004), research on these variables and their relationships needs further study.

Knowledge. A purpose of conservation education research is to determine whether children increase in knowledge of animals and their needs. Knowledge is a variable measured in most assessment of conservation education programs (e.g., Disinger, 1982; Sia, Hungerford, & Tomera, 1985; Leeming, et. al, 1993, Dresner & Gill, 1994; Zelezny, 1999; Kruse & Card, 2004). Increased awareness and understanding of environmental problems, including motivating actions to help resolve them, are essentials in

environmental programs (Miles, 1991). Research shows that increased awareness and knowledge contributes to increased motivation to take action and without knowledge of environmental issues and action skills it is unlikely that students will act (Dresner & Gill, 1994). A potentially critical component of conservation education programming that has been absent from most programs in the past is the teaching of animal needs and student practice of learned skills of providing for animals needs. Conveying this type of knowledge and skills, versus basic natural history, may be a critical knowledge base to later animal compassion and conservation behavior (Raphael, 1999; Myers, Saunders, & Garrett, 2003).

Caring. Another purpose of this conservation education research is to determine whether a child's caring about animals and the environment increases. This variable has not typically been used in other studies, with most looking at attitude change (e.g., Bruvold, 1973; O'Riordan, 1976; Sia, et. al., 1985; Zelezny, 1999; Kruse & Card, 2004). There are many reasons that humans might care about or have certain attitudes toward animals such as aesthetic, ecological, or even utilitarian reasons (Kellert, 1978, 1980) that could be stressed in conservation education programs to get participants to care more or have a more positive attitude. Care, as a variable, is based on the Myers and Saunders (2002) hypothesis that caring for/empathy with animals could be a precursor to future environmental stewardship behavior. Theories of empathy and moral development have either focused on the behavioral, cognitive, or emotional dimensions of prosocial moral development (Hoffman, 2000). Hoffman (2000) combines the three dimensions and provides a framework of prosocial moral development in children. He states that the starting point for development of morals is empathy - one feels what is appropriate for

another person's situation, rather than one's own. Hoffman (2000) believes that moral development is rooted in empathy and that our highest morals are founded on empathic feelings we experience, often vicariously, toward others that make us want to act with kindness toward them. While most of his research (see Hoffman, 2000 for a review) has focused on the development of moral behavior toward humans, the researcher hypothesizes that the same theories can be applied to children's relationships with animals.

Hoffman (1979), states that what he calls empathic distress or, awareness of another's distress, is a prosocial motivator. This is evidenced in his findings (Hoffman, 1979) that empathic distress correlates positively with people's helping behavior. He has also found empathic distress not only correlates with, but also precedes and contributes to helping behavior. Lastly, like other motives, empathic distress diminishes in intensity when one helps, but continues at a high level when one does not help (Hoffman, 2000). People in China do not tend to think of animals as sentient, and this has made for extreme cases of animal abuse and insensitivity (Song, 2004a; Ratloff, 2005).

Humans tend to act emotionally to offenses they do not feel are fair (Hoffman, 2000). The development of caring about *nature as a victim* may motivate people to take a stance against the injustices inflicted on the natural world. Hoffman (2000) recommends teaching children to look beyond their immediate situation and ask how their actions will affect others, not only now but also in the future.

Propensity for behavior and actual behavior. Finally, conservation education research attempts to determine whether students will take action to improve the natural environment. The ultimate goal of conservation education programs is that participants

change their behavior to help preserve wildlife and/or the natural environment (Serrell, 1981; Kruse & Card, 2004). According to Jordan & Seger (2001) participants in zoo conservation education programs experienced positive changes in knowledge and concern and possibly as a result, increased participation, personal responsibility and ability to help. Another study found that when an animal husbandry component was added to a conservation education program, children reported more knowledge and improved attitude, as well as more behavior intent to act environmentally responsible (de White & Jacobson, 1994). In the study by Kruse and Card (2004) however, behavioral intent did not increase in the student self-reports after a residential camp experience.

Another aspect of propensity is transferring new skills to others that participants will come into contact with after the program. Practitioners must empower participants to share their new knowledge, attitudes, and skills with people they come into contact with (Ballantyne, Fien, & Packer, 2001). In the case of animal welfare and conservation and environmental preservation, often children have more current and reliable access to knowledge and skills than adults and there is evidence that children who participate in environmental education programs can positively influence the adults in their lives (Uzzell, 1994; Ballantyne, Connell, & Fien, 1998).

A measure of behavioral intent is not the same as a measure of actual behavior. For years, conservation educators have attempted to change environmental behaviors and naively assumed they were accomplishing that goal. With the continued deterioration of earth's wildlife and nature, conservation educators are now facing the fact that their efforts have not yet been successful. A theory that may be helpful in designing research in this area is the theory of planned behavior (Ajzen, 1985). According to that theory,

behavioral performance can be predicted from people's stated intentions to perform the behavior in question and from their perceptions of control over the behavior (Ajzen, 1985). Conservation education evaluators have hoped that by asking participants at the end of programs whether they would change their behavior due to what they had learned, if they said "yes," then success had been achieved. Unfortunately, what research finds is that people do not always behave in accordance with their attitudes (Doll & Ajzen, 1992). However, Fazio & Zanna (1978a, 1978b) and Regan & Fazio (1977) have found that prediction of behavior from verbal attitudes tends to improve to the extent that the attitude is based on direct experience rather than on indirect experience or second-hand information. This gives conservation educators direction in attempting to plan successful conservation education programs, in that it is known that direct, hands-on experiences with animals and nature are important in causing action.

The theory of planned behavior proposes three independent determinants of intention (Doll & Ajzen, 1992). The first is the view of the actual behavior as either positive or negative (see also Ajzen & Fishbein, 1980). The second predictor is the perceived social pressure to perform or not perform the behavior. The third predictor is the degree of perceived behavioral control, or the perceived ability to perform the behavior. This third aspect is assumed to reflect past experience as well as anticipated obstacles. In general, the more favorable the attitude and subjective norm with respect to a behavior, and the greater the perceived behavioral control, the stronger is an individual's intention to perform the behavior under consideration (Doll & Ajzen, 1992).

Prior experience with a behavior is an influential source of information for the development of attitudes, subjective norms, and perceived behavioral control because of

feedback obtained when performing the behavior (Ajzen & Fishbein, 1980; Doll & Ajzen, 1992). By actually performing the behavior a person can learn about its consequences, about needed resources, and about the reactions of other people. Attitudes, subjective norms, and perceptions of behavioral control formed under direct-experience conditions are more accessible in memory and therefore provide guides for the development of behavioral intentions (Doll & Ajzen, 1992) and further support of the curriculum being examined here.

An essential tool in animal behavior research is an ethogram, which is a list of the behaviors the researchers will watch for and record to answer their research questions (Martin & Bateson, 1993). There are no studies known of by the researcher that use an ethogram to look at human behavior as a result of a conservation education program. The reason the researcher chose to use an ethogram was to record actual camper behavior by an observer throughout the camp experience and avoid the use of self report that could be inflated due to social desirability (Kruse & Card, 2004).

Summary

This chapter reviews the theories and research that support the need for conservation education in China in a children's camp format. The rate of loss of wildlife and natural places on Earth necessitates that adults take responsibility for fostering the next generation's attitudes and beliefs about the natural world to promote reverence and preservation. The foundation of the camp curriculum and the research methods used in this study are based on many fields of inquiry, as well as four years of observations, investigations and pilot programs in schools and informal science settings in both China and the United States. Research suggested the importance of long term programs, outdoor

learning experiences, best age level for effective conservation education programming, and the importance of modeling by camp instructors. Also, research suggested what children need to learn and be exposed to in order to develop bonds for building a caring attitude toward animals and the environment. The curriculum is founded on theories and research on the following: active and peer collaborative learning, cultural sensitivity multiple points of contact and the human-animal bond, and a hypothesis of cross cultural concern for humans as well as animals.

Also this chapter referenced the research and the need for research that influenced the choice of variables: knowledge, caring, propensity for action, and actual behavior toward animals and the environment. The decision to use a mixed-methods approach to examine the efficacy of the camp was based on the weakness of studies that rely on surveys alone or that draw conclusions from only one measure. It is highly desired by the wildlife conservation education community to know conservation education efforts can be effective, and this investigation, with the foundation in the literature explored above, is an attempt at investigating this issue.

CHAPTER 3

METHOD

The purpose of this chapter is to describe the methodology used to determine whether participation in a wildlife conservation education camp, designed by a team from Zoo Atlanta, the Chengdu Research Base of Giant Panda Breeding (Research Base), and the Chengdu Zoo was effective in positively changing students': (a) knowledge of animals, (b) care about animals, (c) propensity for environmental and wildlife stewardship, and (d) compassionate behavior toward animals and nature.

Participants

Participants in the camps were 6-12 year old students from Chengdu, Sichuan Province, China. The students and their families learned about the camp through advertising brochures, recruitment school visits from camp coordinators from each facility, articles in newspapers, and announcements on radio and television.

Twenty-three students at the Research Base and thirty-seven at the Chengdu Zoo participated in each camp, totaling 60 campers in all. Parents of all subjects of this research signed parent permission forms (see Appendix A) and each student personally assented to fill out the research instruments as part of the camp experience. At the beginning of camp, the following statement was read to the students in Chinese: "We would like to ask if we could use some of the writing that you will be doing in camp to help us determine if the camp you are attending is good. Are you willing to help us by letting us use your work? ___ yes ___ no."

There were eighteen boys and six girls at the camp at the Research Base, and eleven boys and nineteen girls at the camp at the Chengdu Zoo. Students came from middle to upper socio-economic families, which we expected due to the camp fee. This camp experience was the first time we have charged for our conservation education programs at the Research Base and Zoo. In the past we were very fortunate to obtain grants to pilot our programs and offer them free of charge to teachers and students. With successful programs piloted and good reputations established, the next phase of education departmental development at the Chengdu institutions stresses the process of making the departments self-sustaining, which is a critical component in the success and maintenance of conservation programs (Jacobson, 1995). The charge at the Research Base was 700 RMB (87.50 USD), and covered all meals, housing, and camp activities for five days and four nights. This is a significant amount of money for families in China where the average annual income for urban citizens in Sichuan Province is 12,441 RMB (1,555 USD) (China Statistics Press, 2004). At the Chengdu Zoo the charge was 200 RMB (25 USD). The original charge for the camp at the Zoo had been 600 RMB (75 USD), but was dropped at the last minute (literally three days before camp started) because not enough campers registered to fill even one session. As soon as the price was dropped, the program filled to over-capacity (30) with 37 campers.

Conservation Stewards Camp Experience

Setting

The camps were held at two locations in Chengdu, the capitol of Sichuan Province, a southwestern province of the People’s Republic of China. Eighty-five percent of the wild giant panda population resides in Sichuan Province, making Chengdu the

centralized location for giant panda research, conservation, and tourism. The Research Base and Chengdu Zoo, with financial and staff support from Zoo Atlanta, established the first formal conservation education departments in zoological facilities in China in 2000. The three partner institutions have worked closely together to develop, pilot, and institutionalize programs and the departments. The curriculum and camp being evaluated here are the result of four years of observations, study (through literature and curriculum review), development, implementation, and testing.

Chengdu Research Base of Giant Panda Breeding. Founded in 1987, the Research Base is located in a northern suburb. It has recently become a high profile tourist attraction and endangered species research facility, attracting visitors and scientists from around the world. Leaders of the Central Government, Provincial Government, and Municipal Government, as well as foreign parties, have contributed to building the 37-hectare (91.5 acre) facility, which includes research buildings, laboratories, veterinary facilities, a nursery, a welcome center, a giant panda museum, and naturalistic enclosures for giant pandas, red pandas and black-necked cranes. With an active research program and plans to expand to 203 hectares (501.5 acres), the Research Base represents China's highest goals for environmental protection, conservation, and wildlife management. Its mission is the preservation of endangered indigenous Chinese wildlife through research, conservation, and education. The animals at the Research Base live in large naturalistic habitats, which help visitors understand how these animals live in the wild. Many types of bamboo, trees, and flowers thrive at the Research Base, creating a feeling of immersion into a natural landscape. Human-made structures are designed to

blend well with the natural scenery. Students stayed in the hotel at the Research Base, and all camp sessions were held at the Research Base.

The Chengdu Zoo. This is a fairly standard Chinese provincial zoo. It is a large park that also includes an amusement park. Animals are housed in the old fashioned style of small featureless concrete and iron blocks for best viewing by visitors. The zoo was originally built in 1953, in an area that now is home to the Bai Hua Tan Garden. It was moved to its current location in northwestern Chengdu in 1976. The zoo covers 17 hectares (42 acres) and houses 206 different species of animals, with 3,010 individuals. The zoo attracts over 2.5 million visitors a year. The mission of the Chengdu Zoo is to protect the environment and to promote love of animals.

Zoo visitors subject the animals to a good deal of harassment. There is no attempt at providing privacy or environmental enrichment. The scenario at the zoo is in stark contrast to that at the Research Base. Zoos in China realize that steps need to be taken to improve the welfare of their animals, but at this time do not have funding or expertise to do so. The difference in scenarios at the Research Base and the Chengdu Zoo could affect the camp experience and this was examined through the data. Students slept in tents set up in the education building each evening and broken down each morning. All camp sessions were held at the zoo.

The Camp Curriculum

The curriculum was composed of five units. The units were designed to take students along a continuum of care: from meeting and recognizing animals as individuals with distinct personalities, feelings, and similarities to us, to caring about them as individuals, all the way to caring about the environment that these new animal friends

depend on for survival, and finally to caring enough about animals and their habitats to change students' own personal behaviors based on knowledge and, most importantly, skills they learned during camp. The introduction to the Conservation Stewards Camp Training Manual, which gave the philosophy, objectives, and unit descriptions for the instructors, is found in Appendix B.

Unit one, *Facility Tour*, consists of a single lesson designed for students to explore the grounds of the organization's facility (for this research, the Chengdu Zoo and the Research Base) and meet the animals they would be studying and getting to know for the next five days. Each student chose an animal that he/she introduced when the group reached the animal's exhibit. Each student received an animal identification sheet with a picture of the animal, and a brief description of the animal's life history and personality. The students studied their respective sheets, and when the group arrived at the animal's enclosure, introduced the animal to the group as they would a friend. Other issues that students were exposed to in this unit were wildlife conservation issues, especially the Asian Turtle Crisis, enclosure design, natural history of featured species, animal nutrition, animal personalities, proper treatment of animals in zoos, and appropriate behavior for visitors. This unit served to introduce the animals as individuals, and help the students feel comfortable in their new surroundings, with the other students, and with their instructors with whom they would spend the next five days. Summer camps and being away from home for an entire week, are not common occurrences in China, and most children have never had this experience. We had to ensure their comfort because it is well known that it is hard to learn when you are uncomfortable or stressed (Maslow, 1954). The objectives for unit one were: (a) know animals are individuals; (b) know that

animals have feelings; (c) know animals are connected to their environment; and (d) model respectful behavior toward animals during camp.

In unit two, *Caring for Animals*, three lessons and accompanying activities were designed to teach students how to take complete care of animals. While students in China have been found to know the basic care that animals need (i.e., food, water, shelter, and even care) (Bexell, Yu, Feng, Yang, & Xu, unpublished data, 2004), there is a lack of understanding of species' specific needs (Luo, personal communication, 2000; personal observation, 1999-2004; Bexell, Yu, Feng, Yang, & Xu, unpublished data, 2004). For example, it is very common for people to feed their dogs and cats a large amount of rice, and very little meat; this is not healthy or appropriate for carnivorous species, and pets of all species have extraordinarily short life spans, often in inhumane conditions. In this unit, students learned that it is very important to do research before attempting to care for an animal so they are provided with what they need to be physically and psychologically healthy. In the first lesson, instructors modeled complete care for small animals such as rabbits, hamsters and guinea pigs. Students learned how to care for the animals, as well as appropriate ways to touch and/or handle them. In the second lesson, students focused on four important topics in animal care: veterinary medicine, diet and husbandry, enrichment and exercise, and how to do research before getting a pet. In the third lesson, students learned about environmental enrichment for animals, the importance of enrichment for captive animals, and how to make and provide enrichment for some species. The objectives of this unit were that students would: (a) know how to take complete care of animals based on specific needs; (b) know animals are individuals; (c) know animals are intelligent; (d) know that animals have feelings; (e) know all animals have value; (f) know positive conservation choices they can make; (g) be aware of the emotional bond that can form between people and animals; (h) recognize the emotional state of an animal based on its behavior; (i) model respectful behavior toward animals during camp; (j) have an increased interest in providing complete care for a pet; (k) have increased interest in making positive conservation choices in their daily lives (i.e., resource consumption choices, pet choice, respect for wild animals, disposal of litter); and (l) have an increased interest in sharing their compassion for animals. In unit three, *Animal Observations*, three lessons were designed: (a) to teach students about the importance of animal behavior research; (b) to show how to conduct basic animal behavior research; and (c) to allow students to get to know an animal of their choice so well that they form a bond with that animal and can imagine that animal's behavior and emotional and physiological state based on observed behavior patterns. It is thought by some (Kogler & Stueber, 2000) that humans can predict another's behavior

based on the combination of general observed behavior patterns (in this case, observed and documented empirically) and empathy; based on knowledge of one's own personal understandings of how one reacts in similar situations. While this aspect of empathy has not been scientifically documented in the study of the human relationships with animals, I felt strongly that this objective was worthy of inclusion. This objective may be a requisite endeavor for effective conservation education programs. The objectives of this unit were to have students: (a) know animals are individuals; (b) know animals are intelligent; (c) know that animals have feelings; (d) know animals are connected to their environment; (e) be aware of the emotional bond that can form between people and animals; (f) identify the emotional well being of an animal based on its behavior; (g) model respectful behavior toward animals during camp; and h) have an increased interest in sharing their compassion for animals.

In unit four, *Animal Expert Presentations*, two lessons were designed for students to meet and learn from three animal experts about care for and bonding with animals they love and for which they provide care. The experts were a combination of pet owners, animal behavior researchers, veterinarians, and keepers or curators. This unit was deeply influenced by social learning theory and modeling (Bandura, 1977). In the pilot of the camp and curriculum in 2004, it was observed that this unit was by far one of the most powerful of the five (Bexell, Yu, Feng, Yang, & Xu, 2004b). The objectives of this unit were that students would: (a) know animal are individuals; (b) know animals are intelligent; (c) know that animals have feelings; (d) know all animals have value; (e) know positive conservation choices they can make; (f) be aware of the emotional bond that can form between people and animals; (g) recognize the emotional well-being of an

animal based on its behavior; (h) model respectful behavior toward animals during camp; (i) have an increased interest in providing complete care for a pet; (j) have increased interest in making positive conservation choices in their daily lives; (k) have an increased interest in talking about positive environmental choices with others; and (l) have an increased interest in sharing their compassion for animals.

In unit five, *Discover Natural Wonders*, three lessons and accompanying activities were designed to help students understand biodiversity and its importance, to discover the awe and wonder of nature, and finally, to understand the links between the animals they have grown to love and admire and their natural habitats. Importantly, throughout the week students learned skills and strategies to make changes in their daily lives to help protect and conserve animals and to treat them with compassion. As a result of participation in the full camp curriculum, it was predicted that students would want to make changes in their own behaviors, and of people with whom they share their lives, to help animals and the environment. The objectives of this unit were that students would: (a) know all animals have value; (b) know animals are connected to their environment; (c) know the health of the environment is important for all living things; (d) understand that biodiversity is important; (e) know positive conservation choices they can make; (f) express that they appreciate the value of biodiversity; (g) have an emotional connection (i.e., positive feeling) to the health of the natural world; (h) model respectful behavior toward animals during camp;(i) have increased interest in making positive conservation choices in their daily lives; and j) have an increased interest in talking about positive environmental choices with others.

Camp Organization and Schedule

On each day of camp, seven hours were allocated to completing the lessons and activities in the curriculum. Each evening, students received two guiding questions for their journal intended to help them reflect on the day's activities. Students also had an English lesson in the evening (this was a significant selling point of the camp). During the remainder of the time, students played games, sang camp songs, watched nature videos, and had a party one night. Students were divided into three groups, each with three instructors.

On the morning of the first day of camp, students completed the pre-camp assessments, learned the rules of camp and met the camp instructors, coordinators and other campers. Throughout the rest of the day, students completed the *Facility Tour* unit, Lesson 1 of *Caring for Animals*, and Lesson 1 of *Animal Observations*.

On days two and three of camp, each student observed her/his respective animal for the *Animal Observations* unit, met animal experts, cared for the small animals and completed their focus topic for *Caring for Animals*. On day four of camp, students observed their animal, met an animal expert, cared for the small animals and completed their focus topic for *Caring for Animals*, and completed Lesson 1 of *Discovering Natural Wonders*. On day five, students completed Lesson 3 of *Animal Observations*, cared for the small animals and completed their focus topic for *Caring for Animals*, completed Lessons 2 and 3 of *Discovering Natural Wonders*, and had camp wrap-up activities. Lastly, they completed the conservation steward's camp survey, vignettes and end of camp questionnaire.

Instructors and Training

Full time coordinators were hired in the summer of 2004 to run camp programs at the Research Base and Zoo. The camp coordinators were both recent college

graduates with degrees in English and biology, respectively, and trained on how to run camps during the 2004 pilot program. Zoo Atlanta staff and camp coordinators conducted five-day intensive training in 2005 for camp instructors at the Research Base during the week of July 11-15, and at the Zoo July 30-August 3. With both sites being so starkly different in design, mission, and species, it was essential to conduct separate instructor trainings. One week of children's camp was held at each institution following instructor training. A core of five instructors (three from the Research Base and two from the Zoo) taught at both sites.

For the 2004 pilot program, all lead instructors were science teachers (usually head science teachers) from the campers' schools. To those were added 10 student volunteers from local universities, making the instructor-to-student ratio 1:5. In 2005, five instructors at the Research Base were full time staff of the Research Base or Zoo and three were highly experienced educators from outside. At the Zoo, all instructors were staff of the Zoo or Base except one who was a retired science teacher. The 2005 instructor ratio was approximately 1:4. During training, instructors participated in the activities and spent the night, just as their campers did the following week. They also learned extensive background information on biodiversity, animal care, animal behavior, best teaching practices, modeling of good behavior with animals, wildlife conservation issues, natural history of featured animals, and camp logistics.

Documentation of Camp Implementation

Lessons from the 2004 Camp

We found in the pilot of the camp in 2004 that the two sessions ran very differently. In the first session, it was the first time the new coordinators had ever run a camp, and the first time any instructors themselves had ever had experience with teaching and running a camp. Camp experiences in China are extremely rare, so none of the coordinators or instructors had ever been to camp as children to even have that as a point of reference to mimic a typical camp experience and atmosphere. The first three-day

camp in 2004 went exceptionally well considering it was the first attempt, but many of the activities were not carried out as intended. A poignant example is the way that Animal Observations was taught. We found that during training we had not successfully taught coordinators or instructors thoroughly enough about the importance of animal behavior research, or about the personal connections that are made when children spend considerable time observing their respective assigned animals. Unfortunately, this led to the activity being portrayed in a way that students did not understand the point of the observations, and quite frankly disliked doing them. We realized after the first session and discussions with instructors about student dissatisfaction with the activity, that it was imperative to explain why observing animals was important, as well as that the instructors needed to understand its importance and have enthusiasm for the activity. The animals were spread out over great distances at the Research Base, which meant much walking in the heat. Also, giant pandas sleep a great deal of the time, so observations were not always exciting to the campers. However, the researcher knew that an instructor with a passion and interest in animals could make this a successful experience for students, if it was explained correctly. Discussing this issue with coordinators and instructors during afternoon team meetings remedied the situation. Then in the second session of camp, students enjoyed this activity, learned meaningful scientific strategies, and got to know their chosen pandas as the lessons intended. Throughout all of the activities, the camp coordinators and I took notes on the functioning of activities.

Data Collection through Field Notes

Knowing the challenges in implementing the 2004 camp sessions and the importance of field notes in making adaptations, documenting how the 2005 camp was

implemented was very important for camp modifications and for the research. To be able to draw conclusions about the experience the students had at camp and the effect of that experience on their knowledge of animals, care about animals, propensity for environmental stewardship, and compassionate behavior toward animals, researcher field notes were collected throughout the entire camp experience to determine whether each camp operated as intended.

Another critical component of the researcher field notes was documentation each evening of instructor meetings to debrief about happenings of the day. During this time I asked all lead instructors (assistant instructors stayed with students) and coordinators to discuss any obstacles they encountered, any issues that the students brought up with them, and the activities that were most and least successful. The camp coordinators and I both took notes during these meetings and then compared them to ensure we had all the information recorded for the day and that our interpretations of the discussion matched. Evenings were also spent with the students to observe and record their evening experiences. Because evening experiences may heighten enjoyment of the camp, or make it less pleasant (e.g., some campers in 2004 did not like the night they spent in tents because they smelled musty), such experiences could shed light on different outcomes of the camp. These data helped determine the effects of the curriculum, versus any other obstacles that occurred.

Analysis of the Field Notes

The researcher field notes were collected in a reflective journal and utilized to inform each new day of camp, each session of camp, and to reflect upon why certain incidents might have occurred. This data served to help distinguish whether any

discrepancies in level of curriculum goal attainment might have been attributed to logistical problems not related to curriculum design.

Although the primary purpose of the researcher field notes was to document the implementation of the curriculum, these notes also documented level of student engagement, enthusiasm for camp and the activities, changes in behavior throughout camp, and anecdotes shared with the researcher and other camp staff. The researcher field notes were also used to look for unintended effects and other actual effects (Patton, 1996) from such things as: what characteristics of instructors, participants, partners, etc. influenced the use and effectiveness of program components.

Student Data Instruments

To answer the four research questions posed in this study, a mixed-method approach, including qualitative and quantitative data collection methods was used. Five instruments were used: a pre and post camp survey, pre and post camp responses to vignettes about human-animal interactions, a student behavior ethogram, an end of camp questionnaire, and student journals. The following instruments were developed or adapted to answer the research questions of this study.

Chengdu Conservation Stewards Survey

A quantitative survey designed to evaluate residential camp programs at the Busch Gardens Zoo (Kruse & Card, 2004) was modified for use in this research. The survey questions are divided into three sections related to goals of the curriculum and research questions in this study: knowledge, care, and propensity. This survey was administered the first day of camp and again at the end of camp. The survey is found in Appendix D. The survey addresses:

1. Knowledge gained from the program with six questions concerning: (a) protection of the environment, (b) protection of animals, (c) the social lives of animals, (d) wild animals as pets, (e) wildlife-environmental interactions, (f) and proper care of pets.
2. Development of care as a result of the program with ten questions concerning: (a) local wildlife and habitat, (b) non-native wildlife and habitat, (c) protecting wildlife and nature, (d) pets, and (e) human-animal relationships. This section also contains three questions that are more neutral to help determine if students are responsive to the survey, or choosing the socially desirable rating.
3. Propensity for environmental stewardship behavior toward animals and nature as a result of the program, with ten questions concerning: (a) using recycled materials, (b) litter, (c) making good personal behavior choices to help animals or nature, (d) encouraging others to behave in a way that helps animals or nature, and (e) writing letters or sending e-mails for the promotion of environmental activity. This section also contains two neutral questions.

The original instrument was reviewed by a panel of experts, including a board at the zoo and a statistician from the University of Missouri to establish content-related validity. They used a Cronbach's alpha internal consistency reliability test for the knowledge and attitude (changed for this study to "care") sections of the instrument, which yielded values of .85 and .93 respectively. It was not explained why they did not statistically analyze the behavior section. The Kruse and Card (2004) instrument was modified for this study in terms of some of the content, appearance, and survey procedure. Questions 1 and 4 of the knowledge section remained the same and the rest

were modified for content. The “attitude” section on the Kruse and Card survey was changed to “care” in the present survey. Questions 9 (only the species were changed), 14, 15, and 16 were changed in this section, the others remained the same. One question from the original survey was not included in the final analysis. The question omitted was “Getting to go swimming in a lake.” The reason this question was omitted was that the majority of people in China do not learn to swim, especially those who do not live near coastal areas. Because most, if not all, of the research subjects probably did not know how to swim, they most likely would not care much about whether they had the opportunity to swim in a lake. In the behavior section, all of the questions were modified for content other than the questions about littering and encouraging others to protect the environment (the numbers for each changed). Also, the original survey asked students “How many days have you done these things in the past month?” and the survey for this study asks the students “Do you plan to do any of these activities in the next month?” Neutral questions were also added to the care and propensity (plan) sections to help determine whether students are responsive to the survey or responding in a socially desirable way. Lastly, there were two more questions in the propensity (plan) section on the new survey. This instrument was not tested with Chinese students prior to this study.

The Vignettes

At the beginning and end of camp, after answering the survey, all students responded in writing to the six vignettes found in Appendix D. The vignettes describe situations in which human characters have made poor, good, and neutral choices for animals. Vignettes one and two encourage students to think about what they would do if they were in that situation, their own feelings in reference to the scenarios, and the

animals' feelings. Vignette three encourages children to use their knowledge of pet needs to make good choices for animals. Vignettes four and five draw upon students' knowledge of animals and animal care to help them decide what others should do in a situation. Vignette six provides a neutral scenario. Vignettes one through five allow students to state in writing what action they would personally take if they were presented with similar circumstances. All of the vignettes are based on researcher-witnessed situations in China over the past five years, so the scenarios are society-relevant ones that young people would most likely encounter in their lives at one time or another. The vignettes were administered pre and post to determine whether at the end of camp the following changes would occur: thoughts, feelings, and proposed actions would be more descriptive and appropriate, students would care more, and be empowered to make a difference for the animals in each scenario.

Student Journal Questions

Each evening, students wrote about two or three guided questions in their student journals, which were collected the last day of camp. The purposes of the journals were (a) to cause the students to reflect on the day's experience and (b) to allow assessment of whether activities the students engaged in each day produced the intended changes in knowledge, empathy, and ability to make informed decisions about environmental stewardship and animals. Following is the list of guiding questions for each day's journal entries:

Monday

1. What was the most surprising thing that you learned about animals during the tour today? What was surprising about it?

2. What new things did you learn today about how to provide proper care for animals? Did anything surprise you? How did it surprise you?

Tuesday

1. What is the most interesting thing you have learned about your animal from observing him or her? Why is it the most interesting to you?

2. Do you think that you will be able to make better decisions about possible pets for you in the future? If yes, how are you better prepared to make those decisions now?

Wednesday

1. What was the most meaningful thing that you have learned from the animal experts? Why is it meaningful to you?

2. Do you feel like you are getting to know your animal? Did you think this was possible before you came to camp? Why or why not? How does it make you feel to know your animal?

Thursday

1. How do you feel when you are exploring nature? Why do you think you feel that way?

2. What is your favorite thing that you have discovered while exploring nature? Why is it your favorite?

3. Are you able to imagine how an animal is feeling when you observe it? How do you do this?

End of Camp Questionnaire

At the end of each camp, all students responded in writing to a questionnaire. The data from the questionnaire serve as a student self-report on the perceived effects that the camp had on him/her. Following are the questions the students answered:

1. How did camp change the way you think about animals?
2. How did camp change the way you want to behave toward animals?
3. How did camp help you to understand or appreciate animals more?
4. Did camp make you want to teach other people about animals and what they can do for them? Please explain your answer.
5. What do you think are the most important things you learned about animals?
6. If you saw someone hurting an animal, what would you do?
7. What do you think about the way people treat animals?
8. What do you think about the way people treat the natural environment?
9. Imagine that you are doing a school project on animals. In your presentation you need to explain the relationship between people and all other animals on Earth. What examples would you give your classmates to help them understand how each person has an impact on animals?
10. Which parts of camp influenced you the most? Why?
11. Before camp, how often did you hear people talk about animals' feelings? Why do you think that is?
12. Before camp, how often did you hear people talk about animals and their relationships with humans? Why do you think that is?

Student Behavior Ethogram

An ethogram is a type of instrument commonly used in zoos and field studies to guide behavioral data collection. In animal ethograms, behaviors of interest are listed and explained in enough detail for the researcher, and other researchers that may use the list, to recognize the occurrence of relevant behaviors to a study. Occurrences of behaviors

are then recorded on a data sheet by an observer whenever the behaviors occur. The ethogram created for this study was used to observe camper behavior. To assess overall change in student behavior toward animals and the natural environment throughout the camp experience, the student behavior ethogram listed specified behaviors including negative behaviors that should decrease with a positive camp experience and positive behaviors that should increase. The combined ethogram and data collection sheet is found in Appendix E. During pre-camp training, assistant camp instructors were instructed in how to collect student data using the ethogram. Without recording names, assistant instructors placed a tally mark next to each behavior each time they observed it in their group on the day it occurred, this is called all occurrence sampling. Instructors sometimes were able to describe the circumstances in which the behavior occurred.

Behaviors expected to decrease:

- Shouted at animals
- Fed animals (at inappropriate time)
- Made negative comment about an animal (e.g., pandas are lazy, monkeys are stupid, snakes are ugly)
- Littered
- Picked a plant
- Kill an insect or spider

Behaviors expected to increase:

- Asked someone to not bother animals
- Expressed concern for an animal
- Asked someone not to litter

- Asked someone not to feed the animals
- States he/she wants to teach others about something they learned about animals
- Independently demonstrates proper care of an animal
- Recognizes one of the animals on an individual basis
- States how smart an animal is
- Demonstrates respect for an animal in camp (e.g., approaches an animal slowly and quietly, holds or touches an animal gently, avoids harming an insect, not touching an animal that should not be touched, etc.)
- Discusses a positive environmental choice with another student
- Expresses a positive emotion about an animal or nature
- Expresses how they think an animal is feeling based on their observation of the animal
- Expresses worry for an animal
- Expresses worry for the natural environment
- Other

Analysis of Student Data

The survey, vignettes, journal entries, and end of camp questionnaire were analyzed to assess the first through third research questions, concerning knowledge gain, development of care, and propensity for stewardship, while also looking for alternative emergent themes. The survey and vignettes were analyzed statistically, and vignettes, journals, and end-of-camp questionnaires for campers eight and older were analyzed qualitatively. The results of the survey and vignettes were triangulated with a qualitative

analysis of the questionnaire, vignettes, and journal entries. The researcher is careful to mention contradictory data where it exists. This methodological design allows the analysis of data to be consistent and confirmatory with regard to determining if the program objectives were attained, while also having been open to emergent themes that could be pertinent to the success of the program and wildlife conservation education programming.

Translation of all qualitative data was done by a Chinese colleague in China and checked for meaning by another Chinese colleague and the researcher. This was a very time consuming process as meanings can change dramatically if words unfamiliar to colleagues are used and mechanical translators employed. Therefore, this was a critical part of data analysis. Qualitative data were analyzed through constant comparative analysis (Miles & Huberman, 1994) for both anticipated and emergent themes. Data were also analyzed in terms of the research hypotheses (Glaser & Strauss, 1999), i.e., to look for answers to the research questions. Informative and important patterns and contrasts observed during the course of the program were also sought after. Peer debriefing was conducted with one of the researcher's Chinese colleagues in March-April, 2006. Member checking was not possible because the only campers the researcher had access to were children of Research Base staff, and all were under the age of eight at the time data was collected.

Chengdu Conservation Stewards Camp Survey

The Chengdu Conservation Camp Survey had not previously been used with Chinese students. Therefore, the trustworthiness of survey results in China will depend on further analyses of the reliability and validity of the survey, including an examination of

internal consistency and results of the triangulation of the survey with the other data in this study. The survey findings in the present study are discussed in light of this weakness. If reliability and/or validity prove weak, the survey will be revised before being used for further testing beyond this dissertation project.

To determine whether students increased in self-reported knowledge, caring, and propensity from beginning to end of camp, the Conservation Stewards Survey was analyzed using three Analyses of Variance (ANOVAs) with repeated measures. Camp was the between group factor and time (pre/post) was the repeated measure. Each analysis used one section of the Survey, knowledge, caring, or propensity as the dependent variable. There were some missing data in the surveys, since occasionally a child skipped a question. Since the missing answers did not appear to be systematically left blank, averages for each variable (knowledge, caring, and propensity) were computed using total section score divided by the number of questions answered. Fifty-five children completed pre and post surveys. All analyses were computed using SPSS 12.0.

The Vignettes

The vignettes were analyzed both quantitatively and qualitatively. The researcher created a codebook with knowledge, care, and propensity and many sub-themes under those, as well as the emergent theme of empathy. The codebook allowed for categorizing the responses according to knowledge, care, propensity, empathy, and misconceptions. The codebook was created utilizing the research questions as a guide. All the responses to the vignettes were first translated and then checked by the researcher, and one Chinese research assistant for correct interpretation of the translation. The Chinese research assistant was then trained how to code the vignettes according to the codebook. Cases

were first coded independently, then coded together. Where there were disagreements, the researcher and assistant worked together until agreement was attained. Special care was taken with words that have many meanings in English to be sure campers' thoughts were correctly represented by the chosen English words. An outside rater was also found to quantitatively code the children's responses by placing a K, C, P, or E, wherever the text represented one of those areas as represented in the rubric (see Appendix H). Data was coded independently and then compared for inter-rater reliability.

To ascertain from the vignettes whether students grew in their knowledge, caring, propensity for environmental stewardship, and empathy from beginning to end of the camp program, three ANOVAs with repeated measures were computed, with camp as the between factor and time (pre and post) as the within factor. The dependent variables were total numbers of times knowledge, caring, and propensity were mentioned in their answers. Fmax tests comparing the largest and smallest variances on the pre data for knowledge, caring and propensity on the survey and vignettes indicated that the assumptions of homogeneity of variance were not violated.

> All vignettes from each camp session for students eight and older were analyzed qualitatively for evidence of knowledge, care, propensity, and empathy using constant comparative analysis (Miles & Huberman, 1994) and were used to inform and triangulate with the other qualitative and quantitative data.

Journal Entries

Although journal data were collected from all participants, only students eight and older were analyzed for this research. The journal entries were very brief, so data were not used according to the reasons originally intended. Responses were not analyzed question by question in terms of how they reflected the days' activities and the curriculum. However, it was possible to analyze them according to the second objective,

which was: as the responses related to the research questions pertaining to student gain in knowledge, care, and propensity.

End of Camp Questionnaire

The end of camp questionnaire was analyzed question by question and provided data reflecting the effect of the entire camp experience as well as support for knowledge, care and propensity. The questionnaire data from campers eight and older were used for analysis.

Student Behavior Ethogram

The data from the student behavior ethogram were analyzed separately by camp to determine whether student behavior became more compassionate toward animals and nature over the course of the week. The tallies made by the instructors each day were averaged across instructors for each item (behavior), and the averages of all the positive behaviors and negative behaviors were summed separately. To show whether positive behaviors increased and negative behaviors decreased across the week, the positive and negative behaviors as separate categories were graphed each day on the x-axis with the number of positive and negative behaviors, each averaged across instructors, on the y-axis. The ethograms could not be analyzed statistically because data were not collected on individual children. Analysis by instructors would have resulted in an N of three for each camp, too small a number for analysis.

Summary and Significance

For decades, American zoos and aquariums have attempted to develop conservation education programs that not only awe and inspire their participants, but also

promote conservation behavior. As global biodiversity continues to decrease at alarming rates, zoos and aquariums, among the most popular leisure time and field trip sites the world over, are proactively investigating ways to impact those they reach. It is the duty of zoos and aquariums to the animals they care for to spread awareness of their plight and provide concrete tools for individuals to help. Zoos of the past were designed to be merely viewing sites of the exciting animals of the world, but zoos today increasingly are designed to improve understanding of human relationships with the nonhuman world, foster positive attitudes toward the environment and animals, and promote environmental stewardship (Kruse & Card, 2004). While zoos in China still have a long way to go in presentation of their animals, Zoo Atlanta has been asked to introduce the most progressive programming that decades of experience can produce. Perhaps if enough youth in China become aware of the changes needed in their city zoos then those changes would come about more rapidly. A similar phenomenon must have occurred in America as our zoos were exactly the same as Chinese zoos only decades ago, with Zoo Atlanta being a famous example.

Conservation education camps are designed to educate youth about the importance of wildlife, habitats, and behaviors to promote conservation behavior (Serrell, 1981). However, the effectiveness of these conservation education camps is not known (Kruse & Card, 2004). To establish the effectiveness of these programs, more research is needed (Jordan & Seger, 2001; Kruse & Card, 2004), especially into how knowledge, care, and behavior are affected over time by conservation education and how these experiences are related to behavior change (de White & Jacobson, 1994; Mayer, 1994; Shepard & Speelman, 1985). Another potential area of influence is whether educators can

increase levels of empathy with animals in program participants to facilitate compassionate behavior toward animals and their wider ecologies (Myers & Saunders, 2002). It is critical that educators know if their conservation education programs are effective.

CHAPTER 4

RESULTS

The purpose of this chapter is to present the findings of the research instruments used to determine whether participation in the wildlife conservation education camp was effective in positively changing students': (a) knowledge of animals, (b) care about animals, (c) propensity for environmental stewardship, and (d) compassionate behavior toward animals and nature. This project used a mixed methods approach because of the sensitivity of the topics and complexity of developing a quantitative assessment of development of caring and propensity for environmental stewardship. The development of a valid and reliable survey instrument is needed to evaluate the effectiveness of the camp program when it is implemented in the future, and at other institutions throughout China.

In this mixed methods study, quantitative and qualitative data were triangulated to answer the following questions about the wildlife camp experience:

5. Did it increase student knowledge of animals?
6. Did it increase student care about animals?
7. Did it increase student propensity for wildlife and environmental stewardship?
8. Did it affect student compassionate behavior toward animals and nature?

Organization of Chapter

In this chapter, how the camps and curriculum were implemented will first be described, using policy decisions, questionnaire items, and researcher field notes to describe the campers and determine whether how the camp was implemented might have affected the desired outcomes. An attempt to document the success of lesson implementation each day was also made by the development of the questions for the student daily journals. However, data gleaned from this instrument were scarce and provided little support to demonstrate whether how the lessons were taught affected the outcomes of the lessons. This issue is explained below in detail.

The next section provides an introduction to how the data from each of the instruments were analyzed, including an explanation of the development of the qualitative data codebook and the rubric for the quantitative analysis of the vignettes. The last section of this chapter presents the findings from each instrument by research question with a description of the connections among findings from various instruments.

The Campers

Numbers of Participants

Two sessions of camp at the Chengdu Research Base of Giant Panda Breeding, and two sessions at the Chengdu Zoo had been planned. One session of camp for each institution was cancelled because not enough campers signed up to fill the allocated 30 spots for each session. Advertising brochures were created and disseminated in area parks and at special events in Chengdu. Solicitation of campers through the schools was not possible because the city of Chengdu was competing for the title of one of the safest cities in China. Therefore few administrators were allowing students to leave campus,

considering field experiences for students a safety risk. The low response to camp solicitations also could have been due to the price of the camps. The Research Base's camp price was set at 700 RMB and the Chengdu Zoo's was set at 600 RMB. As stated earlier, this is a substantial cost for a family in a region where the average annual salary is 12,441 RMB. These prices were set in order to cover the costs of the camp, not in order to make a profit, so lowering costs was not desirable. In the end, at the Research Base the full amount was charged, and 23 campers attended one camp. At the Chengdu Zoo the price was dropped to 200 RMB and camp filled to above maximum (30) within one week and had 37 campers.

Background Information

The only background information on the campers was obtained from two questions on the Post Camp Questionnaire. These questions were designed to identify why each camper came to camp and if the campers had pets at home. There were 16 different reasons that campers stated they came to camp, as well as one camper that didn't know why, four missing answers, and three that did not make sense. Of all the reasons for coming to camp, to learn about animals was stated most often with 20 campers responding this way. Other reasons were: parents allow them to come (6), they like animals (4), for fun (4), to get to know animals (3), had never been to a camp before (3), to develop their own independence (2), they want to protect animals (2), to cherish animals (1), had nothing to do at home (over holiday) (1), wanted to (1), pandas (1), for fresh air (1), to learn how to care for animals (1), it's interesting (1), and because others told them about camp (1).

Of the 60 campers, 28 had pets, 29 did not have pets, three did not respond to the question, and four campers had more than one pet. One camper gave the name of his/her pet, but not what kind it is. The most common pets were dogs and fish, with nine campers having dogs and eight having fish. Pets other campers had were birds (6), cats (4), tortoises (4), and a crab (1).

Missing Data

Four campers at the Chengdu Zoo missed the first day of camp and therefore did not have an initial journal entry and did not answer the initial questionnaires: the Conservation Stewards Survey and the vignettes. These campers' data were not included in the data analyses. The vignette data and the post-camp questionnaire for the eight children younger than eight years old were not coded. The camp and the instruments were designed for children 8-12 years old. The children under eight years old, though they seemed to understand the survey which they read while their instructors read the questions to them out loud, had a very hard time expressing themselves in writing. In fact, many of them resorted to pin yin, the use of the standard alphabet to demonstrate the sound of the characters, which children today learn before they learn characters, in an attempt to express themselves. Therefore, the data for the 6-7 year-olds were not used for the qualitative analyses or the quantitative analysis of the vignettes.

Documentation through Field Notes

To be able to draw conclusions about the experience the students had at camp and the effect of that experience, it was important to document whether the camp was implemented according to the planned curriculum. Researcher field notes were collected throughout each camp experience to determine whether each camp operated as intended.

Another critical component of the researcher field notes was documentation each evening of the instructor meetings when instructors debriefed about the happenings of the day. During this time, lead instructors and coordinators discussed any obstacles encountered, any issues students brought up, and activities that were most and least successful.

Evening experiences were not within the curriculum. Because they were planned by camp staff, they were slightly different at each institution. These experiences could have heightened enjoyment of the camp or made it less pleasant (e.g., some campers in 2004 did not like the night they spent in tents because they smelled musty). Because such events could shed light on different outcomes of the camp experience, documentation continued during evening activities. These data were explored to help distinguish any discrepancies in the outcomes of the camp experiences that could have been attributed to logistical problems.

Although the primary purpose of the researcher field notes was to document the implementation of the curriculum, these notes also documented enthusiasm for camp and the activities, changes in behavior throughout camp, unanticipated emergent themes, and anecdotes shared with the researcher and other camp staff. The researcher field notes were also used to look for possible unintended effects (Patton, 1996) from such things as: characteristics of instructors, participants, partners, etc., the use and effectiveness of program components, and whether there were barriers to implementation of program components (e.g., rainy days, limited space for nature play and/or exploration).

For the most part, the logistics of camp at both the Research Base and Zoo ran smoothly. All lessons were covered satisfactorily. There were concerns that may have affected the camp experience, however. These will be discussed by camp.

Camp 1: Chengdu Research Base of Giant Panda Breeding

Instructors. Training for the instructors at the Research Base occurred Monday, July 11 through Friday, July 15, 2005. Training lasted approximately eight hours a day and covered the curriculum, background knowledge, classroom management, safety, and scheduling. See Appendix F for the full schedule. Camp at the Research Base ran from Monday, July 25 through Friday, July 29. The 23 campers, aged six to 11, were broken into three age groups: the Jumping Rabbits aged 6-9, Clever Dogs aged 8-10, and Lovely Bears aged 10-11.

The eight instructors at the Base were mostly Research Base and Chengdu Zoo conservation education staff. Three of the instructors (including the camp coordinators from both the Base and the Zoo) were experienced, having received training for and having taught at the 2004 camp. Two of the instructors, one at Research Base and one from the Zoo were brand new to their jobs and to the education and conservation field. Three highly qualified instructors were hired from the outside, one an Australian English teacher from a nearby school who also speaks and taught in Chinese, another was an environmental sciences instructor from a local university, and one a retired primary school science teacher of 40 years. The new instructors, paired with experienced instructors were exceptionally good with children and with the content.

I was one of two specialty instructors for the Research Base camp from Zoo Atlanta. Zoo Atlanta's conservation biologist taught about biodiversity for the *Discover*

Natural Wonders unit as well as fielded more complex questions that campers had about biodiversity throughout camp. I taught animal behavior, behavioral enrichment, animal care, and English.

Implementation of camp at the Research Base. The camp coordinator developed special schedules for each of the three groups in order to facilitate both individual group lessons and activities, and activities when all groups needed to come together. See Appendix G for the general daily camp schedule. For the most part, the schedule was followed and camp logistically ran smoothly. All lessons were covered as well as several of the supplementary activities.

A pervasive issue, in this camp that the leaders and I know had an effect on campers and instructors, was that in the oldest group there were four boys that had fairly severe (for China) behavior problems. The four boys, friends from the same school, were extremely problematic for the entire camp, both for instructors and the other campers. Their behavior dominated instructor meetings and instructor attention during activities. The instructors for their group said they were always making jokes and not listening, and they also talked dirty and made fun of others. Instructors were concerned for the other campers because the boys' comments were a personal attack on them. Because their behavior took instructor time away from activities, and in general put a damper on the mood of the camp, learning may have been slightly impeded. An important thing learned from this experience was that a strong behavioral management component needed to be a part of camp training.

Another problem was that the Research Base did not get much support from other departments, so there were small glitches (e.g., broken air conditioner and broken water

cooler that no one would fix) that would not have been a problem if there had been more support. Also, the weather was extremely hot and humid and the mosquitoes were unbearable. Maslow's (1954) hierarchy of needs certainly applies. There were times when meeting comfort needs were so basic that both campers and instructors didn't want to do activities outside, and especially not in more natural areas where the mosquitoes were the worst. It is hard to concentrate or have fun if you are overly hot or constantly being bitten. However, as mentioned above, all lessons were covered.

Camp 2: Chengdu Zoo

Instructors. Training for the ten instructors at the Chengdu Zoo occurred Saturday, July 30 through Wednesday, August 3. Training lasted approximately eight hours a day and covered the curriculum, background knowledge, classroom management, safety, etc. See Appendix F for the full schedule. Camp at the Zoo ran from Monday, August 8 through Friday, August 12. There were 37 campers aged 7 - 12, who were broken into three age groups: the Rabbits aged 7-8, Dogs aged 9-10, and Bears aged 10-12.

The camp at the Zoo had many experienced instructors. The camp coordinator had been trained for and taught two sessions of camp at the Research Base in 2004 and had been through training and camp the previous two weeks at the Research Base. Three of the Research Base staff came to the Zoo to go through training and teach camp there. The Zoo also invested in four new full time education staff members for whom this was a first job out of school. They were new to education and conservation, but one had been through training and taught for the camp at the Research Base the two weeks before. New staff members were paired with experienced instructors and did an amazing job. Camp at

the Zoo was also able to attract a retired science teacher who had had a great deal of experience bringing students out for residential camp programs, and his expertise and skill with the students was invaluable. I was the only special staff for this camp and I did the staff training and taught English during two of the evenings.

Implementation of camp at the Zoo. The camp coordinator developed special schedules for each of the three groups in order to facilitate both individual group lessons and activities and activities when all groups needed to come together. See Appendix G for full schedules. For the most part, the schedule was followed and camp logistically ran smoothly. All lessons and most of the supplemental activities were covered.

The students who attended camp at the Zoo were exceptionally well behaved. Everyone, especially instructors who had worked for the Research Base camp commented on this throughout the week. There were only two discipline problems of note for this week of camp, but neither caused problems for all the campers. The researcher feels that the good behavior of the campers and sense of camaraderie that developed enhanced the camp experience at the Zoo.

There was also a lot of support for camp from all Zoo staff. The camp coordinator's two direct supervisors were present most of the time. One of them even spent the night with the campers every night. They also ate meals with us. A driver was given to the camp to collect and deliver all meals and serving utensils, as well as take the researcher home after evening activities each night. A poignant example of the support given is that on Tuesday when it rained while children were out on grounds, a group of three men carried umbrellas to all of us.

In summary, both camps ran very smoothly and the researcher does not feel that logistics of the camps would have influenced camper learning or their ability to achieve the intended objectives of the camp curriculum. In the statistical analysis of the quantitative data there were also no differences found between camp outcomes.

Student Journals

The original intent of the student journals was to help ascertain whether the lessons for each day were teaching the campers what was intended. However, the researcher does not think that the importance of the journals was made clear and instructors did not reserve much time for campers to complete them, or encourage students to write more than a short, often not even a full sentence, response. Therefore, these data are not helpful for this purpose but were analyzed qualitatively to look for support of overall themes (knowledge, caring, propensity, and empathy). These data are presented later by research question within the overall qualitative analysis.

Data Analysis

Conservation Stewards Survey

To determine whether students increased in self-reported knowledge, caring, and propensity from beginning to end of camp, the Conservation Stewards Survey was analyzed using three Analyses of Variance (ANOVAs) with repeated measures. Camp was the between group factor and time (pre/post) was the repeated measure. Each analysis used one section of the Survey, knowledge, caring, or propensity as the dependent variable. There were some missing data in the surveys, since occasionally a child skipped a question. Since the missing answers did not appear to be systematically left blank, averages for each variable (knowledge, caring, and propensity) were computed

using total section score divided by the number of questions answered. Fifty-five children completed pre and post surveys. All analyses were computed using SPSS 12.0.

Quantitative Analysis of the Vignettes

The vignettes were used both qualitatively and quantitatively. Initially the answers were coded with a researcher-created rubric to identify the campers' answers reflective of their knowledge, level of care, and propensity for environmental stewardship and compassionate behavior toward animals. An outside rater was given the rubric and verbal directions in order to know how to tabulate the occurrence of K (knowledge), C (caring), P (propensity for stewardship), and E (empathy, an emergent theme). The raters then rated the responses independently and later responses were compared one by one for agreement with the researcher's responses. Inter-rater reliability was 87%. See Appendix H for the list of codes used to identify statements of knowledge, care, propensity and empathy. Once each response by each child was coded for the four factors, the number of times these factors appeared in their overall responses for questions 1-5 was totaled. Question six concerning feelings about a field trip to the mountains was not included because it had been added to make the intent of the instrument less obvious. Since the tabulated responses were based on written answers to questions, only data from the children eight and older were included. Responses both at the beginning and at the end of the camp experience were recorded.

To ascertain whether students grew in their knowledge, caring, propensity for environmental stewardship, and empathy from beginning to end of the camp program, four ANOVAs with repeated measures were computed, with camp as the between factor and time (pre and post) as the within factor. The dependent variables were total numbers

of times knowledge, caring, and propensity were mentioned in their answers as well as the total number of times the emergent theme, empathy, was mentioned.

Qualitative Analysis of Vignettes, Student Journals, and Post Camp Questionnaire

With the exceptions described under *missing data*, the vignettes, journals, and post camp questionnaires from all the children were included in the qualitative data analysis. The analysis utilized constant comparative analysis (Glaser & Strauss, 1967; Miles & Huberman, 1994) to determine whether there was further support for the themes of knowledge, care, and propensity, and to uncover any emergent themes.

To create a qualitative data codebook (see Appendix H), the researcher first went through the journals and coded each response based on whether they represented knowledge, care, or propensity. The student journals were analyzed first because the responses were most brief and straightforward. As the researcher did this, themes such as knowledge of animal behavior, knowledge of animal needs, care about animals, and care about nature, etc., began to emerge and were described. The student journal questions were then coded according to those themes. Next the post camp questionnaire was coded in the same way and more themes and sub-themes emerged. Then the post camp questionnaire responses were coded and the student journal responses recoded due to additions and changes made to the codebook. Lastly, the vignettes were coded in the same way and many more sub-themes emerged, as well as the fourth and emergent theme of empathy. At this point both the student journal and post camp questionnaires were recoded with additions from the review and coding of the vignettes.

After the first series of analyses, there were many codes depicting a great deal of detail. The next step was to condense the codes into more global sub-themes, and this

process streamlined analysis and interpretation. All three qualitative data sources were then recoded according to the streamlined codebook. The qualitative data and codebook were then shared with a Chinese colleague who had been one of the instructors of both camps. She had good knowledge of the intent of the camp, as well as Chinese language and culture to help the researcher ensure the data were being appropriately interpreted. Due to the complexity of the statements, and possibilities for misinterpretation by the researcher, who is not Chinese, all qualitative data were coded separately by the researcher and her colleague and then together. Several codes were modified through this process, (e.g., Knowledge Animals Benefit Humans – camper states they appreciate animals more because they learned that animals benefit humans, was modified to be defined as: camper states that animals benefit humans; Knowledge Treat Good Animal Lover – camper states that only people who really love animals treat them well, was modified to be defined as: camper states they think people treat animals well; and Knowledge Animal State – camper expresses knowledge of an animal's physical state, was modified to be defined as: camper expresses knowledge of an animal's state through words like miserable or pitiful. However, throughout these modifications knowledge, care, propensity, and empathy codes remained. When there were disagreements on statements, the researcher and colleague discussed the statement until agreement could be achieved. Therefore, 100% agreement was reached on the qualitative data analysis.

Through the constant comparative method, one new theme and many sub-themes emerged. The unanticipated theme that emerged was empathy. All themes and sub-themes were then explored for connections to primary purposes of the camp: increasing knowledge, care, and propensity for stewardship. Seven sub-themes emerged for

knowledge, four for caring, and four for propensity for stewardship. Themes and sub-themes will be described and illustrative examples given below. See Appendix H for the full list of codes.

Research Question 1: Did Camp Increase Student Knowledge of Animals?

Statistical Analyses

Conservation Stewards Survey. Following is a table of average pre and post answers on the knowledge section of the Conservation Stewards Survey, reported by camp. The means are based on a 7- point Likert scale, with 7 being the most positive response.

Table 1

Conservation Stewards Survey means and standard deviations of knowledge by camp.

Camp	N		Knowledge	
			Mean	SD
Research Base	22	Pre	4.44	1.03
		Post	5.51	1.02
Chengdu Zoo	33	Pre	4.42	1.33
		Post	5.37	1.15
Total	55	Pre	4.43	1.21
		Post	5.42	1.09

The campers' scores increased from pre to post on the dependent variable, knowledge, $F(1, 53) = 37.92$, $p < .001$. There were no differences by camp and no interactions. Following is the ANOVA table for knowledge.

Table 2

Conservation Stewards Survey Analysis of Variance for knowledge.

Source	*Df*	*F*	*P*
		Between subjects	
Camp	1	.079	.78
Subjects within group error	53	(1.99)*	
		Within subjects	
Time (pre/post)	1	37.92	.001
Time X camp	1	.143	.707
Time X camp within group error	53	(.705)*	

*Values enclosed in parentheses represent mean square errors.

To summarize pre and post answers on individual questions, means and standard deviations on each question were calculated. See Table 3.

Table 3

Conservation Stewards Survey means and standard deviations of individual knowledge questions.

Question	Pre			Post		
	N	Mean	SD	N	Mean	SD
K1: Things you can do to protect the environment	55	4.93	1.62	55	5.33	1.49
K2: Things you can do to protect animals.	55	4.71	1.81	55	5.47	1.49
K3: The social lives of animals.	54	3.56	1.92	55	5.02	1.58
K4: Results of keeping wild animals as pets.	55	4.69	2.24	55	5.65	1.87
K5: The importance of wild animals to their environments.	55	3.84	1.99	55	5.25	1.79
K6: How to take proper care of pets.	55	4.84	1.76	55	5.82	1.44

Vignettes. The following table presents the means and standard deviations of the number of knowledge statements made by each child at the beginning and at the end of camp. These statements, taken from vignettes 1-5, indicated knowledge of animals or the environment.

Table 4

Vignette means and standard deviations by camp of knowledge statements by camp.

Camp	N		Knowledge	
			Mean	SD
Research Base	17	Pre	9.29	4.61
		Post	14.35	2.91
Chengdu Zoo	31	Pre	12.65	5.68
		Post	14.00	4.53
Total	48	Pre	11.46	5.52
		Post	14.13	4.00

An ANOVA with repeated measures, with camp as the between factor and time (pre and post) as the within factor, was computed with knowledge as the dependent variable. A significant increase in knowledge was found: a main effect for time, $F(1, 46) = 19.79$, $p < .001$ and a time by camp interaction effect, $F(1, 46) = 6.60$, $p < .02$. Although the two camps had similar knowledge scores at the end of the week, scores at the Research Base were lower initially and increased more than scores at the Chengdu Zoo. Following is the ANOVA table for this analysis.

Table 5

Vignette Analysis of Variance table for knowledge.

Source	*Df*	*F*	*P*
		Between subjects	
Camp	1	1.48	.23
Subjects within group error	46	(33.34)	
		Within subjects	
Time (pre/post)	1	19.79	.001
Time X camp	1	6.60	.02
Time X camp within group error	46	(11.41)*	

*Values enclosed in parentheses represent mean square errors.

Qualitative Analysis: Vignettes, Student Journals, and Post Camp Questionnaire

Presented below are illustrative examples of knowledge themes from each of the qualitative sources: the vignettes, end of camp questionnaire, and student journals. Direct quotes emphasize what the children said at the end of camp. However, to allow comparison, some examples are given of what the same campers said at the beginning and end of camp on the vignettes.

Here, as in other sections of this chapter, no attempt was made to perfect the English translation of the campers' words on the qualitative instruments. The researcher did not want to risk changing the essence of the campers' words and thoughts. Direct translation of Chinese into English is not possible, and when English speakers try to

correct sentence structure, often meaning is lost or even changed. Therefore, the wording of the campers' statements is not always grammatically correct in the English translation, but the meaning intact.

From the qualitative data sources, it is evident that the campers gained a great breadth and depth of knowledge. Below are the seven different types of knowledge pertaining to animals and nature that emerged, including incorrect knowledge, or misconceptions. Each of these sub-themes has many descriptive codes to ensure proper coding (see Appendix H for the list). The descriptive codes were a part of the original codebook before codes were lumped into the final codes used for this project. To increase usability of the codebook, those codes and definitions remain in the codebook in the event someone else would like to see what types of statements belong under each sub-theme. Each knowledge theme is described with selected illustrative examples by instrument. Throughout the presentation of all qualitative data, examples that best defined and explained the meaning and depth of each sub-theme were chosen to present.

Each of the knowledge sub-themes and an example of a descriptive quote for each are presented in Table 6.

Table 6

Sub-themes and descriptive quotes for knowledge.

Sub theme	Descriptive Quote
Knowledge About Animals	Yes, I have learned that animals can also speak, because I have thought only human being can speak, in fact, animals also have its own languages (camp 2, child 26, 8/8/05).
Knowledge of Human Responsibilities Toward Animals	If I decide to raise a pet, I should make enrichment, spend enough time on playing with it, and make sure to raise it until it dies (camp 2, child 27, 8/9/05).
Knowledge of Nature	If a man cut down a tree, then some animals will lose their habitat (camp 2, child 29, 8/12/05).
Knowledge of Negative Impacts Humans Have on Animals	Many people keep killing and catching animals (camp 2, child 31, 8/12/05).
Knowledge of the Human-Animal Bond	Animals will trust you as soon as you treat them as a friend (camp 2, child 32, 8/12/05).
Knowledge of Skills to Help Animals	I'll ask whether he enable to raise it for its life. Because the little animal died it's very miserable (camp 2, child 26, 8/12/05).
Knowledge that is Incorrect	That's a good idea, because the bird only survive outside (camp 1, child 15, 7/29/05).

Knowledge about Animals – Illustrative Examples

The following questions and answers were chosen to illustrate a variety of responses with the theme, knowledge about animals. These particular responses illustrate some of the descriptive knowledge the campers attained, in particular, animal: behavior,

mind, care, intelligence, needs, physiology, emotions, interconnections of living things, and human harm of animals. Illustrative examples are presented by instrument.

Knowledge about animals from student journals. The following illustrative examples were chosen to demonstrate knowledge that animals have social lives and can communicate their thoughts to others. Others were chosen to demonstrate knowledge that animals also need a proper diet, can take care of themselves, and have survival strategies even though they are not as “smart” as humans. Others demonstrate that the camper understands that animals have a mind, are intelligent, and have foresight. Importantly, some responses demonstrate that campers know that people must protect nature for the health of animals. The last response in this section was chosen to demonstrate the paucity of experiences that children have to get to know and understand animals. A similar response was made by many campers.

Q: What is the most interesting thing you have learned about your animal from observing him or her?

> A: Cui Cui is fond of looking itself in the mirror, he think there is another Cui Cui in the mirror (camp 1, child 4, age 11, 7/26/05).

Q: What new things did you learn today about how to provide proper care for animals?

> A: Don’t throw food to animals carelessly. Every animal has its own characteristic. Animals are not more clever than human being, why they’re so competent?” (camp 2, child 23, age 9, 8/8/05).

Q: What is the most interesting thing you have learned about your animal from observing him or her?

A: The hamster loves to labor, because it moves the newspapers from the bottom to the upper for protecting itself (camp 2, child 17, age 9, 8/8/05).

Q: How do you feel when you are exploring nature?

A: I want to protect environment because animals can't survive if environment is polluted (camp 1, child 8, age 9, 7/28/05).

A: There are many animals in nature and I will protect environment (camp 2, child 2, age 8, 8/11/05).

Q: Do you feel like you are getting to know your animal? Did you think this was possible before you came to camp?

A: Animals can consider, because I thought only human being can do so before (camp 2, child 4, age 8, 8/9/2005).

A: I am getting to know them more and more, it's impossible, because there isn't any animal around me, I'm very happy (camp 2, child 23, age 9, 8/10/05).

Knowledge about animals from post camp questionnaire. The following three responses demonstrate camper understanding of the interconnectedness of living things, that humans cause harm to animals both in the wild and captivity, and that animals have feelings.

Q: The following are in response to the question about doing a school project on how people impact animals.

A: I'll tell them that every kind of animals are indispensable (camp 2, child 18, age 10, 8/12/05).

A: Once human being have made one kind of animal become extinct, then all biologies will die out finally (camp 2, child 27, age 11, 8/12/05).

A: For example, animals will feel scared when someone knocks on the glass (camp 2, child 23, age 9, 8/12/05).

Knowledge about animals from vignettes. See Appendix D for full vignettes. The examples below were chosen because they demonstrate campers" understanding of animal needs, physiology, and emotions. They also demonstrate an understanding that animals feel pain. The examples were also chosen because they show understanding of human mental and physical harm of animals.

Q: In response to vignette five which asks campers to think about releasing a sick bird into the wild.

A: It's not good because the bird haven't eaten anything for several days so it can't fly. (camp 2, child 12, age 8, 8/12/05).

Q: In response to vignette one about the boy who is tossing a puppy up and down.

A: It (puppy) will feel sad, then flee away. Because it is scared (camp 1, child 9, age 9, 7/29/05).

A: I'll prevent him, because the dog also has its own feeling, it will be very pain and unhappy (camp 2, child 32, age 12, 8/12/05).

Knowledge of Human Responsibilities toward Animals and Nature

This theme is critical to achieving the ultimate goal of the camp program, behavior change. People need to have the knowledge of our responsibilities toward animals and nature, then care about those responsibilities and animals enough to want change their behavior, then given the skills to change. Without this type of knowledge, the thought processes necessary for behavior change will not begin. The reason each illustrative example was chosen follows the chosen responses for each instrument.

Knowledge of human responsibilities toward animals and nature from student journals. The following responses demonstrate that campers understand that captive animals need space and that pet market dealers do not tell the truth about the needs of the animals so they must learn proper care for them on their own. Those responses also demonstrate understanding of the importance of enrichment and play for the physical and psychological health of animals and that it is our responsibility to provide it for captive animals. Responses also demonstrate understanding that releasing or giving away pet animals because we tire of them is not fair to the animal. The last example demonstrates proper touching and holding of animals to create an atmosphere of safety for the animal and in turn begins the formation of a bond between the animal and child.

Q: Do you think that you will be able to make better decisions about possible pets for you in the future? If yes, how are you better prepared to make those decisions now?

> A: I want to raise a pet and buy the biggest cage in the market for it. Moreover I won't listen to whatever the seller will say. (camp 2, child 7, age 8, 8/9/05).

Q: What new things did you learn today about how to provide proper care for animals?

> A: I touch the animals suitably in order to let it feel safe and come closely with me." (camp 2, child 35, age 11, 8/8/05).

Knowledge of human responsibilities toward animals and nature from post camp questionnaire. The following illustrative examples demonstrate camper understanding that people should not buy wild animals, that humans should not hurt animals but should protect and cherish them. The responses were also chosen to demonstrate the understanding that nature needs to be protected by humans and that littering and cutting down trees is harmful. Many campers made statements about not buying wild animals,

not hurting animals and that protecting and cherishing them was the most important thing that they learned from camp. Current primary and middle school curriculum in science, nature, and morality and society classes all state explicitly that people should not buy and kill wild animals, be friends with animals, and live with animals and nature in harmony (Y. L. Zhao, personal communication, June 20, 2006). It seems that most people and children in China have realized the importance of protecting wild animals. However, restaurants and medicine agencies still try to make money by obtaining and selling rare animals. Also enough attention is not paid to common animals and people are not taught *how* to protect or take good care of animals. This possibly demonstrates that this needs to be taught to children, and that possibly the opposite is taught in settings, outside school, or *how* to protect and cherish animals is not taught therefore protection is just a slogan.

Q: What do you think are the most important things you learned about animals?

A: Don't buy wild animals (camp 2, child 11, age 8, 8/12/05).

A: Don't hurt animals! (camp 2, child 30, age 12, 8/12/05).

Q: What part of camp influenced you the most?

A: People should cherish and protect animals (camp 1, child 1, age 10, 7/29/05).

Q: What do you think about the way people treat the natural environment?

A: I think what people have done is wrong, because they throw rubbish carelessly (camp 2, child 18, age 10, 8/12/05).

A: People have cut so many trees. Such behavior should be prevented (camp 2, child 29, age 11, 8/12/05).

Knowledge of human responsibilities toward animals and nature from vignettes. See Appendix D for full vignettes. These illustrative examples from the vignettes

demonstrate camper understanding that humans have a responsibility to protect animals, take proper care of them and not tease or abuse them. The examples also demonstrate that humans must use reliable sources to learn proper pet care, and that lifetime care of a pet is a responsibility when a person gets a pet, and if their pet reproduces they are also responsible for the offspring.

Vignette 1: About the boy who is tossing a puppy up and down.

A: I'll say, "Save that dog, it's right to protect animals." (camp 2, child 2, age 8, 8/12/05).

Vignette 3: Parents allow their child to care for a pregnant dog and then find good homes for the puppies. Campers were asked to state what they would tell the people who will now care for the puppies.

A: I'll tell him/her: "You should take good care of it and don't bully it, as well as reading the same books about it" (camp 2, child 7, age 8, 8/12/05).

Vignette 4: About the shop owner who allows his dogs to stray.

A: I think the shop owner should find several good family to take those dogs in, because he once was the host of those dogs (camp 1, child 3, age 11, 7/29/05).

A: "I'll tell him, "Now that you have raised it. You should take responsibility for it and accompany with it for all its life." (camp 1, child 11, age 10, 7/29/05).

Knowledge of Nature

While the preservation of nature is paramount to preservation of animals, the focus of the camp experience was bonding with animals. It is hypothesized that bonding with animals may be a precursor to preservation of nature behavior. Only questions on the post camp questionnaire addressed knowledge of nature.

Knowledge of nature from post camp questionnaire. The following illustrative examples demonstrate camper understanding that humans must protect nature in order to protect animals.

Q: In response to the question about doing a school project on how people impact animals.

A: Once a person don't protect environment, then animals will be unhealthy (camp1, child 2, age 10, 7/29/05).

Knowledge of Negative Impacts Humans Have on Animals and Nature

While it was not the intent of the camp program to make it evident to participants how much damage humans are inflicting on the planet, it is hard to disguise the fact that humans are the cause of the destruction, suffering, and losses and this became highly apparent in the qualitative data.

Knowledge of negative impacts humans have on animals and nature from student journals. The following examples demonstrate camper awareness of harm people incur on animals and nature, and self-awareness that they have inadvertently harmed animals in the past. Two examples were specifically chosen to present here because they demonstrate awareness of behavior of humans toward animals in captivity. Poor treatment of animals in zoos in the form of feeding, yelling and throwing things at, and teasing are still abundantly problematic in China. These behaviors demonstrate lack of respect as well as breed maltreatment and lack of respect because the behaviors appear socially acceptable. The camp program is designed to explain proper treatment by visitors to animals in captive settings.

Q: How do you feel when you are exploring nature? Why do you think you feel that way?

A: Human being's destroying power is so strong. Everyone should love and protect nature (camp 2, child 16, age 9, 8/11/05).

Q: What new things did you learn today about how to provide proper care for animals?

A: To my surprise there is someone throwing rubbish to the cage (camp 2, child 11, age 8, 8/8/05).

Q: What new things did you learn today about how to provide proper care for animals?

A: Sometimes I feed animals carelessly, which maybe lead them to die." (camp 2, child 21, age 9, 8/8/05).

Q: How do you feel when you are exploring nature? Why do you think you feel that way?

A: I think people like to destroy nature (camp 2, child 17, age 9, 8/11/05).

A: I think human being have destroyed so many things (camp 2, child 22, age 10, 8/11/05).

Knowledge of negative impacts humans have on animals and nature from post camp questionnaire. The following answers demonstrate camper knowledge that animals are disappearing, that using animal parts for decoration is harmful to animals and that humans are catching and killing wild animals.

Q: How did camp change the way you think about animals?

A: I had thought there are so many animals, but now I find out many of them have died out (camp 2, child 29, age 11, 8/12/05).

Q: In response to the question about doing a school project on how people have impact on animals.

A: We made ornaments from the tortoises shells (camp 2, child 20, age 10, 8/12/05).

Knowledge of negative impacts humans have on animals and nature from vignettes. These illustrative examples about were chosen to illustrate the breadth of knowledge campers have on harm humans cause animals including the understanding that when humans harm animals it is often out of selfishness for their own entertainment. The responses also demonstrate an understanding of the harm that is caused to pets when we don't learn how to properly care for them and that losing them is sad because friendships form between people and animals. Another important point made by these responses is that pets are often bought spontaneously without thought about their needs and that the pet trade causes animals to be caught from the wild and harmed.

Q: The following illustrative example is in response to vignette one about the boy who is tossing a puppy up and down.

> A: Now I think the dog must be very painful and sad, because there are some slight injuries in its body. Moreover, it thinks: Why does he just think of his own happiness? (camp 2, child 23, age 9, 8/12/05).

Q: The following five examples are in response to vignette two about the friend who gets a bunny and it dies and then in the future another friend of the camper wants to get a bunny as a pet.

> A: I'm going to prevent him, because if the bunny is killed by you which amount to kill one of our friends (camp 1, child 6, age 11, 7/29/05).
>
> A: I think, why I was so stupid at that moment, the rabbit belongs to nature (camp 2, child 23, age 9, 8/12/05).
>
> A: I think we don't know the proper way to look after it, so it died (camp 2, child 30, age 12, 8/12/05).

A: I feel very shame that you just consider for yourself and ignore others (camp 1, child 11, age 10, 7/29/05).

Q: In response to vignette five which asks campers to think about what they would tell a friend who wanted to buy a bird as a pet.

A: I'll say, "Don't buy it" because the animal dealer will continue to catch and hurt them if you want to buy it" (camp 1, child 13, age 10, 7/29/05).

Knowledge of the Human-Animal Bond

Many researchers from diverse fields believe that the understanding children have of the human-animal bond is more acute and appreciated. This is evidenced in the emergence of this theme in the data.

Knowledge of the human-animal bond from student journals. The following examples were chosen to demonstrate that campers understand that the bond that would form between him or her would be so strong that it would be painful for him/her when the animal dies. The other example demonstrates an understanding of human behavior necessary to facilitate bonds with animals.

Q: Do you think that you will be able to make better decisions about possible pets for you in the future? If yes, how are you better prepared to make those decisions now?

A: I don't want to raise a pet because they will die when they are too old but I still live. (camp 1, child 1, age 10, 7/26/05).

Q: What new things did you learn today about how to provide proper care for animals?

A: I touch it and let it know that I won't hurt it. Animals also need the solicitude from human being. (camp 2, child 31, age 10, 8/8/05).

Knowledge of the human-animal bond from post camp questionnaire. The following answers demonstrate understanding that humans and animals are friends and that if humans treat animals as friends then a trusting bond can form between them.

Q: What do you think are the most important things you learned about animals?

A: Animals are human beings friends (camp 2, child 16, age 9, 8/12/05).

Knowledge of the human-animal bond from vignettes. These examples demonstrate the knowledge the camper has of the strong bond that would form between themselves and a dog. The other example demonstrates the camper believes the dog deserves to be respectfully buried as a person does and that the dog had worked for the shopkeeper and the dog was his responsibility.

Q: In response to vignette three where parents allow their child to care for a pregnant dog and then find good homes for the puppies. Campers were asked to state what they would tell the people who will now care for the puppies.

A: I feel happy and sad. I'm happy for owning a dog, but it will leave me in the future so I am sad (camp 2, child 29, age 11, 8/12/05).

Q: In response to vignette four about the shop owner who allows his dogs to stray.

A: I'll say, "Please you bury it." because the dog used to watch out the shop for him (camp 1, child 8, age 9, 7/29/05).

Knowledge of Skills to Help Animals

A primary goal of conservation education must be the teaching of skills to take action on new knowledge and attitudes we strive to impart. It was exciting to see strong evidence of this accomplishment in the data. A note of caution is that though children may gain this knowledge, we cannot assume they will follow this knowledge in the

future, especially while parents hold the strongest influence. If parents do not have the same knowledge, their knowledge may prevail over the knowledge of the child.

Knowledge of skills to help animals from student journals. These examples demonstrate knowledge of skills to take proper care of animals and how to treat them.

Q: Do you think that you will be able to make better decisions about possible pets for you in the future? If yes, how are you better prepared to make those decisions now?

> A: Yes, I plan to buy the biggest cage in the market and prepare a most comfortable home for it. Moreover I won't buy forage (camp 2, child 4, age 8, 8/9/05).

Q: What new things did you learn today about how to provide proper care for animals?

> A: Firstly, wash my hand with hand-shampoo. Then touch animals gently. That hamster's home is very warm (camp 2, child 24, age 9, 8/8/05).

Knowledge of skills to help animals from post camp questionnaire. The example below demonstrates that the camper knows how to protect animals.

Q: How did camp change the way you think about animals?

> A: I was favor of animals before. Now I not only like them, but also cherish and protect them (camp 1, child 4, age 11, 7/29/05).

Knowledge of skills to help animals from vignettes. The following responses were chosen to demonstrate camper knowledge of how to appropriately and respectfully talk to others about how to protect animals and to be brave enough to talk to them. Another skill demonstrated was to ask others not to buy a pet and remind them of the consequences others have suffered due to buying pets irresponsibly. Lastly these examples were chosen

to demonstrate that campers know that reminding others of the pain animals suffer at our hands is a motivator for better decisions by others.

Q: In response to vignette four about the shop owner who allows his dogs to stray.

> A: I'll make an appointment with him/her and talk about the knowledge how to protect animals (camp 2, child 26, age 10, 8/12/05).

Q: In response to vignette two about the friend who gets a bunny and it dies and then in the future another friend of the camper wants to get a bunny as a pet.

> A: I'll say "Don't buy it. Xiao Bai died so miserably. Do you want to see the tragedy happen again?" Because animals also have lives. (camp 1, child 10, age 9, 7/29/05).

Q: In response to vignette five which asks campers to think about what they would tell a friend who wanted to buy a bird as a pet.

> A: You ought to make clear of the living habits of the bird before making decision (camp 2, child 35, age 11, 8/12/05).

Incorrect Knowledge

Incorrect knowledge from vignettes. These answers demonstrate the misconception that though animals deserve freedom they do not always know how to take care of themselves after being in captivity. Incorrect knowledge decreased significantly after camp, but did not disappear. People in China have very little access to correct information about animals so gains in knowledge from camp was one of the primary goals of the camp curriculum. Incorrect knowledge was not reported in the student journals or post camp questionnaire.

Q: In response to vignette five about releasing a sick bird into the wild.

A: Yes, because the bird is wildlife, it has its own freedom (camp 1, child 8, age 9, 7/29/05).

A: That's a good idea, because the bird won't be slim with partners and food (camp 2, child 14, age 9, 8/12/05).

Pre to post camp qualitative change demonstrated in the vignettes. To show the contrast in the quality of the responses from pre to post camp on knowledge from the vignettes, this example is given from vignette five.

Vignette Five: You and your friend are in the pet market and see this really beautiful bird. Your friend saves enough money to buy it and gets permission from his/her parents to get it as a pet. You both love to watch it and talk to it and try giving it different kinds of food to try. The bird does not seem to want to eat anything and soon becomes very sick. Your friend does not want the bird to die, and decides to release it on the edge of the city. Do you think this a good idea, and why?

Pre camp response: Great because animals love nature. (camp 2, child 29, age 11, 8/8/05)

Post camp response: That's not a good idea. Because the bird unable to prey and will starve once it leaves you. (camp 2, child 29, age 11, 8/12/05).

Summary of Findings on Knowledge

All data sources report gains in knowledge about animals. The survey reported significant gains in self-reported knowledge about animals and nature. Although the survey measured self-reported knowledge rather than actual knowledge, pre-post differences most likely represent actual knowledge gain, as well as confidence in new knowledge campers have gained. This assertion is supported by knowledge gains found

in the statistical analysis of the vignettes. In that analysis, the number of knowledge statements increased from beginning to end of camp supporting an increase of knowledge. The qualitative data from all three sources illustrated the breadth and depth of the knowledge gained by the campers through their experience.

Research Question 2: Did Camp Increase Student Care about Animals?

Statistical Analyses

Conservation Stewards Survey. Results from the analysis of the survey showed a significant increase in self-reported care about animals due to the camp experience. Following is a table of average pre and post answers on the Conservation Stewards Survey for care about animals by camp. The means are based on a 7- point Likert scale, with 7 being the most positive response.

Table 7

Conservation Stewards Survey means and standard deviations of care about animals by camp.

Camp	N		Care	
			Mean	SD
Research Base	22	Pre	5.30	.89
		Post	5.89	.93
Chengdu Zoo	33	Pre	5.08	1.10
		Post	5.50	1.03
Total	55	Pre	5.17	1.02
		Post	5.66	1.00

Scores increased from pre to post on care, $F(1, 53) = 14.685$, $p < .001$. There were no differences by camp and no interactions. Following is the ANOVA table for caring.

Table 8

Conservation Stewards Survey Analysis of Variance for care.

Source	*Df*	*F*	*P*
		Between subjects	
Camp	1	2.38	.224
Subjects within group error	53	(1.57)*	
		Within subjects	
Time (pre/post)	1	14.69	.001
Time X camp	1	.185	.53
Time X camp within group error	53	(.46)*	

*Values enclosed in parentheses represent mean square errors.

In order to be able to examine trends on individual questions, means and standard deviations for each question concerning care were calculated. The following table shows pre and post answers on each of these questions.

Table 9

Conservation Stewards Survey means and standard deviations of individual care questions.

Question	Pre			Post		
	N	Mean	SD	N	Mean	SD
C7: Wildlife in your local area.	55	5.15	1.81	55	5.25	1.90
C8: Wildlife habitat in your local area such as fields, forests, rivers, or wetlands.	55	4.38	2.01	55	5.38	1.46
C9: Wildlife from other countries such as bald eagles, giraffe, gorillas, and zebras.	54	4.72	2.01	55	5.29	1.76
C10: Wildlife habitat in other countries such as tropical forests, tundra, reefs, and wetlands.	52	4.12	2.09	54	4.98	1.70
C11: Going swimming in a lake.	55	4.78	2.43	55	4.96	2.46
C12: Protecting the natural environment.	55	6.11	1.27	55	6.22	1.13
C13: Protecting your local wildlife.	55	5.22	1.66	53	5.75	1.48
C14: Protecting wildlife in other countries.	55	4.85	1.89	55	5.64	1.44
C15: Getting to go hiking in the forest.	54	4.43	2.25	53	4.58	1.99
C16: Pet animals such as dogs, cats, and birds.	54	5.94	1.55	55	5.95	1.75
C17: Relationships between people and animals.	55	6.13	1.35	55	6.25	1.17
C18: Getting to spend time in nature.	55	5.47	1.92	55	6.24	1.33
C19: Individual animal’s happiness.	54	5.56	1.90	55	6.36	1.35

Vignettes

On the vignettes, the number of caring responses did not increase significantly from beginning to end of camp although the mean number of responses increased very slightly at both sites, F (1, 46) = 1.00, p = .32. See Table 10 for the pre and post camp means and standard deviations for care as found from the vignettes.

Table 10

Vignette means and standard deviations by camp of caring statements by camp.

Camp	N		Care	
			Mean	SD
Research Base	17	Pre	1.88	1.69
		Post	2.24	1.25
Chengdu Zoo	31	Pre	2.29	1.24
		Post	2.32	1.16
Total	48	Pre	2.15	1.41
		Post	2.29	1.18

Qualitative Analyses: Vignettes, Student Journals and Post Camp Questionnaire

While a quantitative increase in self-reported care was found from the survey, a significant increase was not found in the quantitative analysis of the vignettes. Following, the qualitative findings on types of care for animals will be presented.

The sub-themes and a descriptive quote for each care sub-theme are presented in Table 11.

Table 11

Sub-themes and descriptive quotes for care.

Sub theme	Descriptive Quote
Care about Nature	I feel great because I like nature (camp 1, child 1, 7/28/05).
Care about Animals	I was favor of animals before. Now I not only like them, but also cherish and protect them (camp 1, child 4, 7/29/05).
Care about other people's thoughts and actions toward animals	I want to raise the mother dog's babies to grow older, firstly, then look for a house for them where people love animals with hearts. Because the dogs also need a good living environment (camp 1, child 5, 7/29/05).
Camper states they don't care about something, or don't like something	I feel nothing (camp 1, child 12, 7/28/05).

Care about Nature

Unit five of the camp curriculum addressed nature and some knowledge of nature was intended, however, the real intention of this unit is an appreciation of nature. Just as children in the United States have little exposure to nature in today's society, Chinese children have even more limited exposure. The intention of the camp is to get children to see the worth of nature and care about it enough to want to protect it. Campers spoke eloquently to questions about their thoughts about nature in the student journals.

Care about nature from student journals. The following statements were chosen to demonstrate camper appreciation of the mystery, beauty, diversity, and inaccessibleness of nature, as well as the good feelings it evokes. The other two qualitative data sources did not yield support for this theme.

Q: What is your favorite thing that you have discovered while exploring nature?

A: I feel nature is so mysterious because there are so many profound mystery in nature (camp 1, child 3, age 11, 7/28/05).

A: I'm very delighted, because there are many different kinds of animals in nature (camp 2, child 8, age 8, 8/11/05).

A: I like the bird song, because it's natural (camp 2, child 22, age 10, 8/11/05).

Q: How do you feel when you are exploring nature?

A: I'm very happy because I have never experience it before (camp 1, child 7, age 10, 7/28/05).

A: Nature is so beautiful, because the peacock can spread its tail and the parrot can speak, so nature is so beautiful (camp 2, child 5, age 8, 8/11/05).

A: There are so many living things in such a small land, which makes me very surprise (camp 2, child 36, age 11, 8/11/05).

Care about Animals

It is hypothesized that care about an animal may lead to better care and stewardship for animals. One of the primary goals of the camp is to foster care for animals in participants and evidence that this occurred is drawn from this theme.

Care about animals from student journals. The following statements were chosen because they demonstrate that level of care was increased because they realized that animals have emotions, social relationships, and skills or talents. They were also chosen because campers understand that spending time with animals increases their level of care for them. The last statement was chosen to demonstrate that a camper cares about a past personal misdeed he or she did to animals.

Q: What is the most interesting thing you have learned about your animals from observing him or her?

A: The way of the giraffe expressing intimacy. Because they lean against each other head by head, which make me feel they are lovely (camp 2, child 35, age 11, 8/9/05).

Q: What was the most meaningful thing that you have learned from the animal experts?

A: The animal's friendship is most meaningful, which is most important to all animals, including human beings (camp 2, child 27, age 11, 8/10/05).

Q: Do you feel like you are getting to know your animal? Did you think this was possible before you came to camp? (The following three statements pertain to this question.)

A: Yes, it's impossible because I didn't cherish and love animals before. I feel happy (camp 2, child 21, age 9, 8/10/05).

A: I get to know more about animals. It's impossible because I can't know more knowledge about animals in city. I am delighted (camp 1, child 5, age 11, 7/27/05).

A: I get to know about animals and have learned the knowledge about animals. I didn't realize animals also have so many talents. I feel very happy (camp 2, child 14, age 9, 8/10/05).

Q: What new things did you learn today about how to provide proper care for animals?

A: Sometimes I feed animals carelessly, which maybe lead them to die" (camp 2, child 21, age 9, 8/8/05).

Care about animals from post camp questionnaire. These responses were chosen because they demonstrate how the camp experience increased level of care about animals

because of new knowledge of them, familiarity (spending time) with them, or due to instructor portrayal of love and understanding of them.

Q: How did camp change the way you think about animals?

A: The camp lets me have new view to animals while playing (camp 1, child 1, age 10, 7/29/05).

A: I used to hate the mouse but the camp changes my mind (camp 2, child 12, age 8, 8/12/05).

A: I didn't like animals before, but I changed my mind after joining the camp (camp 2, child 21, age 9, 8/12/05).

Q: What do you think are the most important things you learned about animals?

A: Animals are very clever (camp1, child 13, age 10, 7/29/05).

Q: How did camp change the way you want to behave toward animals?

A: My attitude toward animals was terrible, but now I discover animals have emotion also (camp 2, child 29, age 11, 8/12/05).

A: I was changed by contacting with animals (camp 2, child 37, age 12, 8/12/05).

Q: How did camp help you to understand or appreciate animals more?

A: The teachers in the camp are so laborious to help me liking animals more than before (camp 1, child 10, age 9, 7/29/05),

A: To play games and see presentations from instructors and great teachers (camp 1, child 13, age 10, 7/29/05).

Care about animals from vignettes. The following responses depict campers' wishes to be with animals as friends, sorrow over loss of animals, guilt over mistakes made about animals, and deep respect for animals even after death.

Q: In response to vignette two about the friend who gets a bunny and it dies and then in the future another friend of the camper wants to get a bunny as a pet.

A: I'll company with you (talking to the bunny) for all my life. I like you so much. I'll stay with you (camp 2, child 2, age 8, 8/12/05).

A: I'll ask for my friend to buy a bigger cage for it as well as its favorite food, if he is eager to take good care of it. Moreover, it should take a vaccine injection every month. Because I don't want to see another bunny to die again (camp 1, child 5, age 11, 7/29/05).

A: I'm very sad and angry, why still raise it, now that he didn't know how to rear Xiao Bai (camp 1, child 4, age 11, 7/29/05).

A: I'm sad because I love it (bunny) very much (camp 2, child 11, age 8, 8/12/05).

A: I feel it is too bad of myself. Why did I allow my friend to buy a rabbit? (camp 2, child 36, age 11, 8/12/05).

Q: In response to vignette three where parents allow their child to care for a pregnant dog and then find good homes for the puppies.

A: There is a dog in my home after all, because I want to have a new friend (camp 2, child 34, age 11, 8/12/05).

Q: In response to vignette four about the shop owner who allows his dogs to stray.

A: Please you don't let the mother dog see its children to die (camp 2, child 36, age 11, 8/12/05).

A: I'll bury it and bring flowers to it every day, because it died (camp 1, child 9, age 9, 7/29/05).

A: We should bury it together, because the dog should be buried (camp 2, child 21, age 9, 8/12/05).

Care about Other People's Thoughts and Actions toward Animals and Nature

An interesting theme that emerged was the campers caring about how other people think and act toward animals. This indicates that they may want others to share their feelings and actions toward animals, possibly in an attempt to widen the circle of care about animals.

Care about other people's thoughts and actions toward animals and nature from student journals. This answer was chosen because the camper was upset that someone threw trash into an animal enclosure, most likely due to their new knowledge that trash can hurt the animals.

Q: What new things did you learn today about how to provide proper care for animals?

A: To my surprise, there is someone throwing rubbish to the cage (camp 2, child 11, age 8, 8/8/05).

Care about other people's thoughts and actions toward animals and nature from post camp questionnaire. These responses were chosen because the campers expressed their thoughts, positive or negative, about other people's actions toward animals.

Q: How did camp help you to understand or appreciate animals more?

A: The teachers in the camp are so laborious to help me liking animals more than before (camp 1, child 10, age 9, 7/29/05).

Q: If you saw someone hurting an animal, what would you do?

A: You're utterly detestable, you can't beat or hurt animals (camp 2, child 2, age 8, 8/12/05).

Q: What do you think about the way people treat animals?

A: I think all people should treat animals friendly. I feel they like dogs if they adopt a kindly attitude towards animals (camp 2, child 18, age 10, 8/12/05).

Care about other people's thoughts and actions toward animals and nature from vignettes. The following responses were chosen to illustrate happiness because of parental support of their caring for animals, and a desire to find homes for the puppies where the people will love them.

Q: In response to vignette three where parents allow their child to care for a pregnant dog and then find good homes for the puppies. Campers were asked to state what they would tell the people who will now care for the puppies.

A: I'm very happy because they understand animals' need (camp 1, child 13, age 10, 7/29/05).

A: I thank my parents very much, because they will save several lives (camp 2, child 20, age 10, 8/12/05).

A: I'm very delighted, because my mother don't permit me to raise a pet usually." (camp 2, child 31, age 10, 8/12/05).

Not Caring about or Liking Something about Animals or Nature

This theme was a very rare occurrence and instances are described here.

Not caring about or liking something about animals or nature from student journals. This theme did not come up in the post camp questionnaire or post camp responses to the human-animal vignettes.

Q: What was the most surprising thing that you learned about animals during the tour today?

A: The cages is very foul (camp 1, child 12, age 10, 7/25/05).

Pre to Post Camp Qualitative Change Demonstrated in the Vignettes

To show the contrast in the quality of the responses from pre to post camp on care from the vignettes, this example is given from vignette two.

Vignette Two: You are hanging out with your friend over summer holiday. She/he decides she wants to get a bunny as a pet. She gets permission from her parents and buys a bunny in a little purple cage on the street. You both love the pretty little bunny and name her Xiao Bai. In a couple of weeks, Xiao Bai dies. How do you feel? Why?

Pre Camp Response: I haven't any feeling about it because it wasn't bought by me (camp 1, child 2, age 10, 7/25/05).

Post Camp Response: I'll feel very sad, because it's a little animal (camp 1, child 2, age 10, 7/29/05).

Summary of Findings on Care

Although the survey results revealed a significant increase on level of self-reported care about animals and nature, the quantitative analysis of the vignettes did not detect changes in number of caring comments. However, from observation of children with and around animals throughout the camp experiences and evidence in the qualitative data, care increased in campers at both institutions. One weakness of the vignettes is that they did not really probe for care, but mainly for knowledge and propensity.

Research Question 3: Did Camp Increase Student Propensity for Environmental and Wildlife Stewardship?

Statistical Analyses

Conservation Stewards Survey. Results from the quantitative analysis of the survey showed that campers showed a significant increase in self-report for propensity for environmental and wildlife stewardship due to the camp experience. Following is a table of average pre and post answers on the Conservation Stewards Survey for self-reported propensity by camp.

Table 12

Conservation Stewards Survey means and standard deviations of propensity for environmental stewardship by camp.

Camp	N		Propensity for Stewardship	
			Mean	SD
Research Base	22	Pre	4.63	.93
		Post	5.12	.94
Chengdu Zoo	33	Pre	4.69	.98
		Post	5.03	1.08
Total	55	Pre	4.67	.95
		Post	5.06	1.02

Scores increased from pre to post on propensity for stewardship, $F(1, 53) = 8.54$, $p. < .005$). There were no differences by camp and no interactions. Following is the ANOVA table for propensity.

Table 13

Analysis of Variance for propensity for environmental and wildlife stewardship on the Conservation Stewards Survey.

Source	*Df*	*F*	*P*
		Between subjects	
Camp	1	.005	.94
Subjects within group error	53	(1.45)*	
		Within subjects	
Time (pre/post)	1	8.54	.005
Time X camp	1	.28	.60
Time X camp within group error	53	(.52)*	

* Values enclosed in parentheses represent mean square errors.

To summarize pre and post answers on individual questions, means and standard deviations on each question were calculated. See Table 14.

Table 14

Conservation Stewards Survey means and standard deviations of individual propensity questions.

Question	Pre			Post		
	N	Mean	SD	N	Mean	SD
P20: Use recycled paper, glass, or plastic.	55	4.15	1.99	55	4.67	2.20
P21: Pick up litter.	55	4.24	2.31	55	5.33	1.90
P22: Not buy products made from wildlife.	53	5.08	2.24	55	5.13	2.28
P23: Encourage others to not buy wild animals as pets.	54	2.96	1.91	51	3.78	2.34
P24: Purchase items with less of packaging.	55	4.45	2.37	54	5.43	1.79
P25: Encourage others to protect the environment.	55	5.22	2.17	55	5.65	1.77
P26: Help animals you see in your daily life.	54	5.19	2.03	54	5.43	1.78
P27: Not allow my friends to litter.	54	4.83	2.66	55	5.00	2.49
P28: Visit a park.	54	5.24	1.90	55	4.98	1.91
P29: Encourage others to help animals.	54	5.22	2.00	52	5.54	1.66
P30: Write a letter to a newspaper or company asking them to support the prevention of harmful activities to the environment or animals.	54	3.69	2.49	55	4.22	2.24
P31: Stop to pet a dog on the street.	55	5.20	2.31	55	4.60	2.35
P32: Other action(s) to help wildlife or the environment.	55	5.16	2.22	55	5.33	1.71

Vignettes

A significant increase in propensity for stewardship was not found from the quantitative analysis of the vignettes, F (1, 46) = 1.98, p = .17. See Table 15 for the pre and post camp means and standard deviations for propensity as found from the vignettes.

Table 15

Vignette means and standard deviations by camp on propensity.

Camp	N		Propensity for Stewardship	
			Mean	SD
Research Base	17	Pre	6.18	3.05
		Post	7.35	2.78
Chengdu Zoo	31	Pre	7.32	3.10
		Post	7.35	1.92
Total	48	Pre	6.91	3.10
		Post	7.35	2.23

Qualitative Analyses: Vignettes, Student Journals and Post Camp Questionnaire

The camp curriculum is designed to empower participants to take action for animals and nature. One of the primary goals was to help our campers think about things they can do after camp for animals or the natural environment. The sub-themes and descriptive quotes for propensity are presented in Table 16.

Table 16

Sub-themes and descriptive quotes for propensity.

Sub-theme	Descriptive Quote
Propensity to tell someone the right thing to do for animals or environment	I'll tell others to care for animals, make enrichment for them and know more about them (camp 2, child 31, 8/12/05).
Propensity to personally do something for animals	There are many animals in nature and I will protect environment (camp 2, child 2, 8/11/05).
Propensity to use a good communication strategy to encourage another person to do the right thing for animals	I'll ask whether he enable to raise it for its life. Because the little animal died it's very miserable (camp 2, child 26, 8/12/05).
Propensity to do nothing	It could be sent to others, because its own home is so small, so it should be sent to others (camp 2, child 5, 8/12/05).

Propensity to Personally do Something for Animals and Nature

After the camp experience, we hope campers will want to help animals and protect nature. Because we cannot follow the children after camp, we can only assess what they think they might do in the future. Strong propensity for animal care and stewardship were found through the data sources.

Propensity to personally do something for animals and nature from student journals. The following responses were chosen because they show that campers were inspired to protect nature for the health of animals and humans.

Q: How do you feel when you are exploring nature?

A: I want to protect environment because animals can't survive if environment is polluted (camp 1, child 8, age 9, 7/28/05).

A: Yes, I want to love nature because people will die without nature (camp 2, child 11, age 8, 8/11/05).

Propensity to personally do something for animals and nature from post camp questionnaire. The following responses show how campers learned to be gentle with animals and treat them better.

Q: How did camp change the way you want to behave toward animals?

A: I became to be more tender (camp 1, child 2, age 10, 7/29/05).

A: It teaches me to treat animals gently (camp 2, child 13, age 8, 8/12/05).

A: The camp improves the way I treat animals (camp 1, child 10, age 9, 7/29/05).

Propensity to personally do something for animals and nature from vignettes. The following responses were chosen because they show propensity to not buy animals as pets when they do not know how to provide proper care for them, that they want to provide proper care or find good homes for animals, and that they want to bury an animal that has died (the researcher and both coders believe this is out of respect for the animals).

Q: The following three examples are in response to vignette two about the friend who gets a bunny and it dies and then in the future another friend of the camper wants to get a bunny as a pet.

A: Because I will kill him. So I don’t buy the bunny (camp 2, child 2, age 8, 8/12/05).

A: I know the rabbit is very pitiful, because it’s a wild animal and sold by people, then died, we would rather not to buy it (camp 2, child 7, age 8, 8/12/05).

A: I don't buy it in the future, because I raise it to die (camp 2, child 26, age 10, 8/12/05).

Q: In response to vignette three where parents allow their child to care for a pregnant dog and then find good homes for the puppies. Campers were asked to state what they would tell the people who will now care for the puppies.

A: I won't send them away, I want to look after them until they become old (camp 1, child 4, age 11, 7/29/05).

A: I'm going to look for a good home for them, because I want to make them happy (camp 1, child 1, age 10, 7/29/05).

Q: In response to vignette four about the shop owner who allows his dogs to stray.

A: I'll ask him to transfer it to me, because he raise it to die (camp 2 child 9, age 8, 8/12/05).

A: I'll bury it and bring flowers to it every day, because it died (camp 1, child 9, age 9, 7/29/05).

Propensity to Tell Someone the Right Thing to do for Animals

We want participants to care properly for and protect animals after their camp experience, but another way to help animals is to spread protective knowledge and attitudes to other people our participants will come into contact with. In a culture where most cases of animal and even domestic abuse are not the business of outsiders, this proves to be a difficult thing to foster. However, as evidenced below, our campers spoke strongly of what they would like to do for animals. It is known that propensity does not equal action, but the strength of responses provides hope. Also, it is assumed that

children may have more freedom to verbalize and defend animals than adults. Empowering children may lead to more proactive adults.

Propensity to tell someone the right thing to do for animals from post camp questionnaire. These responses were chosen because they depict how campers will tell others not to hurt, tease, or say bad things about animals. Other responses state how campers will tell others not to buy wild animals. Still other statements state how campers will tell others about the emotions of animals to get people to care about them, and that people should take care of and care about animals.

Q: If you saw someone hurting an animal, what would you do?

A: I'm going to persuade him not to hurt animals (camp 1, child 3, age 11, 7/29/05).

A: You're utterly detestable, you can't beat or hurt animals (camp 2, child 2, age 8, 8/12/05).

A: Don't hurt them, they also want to survive (camp 2, child 4, age 8, 8/12/05).

Q: Did camp make you want to teach other people about animals and what they can do for them?

A: I'll tell others: Don't pat the glass and throw food to the animals (camp 2, child 22, age 10, 8/12/05).

A: Don't buy wild animals, they belong to nature (camp 2, child 11, age 8, 8/12/05).

A: I won't permit my friend to buy Brazilian tortoise, because its life is strong (camp 2, child 36, age 11, 8/12/05).

A: I'll tell them, "Animals also will feel happy, please cherish and protect them." (camp 2, child 23, age 9, 8/12/05).

Q: The following statements are in response to the school project on how people impact animals.

A: Don't shout when watching pandas (camp 1, child 9, age 9, 7/29/05).

A: Don't say that animals are lazy (camp 2, child 24, age 9, 8/12/05).

Propensity to tell someone the right thing to do for animals from vignettes. The following statements depict how campers would tell others how to take care of animals or that they would tell others they should care about animals and why. This theme did not emerge in the student journals.

Q: The following are in response to vignette two about the friend who gets a bunny and it dies and then in the future another friend of the camper wants to get a bunny as a pet.

A: You should take good care of it, or you'd better not buy it (camp 1, child 9, age 9, 7/29/05).

A: I'll ask for him to try his best to look after it with responsibility (camp 2, child 30, age 12, 8/12/05).

A: I'll say to them that you should take good care of it, and buy a biggest cage and some books related with it, because the little animal needs to be looked after well. A big cage supply it with a spacious home and books help me to know more knowledge about it. (camp 2, child 7, age 8, 8/12/05).

Q: In response to vignette three where parents allow their child to care for a pregnant dog and then find good homes for the puppies. Campers were asked to state what they would tell the people who will now care for the puppies.

A: I'll tell him that what should feed the dog on, what the dog eats and what the dog drink everyday. Moreover, we should look for veterinary checking up for the dog termly (camp 1, child 14, age 8, 7/29/05).

Q: In response to vignette four about the shop owner who allows his dogs to stray.

A: I'll say to the shop owner "You once were the host of those dogs, you ought to have emotion with them." (camp 1, child 3, age 11, 7/29/05).

A: I'll propagandize to others to protect animals and cherish lives, as well as avoiding stray dogs springing up (camp 1, child 11, age 10, 7/29/05).

Propensity to Use a Good Communication Strategy to Encourage another Person to do the Right thing for Animals

This theme was separated out from the propensity to tell others to do the right thing for animals because of the high level reasoning involved in many of the responses. In these instances they were not just outright telling another person to do the right thing and what that is, but asking the person to think about their actions, or what the consequences of their actions most likely would be. Many campers also stated they would ask others to think about the feelings of the animal when making choices concerning animals, a strategy referred to as "transgression inductions" by Hoffman (2000). Transgression inductions are used by parents and other significant adults in the lives of children to promote prosocial behavior in children (Hoffman, 2000). When children do something that harms (transgression) another person, adults (usually parents) often ask their children how they would feel if someone had done that to them (induction). This provokes empathy in children because they now have to think about how they would feel. In turn when they think of their hurtful actions, this induces a feeling of guilt.

Another strategy campers used was to draw upon their new knowledge of animal behavior to explain to others how or why we should treat animals in a particular way. For example one camper mentioned that if we do not disturb animals they will not disturb us. The misconception that animals will bother humans unprovoked is one the researcher has experienced throughout her career working with animal and human interactions. Humans seem to think of animals as malicious and that they will bite you, even if unprovoked, which often leads to the animals being killed outright. Camp teaches children that animals rarely want to be involved with humans and if we leave them in peace and quietly observe and appreciate them they will go about their business and not harm us at all, and that in fact most of their business helps humans.

Another strategy campers used was to remind others that humans have a moral obligation to be kind to animals. Campers also reminded others that if we take them into our homes that we have a moral obligation to take proper care of them and this takes a lot of time and commitment so keeping of pets is something people need to consider seriously before doing. Throughout the world, pets often are bought on a whim which leads to a great deal of animal suffering and loss. Most children in China do not expect pet animals to live a long time, therefore the shock and sadness of the loss is not strong enough to prevent this event from being a normal occurrence in China.

These data show that children are aware of good strategies to get people to do what is right, and what they want, in this case, for animals. This theme did not emerge in the student journals.

Propensity to use a good communication strategy to encourage another person to do the right thing for animals from post camp questionnaire. These responses were

chosen because they depict how campers would use their knowledge of animal minds or behavior to get others to be kind to them.

Q: In response to the school project on human impact on animals.

A: Animals will not disturb you, just if you don't bring troubles to them (camp 1, child 14, age 8, 7/29/05).

Q: If you saw someone hurting an animal, what would you do?

A: Don't hurt them, they also want to survive (camp 2, child 4, age 8, 8/12/05).

Propensity to use a good communication strategy to encourage another person to do the right thing for animals from vignettes. The following responses were chosen because they depict how campers would use their knowledge of animal minds or behavior to get others to be kind to them. The other responses were chosen to demonstrate how children used transgression inductions to try to get others to be kind to animals.

Q: The following examples are in response to vignette two about the friend who gets a bunny and it dies and then in the future another friend of the camper wants to get a bunny as a pet.

A: I'll say "Don't buy it. Xiao Bai died so miserably. Do you want to see the tragedy happen again?" Because animals also have lives (camp 1, child 10, age 9, 7/29/05).

A: I will say: "Last time, the bunny raised by a friend was dead, how pitiful!" Because the bunny is very miserable and can't survive (camp 2, child 4, age 8, 8/12/05).

A: I will be very angry and say: “Why you raise it? Now that you can’t take good care of it.” (camp 2, child 22, age 10, 8/12/05).

Q: The following statements are in response to vignette four about the shop owner who allows his dogs to stray.

A: To start with the angle of the value of animal’s life (camp 2, child 35, age 11, 8/12/05).

A: I’ll tell him: “You will also will feel sad when you meet it. After all, it has emotion with you. Let it be strong. It’s also a life.” (camp 2, child 23, age 9, 8/12/05).

A: I’ll tell him about the dog’s feeling and let him know it’s wrong to do so (camp 2, child 33, age 11, 8/12/05).

Q: The following statements are in response to vignette one about the boy tossing the puppy up and down.

A: I’ll tell him “If I toy with you, just like you have done to the dog, ignoring others feelings, you will also feel uncomfortable. We should protect animals and give them a chance to reproduce.” (camp 1, child 11, age 10, 7/29/05).

A: I’ll prevent and tell him: “Are you happy if someone dallied with you at his pleasure?” (camp 2, child 23, age 9, 8/12/05).

Propensity to do Nothing

The incidence of students saying they could not do anything when presented with a problem involving animals was rare. The data for this theme are presented below. This theme did not emerge in the student journals.

Propensity to do nothing from post camp questionnaire. The following response shows that campers realize it is troublesome to tell others what they can do for animals. Other incidences of no propensity were from two girls who separately stated they were too shy to say something to others, which is very understandable for young children.

Q: Did camp make you want to teach other people about animals and what they can do for them?

A: No, because its very troublesome (camp 1, child 4, age 11, 7/29/05).

Propensity to do nothing from vignettes. The following responses were chosen to show that one camper felt it was not really his business to interfere with his friend's wishes. The second was chosen because the camper thought the dogs should be sent to someone else, not necessarily come home with him or her.

Q: The following example is in response to vignette two about the friend who gets a bunny and it dies and then in the future another friend of the camper wants to get a bunny as a pet.

A: I'll leave him be, because it's he that want to buy a rabbit (camp 1, child 15, age 9, 7/29/05).

Q: In response to vignette three where parents allow their child to care for a pregnant dog and then find good homes for the puppies. Campers were asked to state what they would tell the people who will now care for the puppies.

A: It could be sent to others, because its own home is so small, so it should be sent to others (camp 2, child 5, age 8, 8/12/05).

Pre to Post Camp Qualitative Change Demonstrated in the Vignettes

To show the contrast in the quality of the responses from pre to post camp on propensity from the vignettes, this example is given from second part of vignette two. Vignette Two: What would you do in the future if a friend of yours wanted to get a pet bunny?

Pre Camp Response: It's none of my business, because it's he want to raise a pet. Moreover, as long as he knows how to raise it, he can do it (camp 1, child 4, age 11, 7/25/05).

Post Camp Response: Stop him because he couldn't look after animals (camp 1, child 4, age 11, 7/29/05).

Summary of Findings on Propensity

The survey reported a significant increase in camper self-report of propensity for animal and environmental stewardship. The quantitative analysis of the vignettes from pre to post camp, however, did not reveal a significant increase. It is important to note that campers came in high on stating things that they would do to help animals on the vignettes. Although campers stated they would do certain things to help animals prior to camp, they may have said those things without having the knowledge or skills to carry through with their intentions. From the high increases in knowledge of skills to help animals that were reported in the knowledge section, the researcher believes that the increase in self-report of propensity for animal and environmental stewardship on the survey and detailed qualitative report of skills campers now possess to help, depicts both intention (propensity) and skills to back up those intentions. In other words, campers may have stated they would do things for animals or nature before camp, but when faced with

a situation may not have been able to follow through on their intentions. The knowledge and skills learned in camp would help them in the future if faced with situations where animals or the environment needed their help.

Emergent Theme Empathy

Quantitative Data

The theme of empathy for animals emerged in the analysis of the vignette data and the student journals. Pre and post means for the two groups were nearly identical (see table 17); and since the standard deviation for the pre data at the research base was zero, ANOVA was not calculated.

Empathy was primarily found in responses to questions that probed for empathy by asking campers to think about animals from the animal's perspective. When the instruments were designed, the researcher did not realize the questions were probing for empathy. Empathy was only scored when campers directly stated how they thought an animal was feeling, either emotionally or physically. The researcher is curious about how to discover whether children are empathizing with others, human or non-human animals, without directly asking.

Table 17

Vignette means and standard deviations by camp on empathy.

Camp	N		Empathy	
			Mean	SD
Research Base	17	Pre	1.00	.00
		Post	1.00	.35
Chengdu Zoo	31	Pre	.97	.41
		Post	1.00	.37
Total	48	Pre	.98	.33
		Post	1.00	.35

Qualitative Data

Illustrative examples of empathy (E) are taken from the student journals and vignettes. This theme did not emerge from the post camp questionnaire. No sub themes were delineated for this research.

Empathy from student journals. The following statements were chosen because they depict a camper putting himself or herself into an animal's place and imagining how they feel or think.

Q: Are you able to imagine how an animal is feeling when you observe it?

A: It must be very scared. Be careful, don't quarrel and fight noisily and don't pat the glass when observing (camp 2, child 14, age 9, 8/11/05).

A: It maybe think "why do you look at me?" I observe it quietly (camp 2, child 16, age 9, 8/11/05).

Empathy from vignettes. The following statements depict campers' ability to imagine how animals are feeling in certain situations, most likely based on how they would feel if they were in those situations

Q: The following pertain to vignette one about the boy tossing the puppy up and down.

A: The dog is very sad and angry (camp 1, child 4, age 11, 7/29/05).

A: It feel unhappy, because you'll also be unhappy if you were tossed up and down (camp 2, child 20, age 10, 8/12/05).

A: It will feel sad, then flee away. Because it is scared. (camp 1, child 9, age 9, 7/29/05).

Q: The following example is in response to vignette two about the friend who gets a bunny and it dies and then in the future another friend of the camper wants to get a bunny as a pet.

A: I think the bunny is very miserable. If I were the bunny and dies, I'm also pitiful (camp 2, child 3, age 8, 8/12/05).

Pre to Post Camp Qualitative Change Demonstrated in the Vignettes

To show the contrast in the quality of the responses from pre to post camp on empathy from the vignettes, this example is given from the second part of vignette one. Vignette One: Now, think for a minute about how the puppy felt when the boy was doing that. When you are ready, write down how you think the puppy was feeling and why.

Pre Camp Response: The dog feels sad and must be very pain (camp 2, child 32, age 12, 8/8/05).

Post Camp Response: The dog will be painful and sad, it feels people are so evil because there is a boy to bully it (camp 2, child 32, age 12, 8/12/05).

Summary of Findings on Empathy

Empathy emerged due to certain questions on the vignettes and student journals that (unintentionally) probed for empathy by asking campers how they thought animals were thinking or feeling in certain situations. While empathy did not increase on the pre to post responses to the vignettes, from observing campers and from years of experience teaching children about animal minds and emotions, the researcher believes the campers will empathize with animals on a higher level after their camp experience.

Research Question 4: Did Camp Affect Student Compassionate Behavior toward Animals and the Environment?

Student Behavior Ethogram

In order to determine whether student behavior changed over the course of the camp experience, data were collected by camp instructors for their groups using the student behavior ethogram and data sheet. Each time a student in his/her group exhibited one of the listed behaviors (e.g., littered, picked a plant, asked someone not to litter, etc.), instructors were to record a tally mark. This data collection method is called all occurrence sampling (Altmann, 1974), because all known occurrences are recorded on the data collection sheet. Behavioral occurrences were totaled for each day and graphed to see whether positive behaviors increased and negative behaviors decreased. The following figures show the distribution of positive and negative behaviors across the weeks of the camps.

Figure 1. Results of student behavior data from the Research Base used to determine whether positive behaviors increased and negative behaviors increased throughout the camp experience.

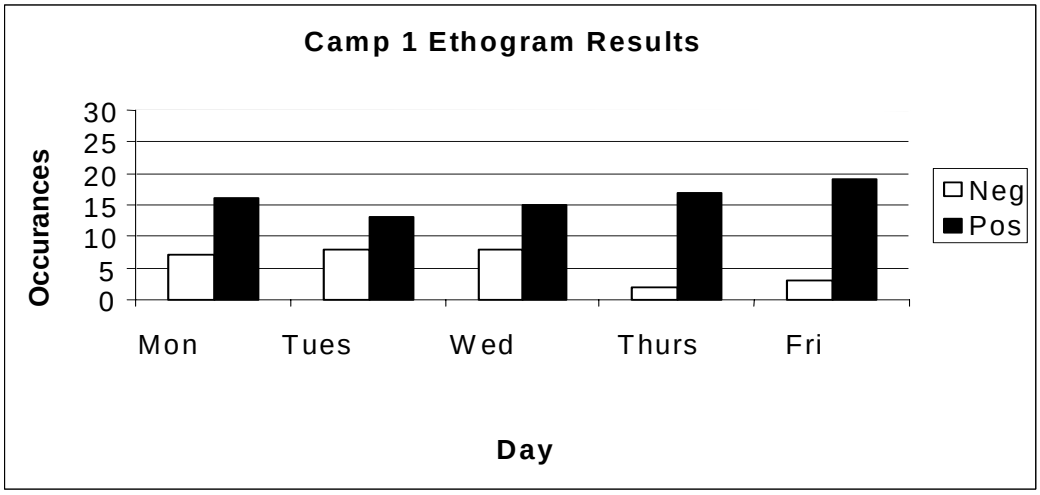
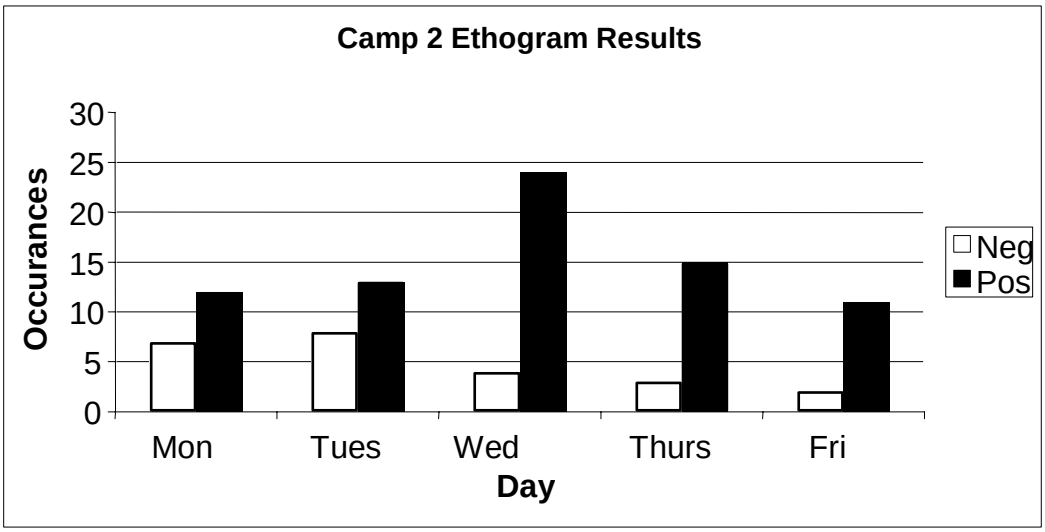


Figure 2. Results of student behavior data from the Chengdu Zoo used to determine whether positive behaviors increased and negative behaviors increased throughout the camp experience.



Although the pattern shown by the positive behaviors is inconsistent, in both camps negative behaviors decreased across the week, indicating that the campers were more

conscious of behaviors to avoid, including throwing trash and yelling at the animals. Also, the positive behaviors listed on the ethogram were much less overt than the negative, and many of the behaviors could have occurred without the instructors noticing. Because of the opportunity of having the campers for multiple days in the residential situation, the researcher felt there would be enough time to detect behavioral changes. In fact, in the pilot the previous year, our team noticed that good behaviors went up and that bad behaviors decreased. A problem in the use of the ethogram in this study was that keeping track of randomly occurring camper behaviors was more than the instructors could handle on top of all other duties.

Summary

Findings from the survey revealed significant self-reported increases of knowledge, level of care, and propensity for animal and environmental stewardship. In addition, the quantitative analysis of the vignettes revealed significant increases in actual knowledge. Confirmation for the statistical analyses were found in all three qualitative sources, journals, post-camp questionnaires, and vignettes in that campers showed a breadth and depth of accurate knowledge of animals, gave examples demonstrating care, and enumerated ways in which they could take action. Comments reflecting empathy and arguments using transgression inductions were unexpected. The use of behavioral ethograms to assess daily changes in positive and negative environmental behaviors showed a mixed trend of positive behaviors but a definite decrease in negative behaviors. This instrument shows promise in studying actual behavior change.

CHAPTER 5

DISCUSSION

This chapter presents interpretation of the results of this research, implications of the findings, and strengths and weaknesses of the sample and measures. Implications for conservation education programming, ideas for future research, and personal reflections are presented. A summary of final conclusions will also be presented.

Field Notes

At both camps, all the lessons were covered and several of the supplementary activities were also incorporated. As far as content covered, both experiences were similar. Some differences in the feel of the camp could have made the experiences different. Camp at the Zoo ran much more smoothly than camp at the Base. The main two reasons this happened are that most of the Zoo camp instructors had already taught camp once (or three times in the case of three of the instructors) and the Zoo camp received the full support of all Zoo staff members. Whenever any problem arose, all the camp coordinator had to do was radio whoever could fix the problem and s/he would help immediately. This was not the case at the Research Base.

For the campers, the only negative influences were the four children with behavior problems and the mosquitoes and heat at the Research Base (Camp 1) and the continuous rain at the Zoo (Camp 2). From the researcher field notes, however, it did not appear that challenges at the two camps had an effect on the outcomes at the camps. In support of this assertion, no differences were found between camps in the statistical

analyses of the survey and the vignettes. All lessons were taught, and campers seemed to enjoy themselves a great deal. Perhaps a strong curriculum and dedicated and passionate instructors, as well as the appeal of animals, overcame potential problems.

As in any educational setting, the outcomes of the camps were highly dependent on instructors. Good teaching requires a certain level of knowledge of the materials and skills being presented, as well as confidence in one's teaching skills, enthusiasm for the educational content and setting, and of course an affinity for the group one is teaching. It was fortunate that there were excellent instructors at both institutions, time for a week of intensive training on the curriculum, and a group that possesses a love of children, animals, and the natural environment. Along with their love of animals, the instructors also had the strength to openly talk about and share their love and compassion for animals, which is a rare trait in China. Because animals are not typically thought of as sentient, expressing love for them is often considered frivolous and a sign of weakness in an individual (Luo Lan, personal communication, October 1999; as referenced in Zu, Li & Su, 2005), presenting a profound cultural barrier to conservation of wildlife. Expressing and demonstrating compassion and having the level of self confidence to express these feelings and skills that go against cultural norms are critical for conservation educators in China.

Research Question 1: Did Camp Increase Student Knowledge of Animals?

The finding that students showed a significant increase in self-report of knowledge on the survey suggests that campers' perceived knowledge of animals, biodiversity, the natural environment, and skills to protect nature and animals increased. This finding was also strongly supported in all three qualitative sources and the

quantitative assessment of the human-animal vignettes. This is important because, if a person does not have access to information about an issue, s/he can neither care about the problem nor take action to alleviate it (Miles, 1991; Dresner & Gill, 1994). Thus, knowledge is a first step toward conservation behavior. Seven knowledge themes that emerged from the qualitative data sources demonstrate the types of knowledge the campers gained. The varied types of knowledge gain demonstrated in the qualitative data are informative and in most cases provide direct support for the types of knowledge students stated they gained through the survey questions for knowledge. The children's responses will be helpful to the conservation education field in showing how children interpret the knowledge that is taught to them, especially experiential knowledge of animals.

Knowledge of Animals

The campers gained a variety of types of knowledge about animals. Three types of knowledge of animals that are similar in meaning and importance emerged in all three sources of qualitative data: knowledge of animal behavior, animal mind, and animal emotions. There was also a reported increase in knowledge of "the social life of animals" on the survey, which is similar to understanding animal behavior in meaning and implications. The literature (Raphael, 1999; Helton & Helton, 2005; Bekoff, 2006) supports the premise that an increase in human care and protective tendencies develop in people who have knowledge of animal behavior, minds, and possession of emotions.

Another critical type of knowledge of animals that emerged in all three qualitative sources and the survey was knowledge of animal needs. Support for this gain was also demonstrated on the survey in responses to "things you can do to protect animals" and

"how to take proper care of pets." As mentioned in the literature (Raphael, 1999; Myers, Saunders, & Garrett, 2003), this type of knowledge has been absent from conservation education programming in the past. Learning about animal needs may be a critical foundation for young people in order for them to learn how to take proper care of and behave compassionately toward animals.

Another important type of knowledge is of an individual animal's life history such as personality traits, special markings, family history, etc. Support for this came from the post camp questionnaire and student journals and could have been part of campers' increase in knowledge of the social life of animals on the survey. The literature supports this as an important way to show individual animals' sentience and endearing qualities, which could engender protective tendencies in humans (Raphael, 1999).

Knowledge of the importance of animals from a biodiversity and food chain perspective was supported in the quantitative increase on survey scores for the question on knowledge of "the importance of wild animals to their environment" and qualitative findings from the student journals and post camp questionnaires. This knowledge could also create more positive attitudes toward animals, because with this knowledge people realize animals are vital for healthy ecosystems (Kellert, 1980).

Several types of knowledge that emerged have moral implications as to human treatment of animals if a person has awareness and acceptance of them. Those that emerged are knowledge: that animals have life, that animals need freedom, that meat humans eat comes from animals, of animals' physical states, and that animals feel pain. These areas of knowledge are also supported by an increase in knowledge reported in the survey on "things you can do to protect animals." The literature supports the desire of

humans to be kinder to and protective of humans (Hoffman, 2000) and animals (Raphael, 1999) when humans are aware of the sentience and physical feelings of others.

Other types of knowledge of animals evidenced in the qualitative data that are more typical of traditional conservation education programs were: knowledge of animal physiology, knowledge of animals (nothing specific stated), and knowledge of animal appearance (what different species look like). Of important note here is that in most conservation education programs, the knowledge focus has been on natural history facts such as where a species is from, its habitat type, what group of animals it belongs to, animal and plant identification, whether the animal is a carnivore, herbivore, etc. That was not the type of knowledge these camps were intended to impart. While some of that certainly was mentioned, the knowledge taught in the camp program was intended to provide the knowledge needed for proper animal care and welfare, as well as for wildlife conservation.

Knowledge of Human Responsibilities toward Animals

Knowledge of human responsibilities toward animals evidenced in both the qualitative and quantitative data is knowledge about how to provide proper care, and that proper care is a moral responsibility of humans for animals in captive situations. This knowledge was demonstrated on all three qualitative sources as well as in increases on the survey statements “things you can do to protect animals” and “how to take proper care of pets.” Campers also demonstrated knowledge that people should look after animals, treat animals well, and protect animals in all three qualitative sources.

Types of knowledge that were taught because of pervasive problems in China (Song, 2004a, 2004b) were that humans should not feed animals carelessly or tease them

(both on visits to the zoo or at home), and that buying pets is a big commitment (and/or that people should not buy a wild animal for a pet). These issues were highly stressed in camp, and evidence that campers learned this knowledge was strongly evidenced in all three qualitative sources and in responses to the survey questions “things you can do to protect animals,” “how to take proper care of pets,” “results of keeping wild animals as pets,” and “the importance of wild animals to their environment.” Providing the knowledge that it is not acceptable to treat animals poorly (Song, 2004a, 2004b) is a critical aspect for conservation education programming for China.

Campers’ knowledge of human responsibilities toward animals included comments that animals should be cherished and cared about and that humans should know how to show animals that they care. Knowledge of human responsibilities was found in all qualitative data sources and also found through answers to the survey question “how to take proper care of pets.” Children in China have almost no intimate experiences with animals. It is known that these experiences are necessary for bonds, trust, and care to develop (Myers, 1998). The finding that children stated in all qualitative sources as well as the surveys, that animals deserve to be cared about (not just cared for), provides evidence that this can be taught and embraced by participants in conservation education programs.

Humans need to have a sense of morality toward animals and the natural environment that will guide their behavior toward animals and the environment (Song, 2004a, 2004b). All of the qualitative data sources revealed children’s moral understandings of how animals should be treated and protected. It is believed that children arrived at camp with some theoretical moral understanding of how animals

should be treated, but that this knowledge was not often translated into behavior. In propaganda-like fashion, the children may know animals should be treated kindly, without being committed to kind treatment or behavior compatible with environmental preservation. In Buddhism it is stated that all animals have a life and that to harm them is wrong (Elvin, 2004). Therefore, the knowledge that humans should not harm non-human animals is a common belief in China, though it is seldom actually practiced (Song, 2004b). While not everyone in China is Buddhist, this Buddhist doctrine has become enculturated into Chinese teachings to all children. Children know it is the right thing to say about animals, but most likely have little knowledge of what that means. Data from the qualitative sources may be a combination of "the right thing to say" and significant new knowledge learned in camp about how to care for and protect animals. Campers' new knowledge and skills could be applied in the future, if the campers were to be presented with situations where animals or the natural environment need their help.

Knowledge of Nature

Humans need to have some knowledge of nature and the interconnections of animals and their habitats in order to start thinking about a more holistic understanding of wildlife conservation. While the emphasis of the camp program being explored here is more on connections with animals, it is believed that connections may form the foundation for future nature conservation behavior as well (Dettmann-Easler & Pease, 1999; Myers & Saunders, 2002). The goal of unit five in the camp curriculum is to foster appreciation and understanding of nature, and how the animals that campers have come to love throughout the week depend on nature for survival. The three areas of knowledge of nature found in all three qualitative sources were: knowledge that nature is interesting

(student journals), knowledge of biodiversity (student journals and post camp questionnaire), and knowledge that it is morally right to protect the natural environment (vignettes). This was also supported on the survey by the increase in campers' confidence in their knowledge of "the importance of wild animals to their environment".

Knowledge of Negative Impacts Humans Have on Animals

The evidence of children's knowledge of negative impacts humans have on animals found in the student journals and post camp questionnaire are: knowledge that humans have destroyed nature and/or wildlife, knowledge that animals are dying out because of humans, knowledge that animal trade harms animals and/or causes their depletion from the wild, and knowledge that humans make improper choices for animals that cause them to suffer or die. The survey question "results of keeping wild animals as pets" provides further support for those findings. The knowledge of human abuse of animals was prevalent throughout all qualitative sources and in the survey question "things you can do to protect animals."

Other interesting findings from the vignette data were existence of the following themes: knowledge that humans do not know how to take proper care of animals, and knowledge that human selfishness about animals is wrong and hurts animals (i.e., people buy them as pets because they want to have them, but don't think about proper care for them). Because survey results showed an increase in knowledge about "results of keeping wild animals as pets," "how to take proper care of pets," and "things you can do to protect animals," campers can perhaps use this new knowledge to help alleviate these same knowledge gaps for people with whom they come into contact in the future.

Children need to be aware that human behavior causes direct and/or indirect harm to animals in order to know how to change their own behavior or that of others with whom they come into contact. As stated in the results section, blaming humans for harming animals was not a stated goal of the camp curriculum. However, because humans are the cause of the vast majority of recent extinctions and inhumane acts, human involvement is obvious to attentive and caring children. This emerged as a very strong theme throughout all qualitative sources. Although conservation education in the United States has advocated that we cannot discuss “doom and gloom” with children (Sobel, 1996), research has not been done to determine what information children can handle and need to be exposed to in order for concern and action to occur. The information should be presented age-appropriately. Children have the capacity to care deeply, and if they do not realize that human behavior causes the loss and suffering of the animals they love, they will not think to change their own behavior or ask others to change their behavior. The finding that campers learned about serious issues facing animals due to human actions without evidence of distress or apathy is important. Possibly because campers learned about the harmful effects humans have on animals while learning and practicing skills to help animals made the awareness less painful, and potentially empowering. Powerful emotions are evoked when people hear of wrong doing, especially toward the innocent and/or those they love (Hoffman, 2000). If those emotions can be channeled directly into action, compassionate and conservation behavior toward animals may occur. Research is needed on thresholds of awareness that children can and want to be exposed to, as well as methods of content presentation to avoid apathy and denial.

Knowledge of the Human-Animal Bond

The understanding of the human bond with non-human animals was evidenced by statements from campers in all qualitative sources. An interesting finding that has underpinnings in Chinese culture was that campers stated in all qualitative sources that humans and animals are equal. The camp does not teach this directly, but does teach participants that animals should be treated as people would like to be treated. Some of this sentiment no doubt comes from school (X. Ping, personal communication, May, 30, 2006; Y. L. Zhao, personal communication, June 20, 2006) and also from Buddhism (Elvin, 2004). However, it has been explained to the researcher that it is just a saying, without actual understanding of the deeper meaning that implies proper treatment of animals. Findings from the student journals demonstrate how campers' thoughts toward animals were changed by their camp experience. This change was exemplified in quotations such as "I was favor of animals before. Now I not only like them, but also cherish and protect them" (camp 1, child 4, age 11, 7/29/05) and "Yes, it's impossible because I didn't cherish and love animals before. I feel happy" (camp 2, child 21, age 9, 8/10/05).

A promising finding from the student journals and post camp questionnaire was that campers learned about or became aware of their own emotions about animals and that they could get to know animals personally. In all three qualitative sources, campers stated that animals are our friends, and we can bond with animals. These findings are promising in that it is known that humans are kinder to and more protective of others that they know and have positive feelings about (Myers, 1998; Raphael, 1999; Hoffman, 2000; Weil, 2004; Joy, 2005). Another provocative finding from the student journals was knowledge that animals will trust you if you treat them well.

As mentioned, humans have many reasons that might lead them to care about animals, including a more utilitarian (Kellert, 1978; 1980) knowledge that animals benefit humans. Evidence of this knowledge was found in the student journals and post camp questionnaire responses. While this sentiment could cause harm to animals as represented by human over-consumption and abuse in that process, the researcher believes that when this sentiment was expressed by the campers they were expressing a deeper appreciation for animals because they realized that animals benefit humans in many ways, not just as food, medicine, pets and trophy items.

Children most likely have a stronger sense of connection with animals than most adults in the current global society that has adopted a distancing from animals (Myers, 1998). This is likely as an emotional defense against the acknowledgement of human harm to them (Plous, 1993). Children's connections with animals can be detected in their communications about animals, and fostered in conservation education programs designed for them. As children grow up in society today, they become more and more distanced from animals, both emotionally and physically. In the past, humans were directly connected throughout their lifespan with animals because knowledge of them was one basis for survival (Wilson, 1984). If humans didn't understand animals they either didn't eat, or were eaten. Children seem to retain understanding and intimacy. Possibly, it is indoctrination by adults that pulls them away from this connection to animals (Myers, 1998). Conservation education programs need to be designed to help children overcome social and culturally imposed distancing from animals. Programs need to foster bonds with animals through methods such as positive modeling of compassion and care about and for animals (Bandura, 1977), personal interactions with small

domesticated animals (Myers, 1998), sharing individual animals' personalities (Raphael, 1999), and teaching about animals' minds (Bekoff, 2006). These were all critical components of the camp curriculum.

Knowledge of Skills to Help Animals

Children must have age appropriate skills in order to take action for animals. As mentioned above, there are some critical steps in conservation education for behavior change. Participants must gain knowledge about animals and what animals need from humans. Participants must care about animals and want to do something for them. Another critical step is they must have the skills to take action for animals. Very promisingly, this theme was strongly evidenced in the qualitative data. One thought-provoking finding in the data was the children's understanding of how to sensitively communicate to others (often even adults that were portrayed in the vignettes) about doing the right thing for animals. They seemed to have an acute understanding that people's behavior toward animals was insensitive because of immoral behavior toward animals. Therefore, they seemed to understand that to criticize someone's behavior toward animals is criticizing the person's morality.

As seen in the results section, some children presented very high level strategies they would use to persuade people to behave properly toward animals. Most impressive were the use of transgression inductions (Hoffman, 2000), as described in the previous chapter, which parents often use to get children to be kind to others. Over time, adults use prosocial training by using these transgression-induction-guilt scripts. An example of a script would be when a child hits a sibling, the parent asks how the child would feel if the sibling had hit him or her. The child then thinks about how they themselves would feel,

which is of course not pleasant. The child then feels guilty for making the sibling feel badly. In the child's mind these scripts are eventually internalized and encourage kind behavior to avoid the negative feeling of guilt. In other words, children empathize with someone they are considering imposing a transgression on and the anticipated guilt is strong enough to inhibit the child from committing the transgression. While Hoffman's work pertains to actions by people to other people, the researcher believes this applies equally to human treatment of non-human animals. Campers in this study had internalized this skill that was used on them by their parents and grandparents to think about how to communicate with people in the vignettes that were harming or had the potential to harm animals.

Another interesting aspect of this finding is that the campers had to accept that the animals had minds, had sentience and were therefore needing and deserving of their protection. As mentioned throughout this paper, sharing animal minds with children in conservation education programming is especially important in societies that shun the acknowledgement of animal mind. This is a provocative area of interest for future research. Children have not only internalized the things they learn when parents use transgression inductions with them, but seem to have also internalized this strategy to teach kindness on their own. This is also an important area for cross-cultural research, i.e., would children in other cultures use this same strategy to help animals?

Also taught in camp were how to choose appropriate pets and the importance of learning how to take care of pets before buying them. The pet trade in China is filled with neglect, abuse, disease, and death (personal observation 1999-2006). Pets are often bought on a whim with no real knowledge of the animals' requirements. Many pets die

very quickly, suffering the entire time due to disease, starvation, abuse, and/or neglect. To make matters worse, when pets die, often families go back to replace the pet and perpetuate the cycle of pain, while adding to loss of species in the wild and inbreeding of select domesticated breeds. This, of course, is not just a Chinese phenomenon. Within the area of pet selection the camp curriculum teaches that wild animals do not make good pets and that buying them leads to endangerment of species. Instructors also teach children that it is not right to release animals when they tire of them or the animals are sick. In these cases, the animal most likely suffers and dies quickly, or if it is a very hardy species and out-competes animals already living in the area, can become an invasive species.

Evidence of all these types of knowledge of skills pertaining to pets and pet care were found in the qualitative data. Quantitative support came from significant increases in reported knowledge about “results of keeping wild animals as pets” and “how to take proper care of pets.” In all three qualitative sources, campers said they learned how to prepare to choose a pet and care for it, as well as good strategies for communicating with humans about animals’ needs and protection. Hopefully, participants in the camps will use and share this knowledge well into their future.

Incorrect Knowledge

Humans lack knowledge and understanding of animals and the natural environment (Munson, 1994), which results in profound maltreatment, loss, and destruction. This is a relatively (in terms of time humans have been on the planet) new phenomenon in human awareness and behavior (Wilson, 1984). Before humans became

so industrialized, out of necessity for survival, humans were in tune with animal needs and behavior, and ecological processes.

Lack of correct information about animals (personal observation, 1999-2006), or lack of understanding of animals (Song, 2004a, & b) has led to extreme cases of animal abuse. For example, many people in China do not believe that animals have emotional or physical feelings, therefore feel no apparent guilt in hurting or neglecting them. Also, as mentioned above a misconception that releasing animals back to the wild is best for the animal has lead to death of the individual animals, or introduction of new invasive species that cause the death of other indigenous plants and animals. Evidence from the human animal vignettes indicated a decrease in incorrect knowledge after camp.

Triangulation Summary on Knowledge

Knowledge gain is a critical first step toward conservation and animal welfare behavior. All qualitative and quantitative data sources support each other on gains in knowledge. The survey found an increase in self-report of the knowledge that campers believed they had gained through the camp experience. The types of knowledge they stated they gained were fully supported by their responses on the qualitative sources. Campers expressed a great breadth and depth of knowledge about animals in the qualitative data sources, often commenting that their new knowledge made them change their behavior toward animals. From review of the types of knowledge that emerged in the qualitative data, it appears that the kind of knowledge shown here is quite different from knowledge most traditional wildlife conservation programs have taught (Zelezny, 1999). There was some evidence of gains in natural history knowledge, but most gains demonstrated knowledge of how to care for and help protect animals.

On the introductory question on the post camp questionnaire, many campers expressed that the main reason they came to camp was because they wanted to learn more about animals. Education and knowledge are revered in China; therefore this is a strong selling point for the camp. Young people in China openly embrace new knowledge, and presentation in novel situations such as the Research Base or the Zoo most likely makes learning even more appealing.

Although it was not the purpose of this study to assess the meeting of the curriculum objectives, it appears that all the stated objectives for the camp curriculum on knowledge have been met. See page six of Appendix B for the knowledge objectives. The findings here are similar to the findings of previous research (Gilbertson, 1991; Dettmann-Easler & Pease, 1999) in that the residential camp program produced significant gains in knowledge. The differences between the present research and previous studies lie in the type of knowledge measured.

An item that was not on the survey but was expressed in the qualitative sources was knowledge of animal emotions. A potentially useful modification to the survey would be adding a statement on camper knowledge of animal emotions to see if that would show self-reported increases. Results could be triangulated with the qualitative data. Another important area to assess in the future would be application of campers' new skills to be sure campers are equipped for situations of need by animals and nature in the future and to see if camper actions correspond to their increased knowledge.

Research Question 2: Did Camp Increase Student Care about Animals?

The results of the survey found a significant increase in self-reported level of care about animals and their environments. The finding that caring increased is very

important. A person who has knowledge and skills to help, but does not care, will not likely put knowledge and skills to use to help solve environmental problems. This finding is also important because it supports and is reflective of the literature on children's relationships with animals (Myers, 1998; Melson, 2000). A critical aspect of the program is to foster a seemingly natural care for animals, a care that may otherwise be lost as children become enculturated and indoctrinated with negative beliefs and behaviors toward animals learned from significant adults in their lives. Caring is critical in animal welfare and conservation issues.

The pre-post quantitative analysis of care on the vignettes did not find a significant increase in care. Possible reasons for the stable level of care on the vignettes are discussed at the end of this chapter. However, evidence of care about animals and nature was found throughout the qualitative data sources. The types of care stated in the qualitative data are supportive of the survey findings and specific questions about care. Each area of care will be discussed by theme.

Care about Nature

In many parts of the world, children are not getting the exposure to nature that humans, even one and two generations ago, got to experience (Louv, 2005). Unit five of the camp curriculum, *Discovering Natural Wonders* is designed to promote appreciation for nature through experiencing nature first hand. Researchers (Stapp, 1978; Cohen & Horm-Wingered, 1993; Tilbury, 1994; Wilson, 1992, 1993, 1994, 1996) believe that without this exposure, children may never gain an appreciation of the natural world. Campers expressed their appreciation for nature in the student journals and the post camp questionnaire, and several survey questions concerned campers' appreciation for nature.

With the severe deterioration of the natural environment in China and remoteness of remnant wild places, children's exposure to nature is almost non-existent. Research has shown that provision of experiences in nature through summer camps is one way to improve children's attitudes toward nature (Carlson & Baumgartner, 1974; Ross & Driver, 1977; Christy, 1983; Shepard & Speelman, 1986; Dettmann-Easler & Pease, 1999). Therefore increase in care about nature found in this study was expected.

Many questions on the survey asked campers about their level of care about different aspects of nature. Those questions included care about "protecting the natural environment," "getting to go hiking in the forest," and "getting to spend time in nature." Campers also responded to the qualitative questions in the student journals and post camp questionnaire favorably. They said that nature felt mysterious, that it felt good being in nature, and that it felt good because it was a new experience. They also mentioned the joy of listening to nature and discovering things in nature. The number of campers stating that this was their first time being in nature (this response was not directly solicited) and that it felt good is further evidence of the paucity of nature experiences for children in China. Providing experiences in natural settings is becoming harder to include in conservation education programs in an increasingly urbanized world. However, the researcher would like to suggest experiences in nature should be a critical component for conservation education program and curricula developers and practitioners. Even small green spaces can provide novel and engaging experiences for children growing up in a world covered in concrete.

Care about Animals

Humans must care about animals in order to work to protect them. The pain and suffering that humanity inflicts on human and non-human animals is severe. There is a profound lack of understanding of animals in China. Animals are generally thought of as unfeeling (physically and emotionally) objects for use by humans (Song, 2004a, & b). If a person does not think of another individual as a thinking, feeling, sentient creature, it is most likely impossible to care about him/her strongly enough to protect him/her (Joy, 2005). Lack of care for animals and misunderstandings about animals in China was one reason the researcher was first sent to China in 1999 to investigate interest in conservation education programming with Chinese partners. The blatant and culturally standard abuse and neglect of animals in China is painful for humans (including a growing number of Chinese citizens) that *do* understand animals as sentient and worthy of respect and nurturance. It is important to be cognizant of the fact that Americans are also instigators of tremendous animal abuse and death (Plous, 1993). While the Chinese situation appears more overt, it is no less problematic that Americans hide harms behind the walls of factory farms and block out thoughts about the animals who lose their homes and lives to American suburbia, just two among the many harmful actions performed daily. Fostering care about animals has always been the central focus of every program our team has developed at the Research Base and Chengdu Zoo. This is also the reason for the heavy emphasis on animal behavior and animal care. In 1999, one of China's leaders in conservation education, shared with the researcher that it was not until she began assisting Zoo Atlanta researchers with behavioral data collection that she realized giant pandas had thoughts, minds, feelings, and intelligence. She explained that she had to truly see the pandas for who they were for her to care about them on any level other

than recognition as China's national treasure. The misunderstandings that she had had about animals had been taught to her; she had had no direct experience to lead her to think and feel any other way.

Through workshops with adults over the years and instructor training for camps, our team has concluded that adults do not initially think about animals as sentient but after exposure to our programs feel enlightened and do not think about animals the same afterward. The children's comments reflect that many of them also learned to view animals as sentient beings through the camp experience with animals. Similar evidence that knowledge of animals' minds and behaviors increases care and protective tendencies have been found with an American sample (Helton & Helton, 2005). Some researchers (Dettmann-Easler & Pease, 1999; Myers & Saunders, 2002) believe that this care about animals could be an essential ingredient to conservation behavior so it is promising that this was a strong theme in the data.

The self-report of level of care about animals increased on the survey. Survey questions assessing care about animals involved "wildlife in local area," "wildlife habitat in your local area…," "wildlife from other countries…," "wildlife habitat in other countries…," "protecting your local wildlife," "protecting wildlife in other countries," "pet animals such as dogs, cats and birds," "relationships between people and animals," and "individual animals' happiness." Care about animals was found throughout all three sources of the qualitative data. The qualitative data provided support for the quantitative findings from the surveys, with campers writing about being happy about getting to know animals and having animals in their life, liking certain animals (either individual or species), expressing concern for an animal's health or well-being, being sad or feeling

guilty about something that happened to an animal, being happy when they thought an animal recognized them, being happy thinking about someone having a new animal friend. They also mentioned that an animal must be buried when it dies, in so doing expressing respect and care for the animal's dignity. Campers mentioned they were changed positively because of contact with animals, that their new understanding of an animal's mind/behavior fostered their care/love for the animal, and that they appreciated animals more because of the hard work of their instructors. The latter is evidence of the power of modeling by their instructors (Bandura, 1977). The researcher believes that modeling by instructors influenced camper appreciation of animals, and also promoted interest in learning and processing new knowledge that led both to student gains in knowledge, and to increases in care about animals and nature. These findings about type and level of care about animals in children are supportive of the work of other investigators (Myers, 1998; Melson, 2000).

The qualitative data demonstrate an intimate level of care that would be hard to achieve from a survey instrument, but that provides strong support to the survey findings that found a self-reported increase in care about animals. The data demonstrate that the campers were not just abiding by social norms, but expressing specific and deep levels of care and understanding of animals' needs and minds. Children in China are taught through their moral and science education curricula that they should care about and protect animals, but how to care is not conveyed. The qualitative data presented above gives evidence that campers care about animals in specific ways, not in a slogan-like manner.

Care about other People's Thoughts and Actions toward Animals

Humans must care about influencing other people's thoughts and actions toward animals in order to have the will to want to talk with them about their behavior towards animals. This was not a particularly strong theme in the data. However, the researcher believes it has meaning, and could provide an area of inquiry for future researchers, and inclusion in conservation education programming. The fact that the campers cared about other people's level of care about animals could be significant in conservation education programming and research. In order for children to want to share their knowledge, care, and protecting skills about animals and nature with others (Uzzell, 1994), they have to care about others' thoughts and behaviors toward animals and nature. In conservation education not only the fostering of personal care about animals and nature needs to be emphasized, but also the power of sharing their new knowledge and desire to widen the impact of stewardship behaviors must be a focus.

Statements about other people's care for animals were found in the qualitative data. This was not asked for in the survey and would be a good addition for future use of the instrument. Qualitative statements of care about other's thoughts and actions toward animals were found in responses to the vignettes. Campers mentioned their own care about human behavior toward animals, their parents' support of them to care for an animal, and care about other people's understanding and feelings about animals. These findings suggest that programs fostering personal care about animals can also influence participants' desires to get other people to care, especially family members and close friends. This could be a precursor to the transfer of knowledge needed to expand a conservation ethic and behaviors (Uzzell & Rutland, 1993; Uzzell, 1994).

Do Not Care

Conservation education programs can increase the level of care about animals and nature, as well as help participants to realize they *do* care. The occurrence of data demonstrating *no care* was extremely rare in either the pre or post data. The qualitative statements that gave evidence of *no care* from the student journals and post camp questionnaires included comments about not learning what they were most interested in or that the animals were smelly (a common comment among children). On only a few occasions on the vignettes did a camper state that she/he did not care about an animals' situation.

Emergent Theme: Empathy

Empathy is a precursor to caring and development of moral behavior (Hoffman, 2000), and is therefore significant as an emergent theme in this study. If children can empathize with animals, it is predicted that normal children will care more about animals, treat them well, provide for their needs in captivity, and want to protect their habitat in the wild. Myers and Saunders (2002) began a provocative inquiry into whether the possession of empathy with animals could lead to environmental stewardship behavior. The premise is that if one cares about and empathizes with someone, then one wants him or her to be healthy, happy, and safe. Myers and Saunders (2002) and Myers (1998) were the researcher's primary inspiration for developing the camp curriculum being investigated here. Prior to reading their work, it had been the researcher's goal to create conservation education programs that changed human behavior toward animals and the natural world for the preservation of biodiversity and animal welfare. These sources provided the road map. Goals for programs became helping children bond with animals

and understand them and their needs well enough to inspire these children to learn how to best care for animals and protect their habitats. The root of true care, the researcher believed, had to be empathy although it was unclear how empathy might be assessed. For a culture where animals are not thought of as sentient, empathy has been the first step in all of our team's conservation education programs in China. It is hoped that promoting empathy with animals will change participants' animal welfare behavior over the years. As Noddings (2006) has encouraged, adults need to help children think about what humans do to animals that may cause them to suffer. If human actions cause pain or emotional suffering in an animal, children should be encouraged to care about animals and discover ways to avoid harming animals.

How do conservation educators support growth from empathy for individual animals to wildlife and nature conservation activism? From the data in this study as well as years of experience working with children and animals, and from the literature review, the researcher believes that there are the following critical factors: (1) empathy with animals, often because of knowledge of animal mind and behavior; (2) knowledge of animal needs; (3) caring about animals; (4) adults and peers who model their respect for and care of animals, and very importantly love for them; (5) understanding of biodiversity and the interconnectedness of life; (6) learning and practice of concrete, age appropriate skills for the care and conservation of animals; and (7) empowerment to share knowledge, care, and skills with others. Myers & Saunders (2002) predict that empathy forms the foundation for all the other factors. The present research findings lend tentative support to Myers and Saunders' hypothesis that empathy leads to propensity for environmental stewardship behavior, especially by providing evidence from another

culture. While the camp curriculum under investigation here was specifically designed to fit with Chinese culture and wildlife conservation issues, it was deliberately founded on human universals of empathy, compassion, and morality. While this research supports the efficacy of the camp and curriculum in the uniqueness of Chinese culture, it is predicted that this model, founded on empathy for animals, can be applied within most human cultures with modifications for cultural and indigenous wildlife conservation issues.

In the data discussed here, the researcher believes that cognitive empathy (as defined by Preston and deWaal, 2002) was what was demonstrated in the camper's responses. Preston and deWaal (2002, p. 5) define cognitive empathy as "Apart from being emotionally affected, the subject cognitively understands the object's predicament and situation. This implies perspective-taking and attribution." Quite possibly campers did experience a personal sense and emotional change similar to what the animals in the vignettes were experiencing ('true' empathy), but that cannot be determined from these data. However, campers did demonstrate a strong understanding of what the animals in the stories must have been feeling, both physically and emotionally, acknowledging a belief in animal mind. Belief in animal mind must be a precursor to empathy with animals. This research suggests that sharing the growing evidence of children's recognition of animals' minds (see Bekoff, 2006 for a review) would be beneficial for conservation education programming in China.

Triangulation Summary on Care

The survey results revealed a significant increase on level of self-reported care about animals and nature. However, the quantitative analysis of the vignettes did not detect changes in number of caring comments. The survey asked directly about care

about animals and was much easier to respond to in a timely manner. Quantitative changes may not have been found on the vignettes because the vignettes did not probe for caring feelings as much as for knowledge and propensity. However, support for increases in care, through sincere caring comments, were found throughout the qualitative data. Also, from the field notes on observations of children with and around animals and throughout the camp experiences as well as the evidence in the qualitative data, the researcher believes care increased in campers at both institutions. Perhaps if children had been interviewed rather than asked to express their feelings in writing in a rushed end-of –camp atmosphere, the data would have supported more care.

As an emergent theme, empathy was not tested for with the survey. Data from the qualitative sources provided evidence for the occurrence of campers showing empathy with animals. The researcher believes that the first and third care/empathy objectives of the camp curriculum were met. Those objectives were: (a) be aware of the emotional bond that can form between people and animals and (b) express that they appreciate the value of biodiversity. The researcher believes that the second objective, identify the emotional well-being of an animal based on its behavior, and the fourth objective, have an emotional connection to the health of the natural world, were partially met. A longer time with participants may be needed to attain these objectives, and stronger assessment tools may be needed to determine success on these two objectives.

Important additions to the survey could be questions about campers' care about: how other people think about animals, how other people treat animals and nature, and how other people think about nature. Questions that probe for care need to be added to the qualitative instruments.

Research Question 3: Did Camp Increase Student Propensity for Environmental and Wildlife Stewardship?

Results from the survey found that there was a significant increase in campers' self-reported propensity to take action. This finding suggests that the camp experience was influential in increasing empowerment of campers to take action for animals and the environment in the future. In the camp curriculum, knowledge, care, and skills were presented in a manner that encouraged and possibly allowed for statements of propensity. This is a significant finding, because as stated earlier, behavior change is the primary goal of conservation education today (Kruse & Card, 2004). Though propensity is not a direct measure of behavior change, it is the most clearly related data feasible to collect, in most cases (Regan & Fazio, 1977; Fazio & Zanna, 1978a, 1978b; Ajzen, 1985). Types of propensity demonstrated in the qualitative data will be discussed by theme.

Propensity to Personally do Something for Animals or the Environment

The qualitative data well supported the self-reported levels of propensity for wildlife and environmental stewardship found in the survey. Statements from the student journals and post camp questionnaire that demonstrate propensity to personally do something for animals or the environment include wanting to treat or touch animals gently, improving personal treatment of animals, and wanting to protect nature. Statements from all three qualitative sources include not buying a pet because it would not be good for the animal, taking proper care of an animal, and learning how to care for an animal before getting one as a pet. On the vignettes, campers stated they would find a good home for a homeless animal, take responsibility for an animal that someone else was not caring for properly, and would bury an animal who has died. Statements from the

post camp questionnaire and vignettes involved stopping someone who was hurting an animal.

One of the most important intentions of the camp curriculum is that campers will feel empowered by their new knowledge of animals and protective skills, and care for animals enough to want to personally take action to help animals or the natural environment. This theme was highly pervasive throughout all three qualitative data sources, especially the vignettes. Campers very explicitly demonstrated their willingness to do particular tasks to help or defend animals in their free-written responses. While this is not a direct measurement of behavior, often in conservation education programming this is the closest educators and evaluators can come to measuring potential behavior change. Increases in propensity were supported by trends in the ethogram results. In the future it is planned to partner the measurement of propensity with a take home ethogram for parents and to interview families periodically after their children's involvement in our education programs to assess whether behavior was changed, and if so, for how long. Practitioners and evaluators also need to be able to assess the transferability (Basile, 2000) of the knowledge gained in conservation education programs to similar situations in real life. The vignettes provided scenarios similar to real situations and may help children reflect on how they would actually behave.

Propensity to Tell Someone the Right Thing to do for Animals

If conservation education programs only affect those who participate in them, conservation impact will be small. Practitioners attempt to empower participants to share their new knowledge, attitudes, and skills with people they come into contact with after the program (Ballantyne, Fien, & Packer, 2001). Participants must feel confident enough

in their new knowledge to speak openly. In order to be effective, they must not only possess skills to help animals, but also understand those skills enough to teach them to others. In the case of animal welfare and conservation and environmental preservation, often children have more current and reliable access to knowledge and skills than adults, and there is evidence that children who participate in environmental education programs can positively influence the adults in their lives (Uzzell, 1994; Ballantyne, et. al, 1998).

If participants are going to take action, they must also share new knowledge in a sensitive manner. The willingness to take action was shown in the survey results in an increase in self-reported plans to encourage others to help animals and/or the environment. Those statements from the survey include specific actions such as encouraging others to not buy wild animals as pets, not allowing friends to litter, and writing letters to officials asking them to protect the environment and/or animals. This theme was also highly pervasive throughout the vignette qualitative data, and the post camp questionnaire. From the post camp questionnaire it was learned that campers would tell others that people should get to know animals and not say negative things about them (e.g., pandas are lazy). This theme was not probed in the student journals.

Statements from the vignettes and post camp questionnaire include telling someone to take proper care of an animal. Specific suggestions included providing enrichment for animals, neutering or spaying pet dogs and cats providing enough freedom, and showing respect for dead animals by burying them. In their answers, the campers also showed that they knew not to hurt animals, not to feed animals carelessly, not to tease/bully animals, not to shout at animals, not to buy wild animals as pets, and not to get a pet if they do not know how to take proper care of it. The children said they

would tell others how to take proper care of an animal and that they should take responsibility for their actions concerning animals. The qualitative data showed that the campers were not just saying they would encourage others to do things for animals or the environment, but had real ideas about things they could ask others to do, and a passion to do so.

Propensity to Use a Good Communication Strategy to Encourage another Person to do the Right Thing for Animals

As mentioned earlier, children seem to understand the sensitivity of asking someone to change their behavior toward animals, most likely because of moral underpinnings. Throughout the qualitative vignette data campers displayed an understanding about how to sensitively communicate to others (often even adults who were portrayed in the vignettes) about doing the right thing for animals. Very importantly, they also stated their willingness to do this for animals. Campers seemed to understand that, given the moral nature of human behavior toward animals, to criticize someone's behavior toward animals is criticizing the person's morality. The campers understood that in asking someone to change, they must say it in an appropriate way so that others listen and take them seriously. Campers knew they had to phrase their wishes calmly, wisely, and with sincere sensitively about the animals.

The above finding was unanticipated and provoking. The evidence of children's abilities to convey their wishes for other people's treatment of animals is evidenced in a variety of statements such as: tell someone to consider the possible consequences of their actions toward an animal before making a decision to do something, ask someone to consider whether s/he really can care for an animal properly (especially when someone is

considering getting a pet), tell someone that animals have a life (therefore should be treated well), and tell someone about an animal's feelings (to get them to be kind or fair). Other statements involved telling someone that animals are our friends (sometimes mentioning that we should treat them as we would a friend), telling someone that it is morally wrong to do something bad to animals, asking someone to think about the feelings, physical or emotional, of an animal in order to persuade him/her to do the right thing for an animal, questioning how a person would feel in a situation similar to the animal's, and questioning someone's thoughts/morals/actions toward animals to get her/her to think about behaving better toward animals.

As previously discussed, in the case of animal welfare and conservation and environmental preservation, often children have more current and reliable access to knowledge and skills than adults. There is evidence that children who participate in environmental education programs can positively influence the adults in their lives (Uzzell, 1994; Ballantyne, et. al., 1998). The quantitative data from this study shows an increased willingness in campers to encourage others to help animals and nature. The qualitative data presents knowledgeable and sensitive methods campers possess to do so. Again, this does not mean they will have the strength to do so in a real life situation, but provides optimism that they might try.

No Propensity

There were 10 cases where children apparently did not feel confident to take action for animals or the environment. Eight came from the post camp questionnaire and two from the post camp responses to the vignettes. It is important to understand the situations that are too difficult for children to address, or where a program fell short in

delivering the knowledge and skills to take action. Research also needs to be conducted to see at what ages are children able and confident enough to take on actions for animals and/or the environment.

Two negative types of propensity were recorded, one when a camper stated that he can't tell others to do something for animals (e.g., because he is too shy, or speaking up is too troublesome), the other when a camper stated she will not do anything about an animal's situation, in this case blaming the person in the scenario for the wrong doing.

Triangulation Summary on Propensity

Survey findings indicated a significant increase in campers' self-report of propensity for animal and environmental stewardship. The survey asked directly about propensity for animal and environmental protection and was easy to respond to in a timely manner. Although the quantitative analysis of the vignettes did not reveal a pre to post camp increase on propensity, the qualitative answers indicated plans to take action on behalf of animals and the environment. The finding of no pre-post differences may be because at the beginning of camp, the children's answers on the vignettes included many things they would do to help animals. Although campers made these statements prior to camp, their statements were likely made without having the knowledge or skills to carry out their intentions. From the high increases in knowledge of skills to help animals that were reported in the knowledge section, the researcher believes that the increase in self-report of propensity for animal and environmental stewardship on the survey and detailed qualitative report of skills campers now possess to help, depicts both intention (propensity) and skills to back up those intentions. Knowledge and skills learned in camp should help them in the future, if faced with situations where animals or the environment

need their help. These are some of the most promising findings from this study, since the goal of conservation education is to create better stewards of Earth.

The researcher believes that the propensity (action) objectives of the camp curriculum were met and truly embraced by the campers. See page seven of Appendix B for stated objectives.

Research Question 4: Did Camp Affect Student Compassionate Behavior toward Animals and Nature?

The ethogram was the only instrument designed to assess actual behavior change over the course of the week-long camp program. Though the pattern shown by the positive behaviors (e.g., demonstrates respect for an animal in camp, discusses a positive environmental choice with another student, expresses worry for an animal) is inconsistent across the week. However, in both camps negative behaviors decreased across the week, indicating that the campers were more conscious of behaviors to avoid (e.g., throwing trash and yelling at the animals). From other instruments in this project it was learned that the campers did want to improve and/or change their behavior toward animals and the environment and were able to give examples of specific behaviors they planned to change. The positive behaviors listed on the ethogram were much less overt than the negative, and many of the behaviors could have occurred without the instructors noticing. In future use, more overt positive behaviors will be added to the ethogram.

The ethogram has promise as a tool to assess actual human behavior change through conservation education programming. Self-reported behavior is easier to measure than actual behavior but it is actual behavior that must be changed for the preservation of life on Earth. However, unless practitioners and evaluators can somehow track the

behavior of program participants, how is it known if programs create this behavior change? Because of the opportunity of having the campers for multiple days in the residential situation, the researcher felt there would be enough time to detect behavioral changes. In fact, in the pilot the previous year, our team noticed that good behaviors went up and that bad behaviors decreased.

A problem in the use of the ethogram in this study was that keeping track of randomly occurring camper behaviors was more than the instructors could handle on top of all other duties. Perhaps the importance of the instrument was not made clear during training week with the result that instructors did not make much effort to pay attention to the campers' behaviors and document them. Time did not allow for the measurement of inter-observer reliability in scoring the campers behaviors but will be done in future research. The researcher still believes the ethogram can be a useful tool and will use an ethogram in the research, since begun, with kindergarten and primary populations in Chengdu. However, it is recommended that one person without instructional duties (or a highly experienced instructor) be responsible for documenting behavior change throughout a program. Lastly, it would be optimal to have observers unknown to program participants watching for these behaviors. Most people tend to be on their best behavior in front of teachers and act quite differently when they think no one is watching.

The behavioral ethogram could also be a useful tool for data collection *after* camp, if classroom teachers and parents can be persuaded to record these data for researchers after their children have been a part of a program. While it is important to know if behavior changes within the span of a week, it is even more important to see if attitude and behavior change is durable enough to last after the program ends. This

simple tool, combined with a journal to record children's unsolicited, as well as solicited, dialogue about animals and nature would provide valuable data about the efficacy and durability of conservation education programs.

Strengths and Weaknesses of the Study

Both the camp program and the research methods had strengths. The camp had been piloted the previous year to clear up glitches in all aspects of the camp experience. The curriculum had been used previously and included many research-supported elements. Another strength was having staff with a great deal of knowledge and experience with the curriculum. Not only had the camp coordinators and lead instructors taught the camp curriculum several times, many of them had been translators of the curriculum giving them great familiarity with the content. As a result, we could truly test the curriculum and the experience because it was taught much as it had been intended. The research was conducted in a country where there is little research on the efficacy of environmental education. The many theories that formed the foundation of the camp curriculum need exploration in other cultures, namely constructivist learning theory, Biophilia, and the formation of human-animal bonds.

Strengths in the research methods of the study include the use of both quantitative and qualitative data, pre-post data, multiple sources of data from multiple instruments and types of analysis, comparison between camps, and the use of a behavioral observation instrument. The use of mixed methods allowed the researcher to compare self-reported knowledge, caring, and propensity for environmental stewardship on the survey with open-ended responses that demonstrated knowledge of skills for taking action and empathy that is difficult to measure on surveys.

There were also some weaknesses that may limit the findings. These include some logistical camp-related problems and limitations of the instruments. Among the former were (a) a smaller sample size than anticipated because of the cost of the camps and the difficulty in recruiting through the schools and (b) the timing of the data collection. Related to recruitment problems, some of the children of staff were allowed to come even though they were younger than the age for which the curriculum was developed. The youngest children seemed to enjoy the program, but much of their data could not be used because of writing difficulties. Several instruments were used to collect post data, making this aspect of data collection too time consuming. Children were answering questionnaires while their parents were arriving to take them home, causing them to rush through their answers. A weakness of the survey was that it had not been researched with Chinese children, raising questions about the cultural reliability and validity of the instrument. Also children may have given socially desirable rather than honest responses. The behavioral ethogram being piloted in this research may not have detected some of the behaviors occurring because the staff was either not aware of the importance of the instrument or was too preoccupied with other responsibilities to pay close attention. In spite of these limitations, the research has some important implications for conservation education.

Implications for Conservation Education

It is hoped this research will provide suggestions for conservation education program development in China. The camps and curriculum in this study featured personal interactions with animals and hands-on animal care by participants as discussed in Katcher & Wilkins (1993), experiences in natural areas proposed by Louv (2005),

modeling by caring adults (Carson, 1956), provision of knowledge and skills to enable effective communication to others about animals and conservation (Ballantyne, Fien, & Packer, 2001), and encouragement of empathy with animals through teaching animal mind (emotions and pain) (Bekoff, 2006) and behavior (Bekoff & Jamieson, 1987). This combination of elements was successful in promoting increases in self-reported knowledge, caring, and propensity for compassionate behavior toward animals and environmental stewardship.

Other implications for conservation education involve the instruments that were developed for this study and tested in this research. Especially used in combination, they show promise in assessing various aspects of children's knowledge, caring, propensity for action, and actual behavior.

Previous research found extended contact to be necessary for change (Dettmann-Easler & Pease, 1999; Zelezny, 1999). Although a camp format provided extended engagement with animals and environmental issues, the researcher believes even more extensive experiences would be beneficial. Curriculum immersion within school systems, and with inclusion of families, may be a way to create the paradigm shift in human minds that must take place to ensure the sustainability of human life on Earth. This is the next phase of work being conducted by the Research Base. The researcher is utilizing the foundations of the camp program developed for this research to create curricula to be implemented into the school system in Chengdu. The curriculum will include training and a manual for teachers and parents as well and curriculum workbooks for students. In phase one, curricula for grades four and five will be created and piloted; and in following phases, other grades will be included until curricula are created for each grade level.

These curricula will be promoted in other cities in China as well and be adapted for use in rural areas of China, where impact on wildlife and nature is often more direct.

As a note of interest, since this research was conducted, the school system in Chengdu has become more open to field experiences for students and proclaimed them instrumental in supplying a well-rounded education for their students (Y. L. Zhao, personal communication, April 19, 2006). With new curriculum reform in China, emphasizing inquiry study to help students develop the ability to identify, research, and solve problems (Poisson, 2001), a few schools across China have cautiously begun to organize field trips. Education reform currently underway opens possibilities for integrating conservation education elements found successful in this research into the school curriculum.

Implications for Teacher Education

As mentioned in the literature review, China has implemented a mandate for environmental education in schools (CCICED, 1997). Also, curriculum reform currently underway in China states that environmental education should be a logical and integral part of new educational content and methods (Poisson, 2001). However, teacher training and materials have not yet been developed (Wu, 2002). With environmental threats and curricular and methodological training needs apparent, this research has implications for teacher education in China. The curriculum under investigation here addresses one of the most pressing environmental challenges Earth faces today, loss of biodiversity (Dirzo & Raven, 2003), and this investigation suggests a model for biodiversity preservation education. The researcher proposes seven criteria for formulating biodiversity conservation education curriculum and teacher training: (1) encouragement of empathy

with animals through knowledge of animal mind and behavior; (2) providing knowledge of specific animal needs; (3) promoting true care about animals (not propaganda); (4) training of adults and peers who model their respect for and care of animals, and very importantly love for them; (5) teaching about of biodiversity and the interconnectedness of life; (6) teaching and practice of concrete, age appropriate skills for the care and conservation of animals; and (7) empowering students to share knowledge, care, and skills with others. Essential curricular and teacher training components should include: extended personal interactions with animals, *multiple points of contact* with individual animals, hands-on animal care by participants, observation and interpretation of animal behavior, biodiversity knowledge and conservation skills, encouragement of empathy with animals through teaching about animal mind (emotions and pain) and behavior, conversations with conservation experts, specific skills and knowledge about appropriate pets and animal care, and provision of knowledge and skills to enable effective communication to others about animals and conservation. The researcher would also like to stress the need for hands-on teacher training that includes involvement with animals, and practice of compassionate and conservation skills. With human psychological and social barriers to overcome for the preservation of biodiversity which sustains life on Earth, resources to create, test, and implement effective conservation education programs for biodiversity preservation are imperative.

Future Research

The field of conservation education needs further research on promoting empathy and providing knowledge of animal mind in conservation education programs, as well as their effects on future animal welfare and conservation behavior. The impact of teaching

age-appropriate skills to help animals and the likelihood that those behaviors will still occur after the program ends needs to be assessed. The optimum length of program and the effects of parents and other significant adults also need to be determined. Another provocative area of inquiry, especially for China under the one child policy, is the effectiveness of children as change agents for animal welfare and conservation. Can children impart conservation morals in significant adults in their lives? A cross cultural examination of the use of transgression inductions (Hoffman, 2000) concerning behavior toward animals would be interesting from an anthropological perspective, and informative to conservation education planning. It would also be important to assess the impact of participation with friends versus participating without any close friends in the program. It seems likely that desired behavior change could be sustained if reinforced by peers from the program with who continued contact is promoted.

Personal Reflections

My dissertation has reaffirmed for me that it is the young people of the world with which we need to work to change human attitudes and behaviors toward animals and the environment. I was pleasantly inspired and reassured by the genuineness of the children's responses to the instruments and the fervor with which they expressed their intentions toward and for animals. The creation of the camp curriculum was for me a culmination of four years of study into how children best learn, what children need to learn to be inspired to take action for animals, Chinese conservation issues, and Chinese culture. While I believe that young children are the key to the paradigm shift that humans need to make if we are all to survive on this planet, I realize that parents and other significant adults in children's lives must be included for conservation and welfare thoughts and

behavior to continue after conservation education programs end. In that vein, I have always included parent and teacher workshops in non-camp programs to garner support for the ethics we hope to instill and to support continuation of learning at home and during routine school days. This component is continued today in our programs for children at the Research Base, and becoming a more prominent part of what we do. I hope that this will be a trend for conservation education globally.

Summary

Conservation education is beginning to be recognized as one of the critical components of preserving life on Earth (Orr, 2004). As mentioned at the start of this paper, loss of biodiversity is one of the most pressing and irreversible problems the Earth faces today. Humans may, with a great deal of foresight, be able to clean up air and water pollution and other environmental hazards, but humans cannot bring back extinct life forms. Each organism plays a critical role in the functioning of earth, and adults have the obligation to impart to children moral thoughts and behaviors toward animals. Conservation education must occur for all ages, but especially with children, in hopes that someday care for planet Earth will become a part of the human mindset.

A concern shared with the researcher throughout this study is how can young children help to preserve Earth's biodiversity in time? Since scientists predict that many species will go extinct in the next 10 to 20 years (May 2000; Reid, 1992; Wilson, 1999), how are children 8-12 years old really going to help? This question is highly justified and asked out of true concern for the survival of unknown numbers of species. Teaching children, unfortunately, is not the "silver bullet" all conservationists are looking for. However, the researcher would encourage all conservation education developers to

include whole families and schools. Conservation education programs should also include as a critical component the empowering of children to transfer their knowledge and conservation attitudes and skills to people in their lives (Uzzell & Rutland, 1993; Uzzell, 1994; Ballantyne, et. al., 1998; Ballantyne, 2001). Children can learn how to have an impact in their daily lives and communities; however, it will take powerful and responsible adults to influence the human mindset and behavior that will be necessary if we are to have any chance of avoiding the predicted losses. Children can be powerful allies for the environment and influential on the adults with whom they share their lives (Uzzell, 1994). The one child policy in China could also prove a positive force in China where adults in a child's life are primarily concerned with the health, happiness, and schooling of their children. Children in China are incredibly powerful agents within their families. It is hoped that when children share their knowledge, care, and skills for wildlife preservation and compassionate behavior toward animals, significant adults in their lives will support them and behave accordingly. It must also be emphasized that we cannot put the responsibility of our planetary problems just on children. It is the responsibility of all humans to act with a moral sense toward the natural world. An important aspect of conservation education is working with families and teachers as well as with children.

It is also critically important to keep in mind that education is just one of the tools needed to attempt to lessen the losses Earth faces daily. Conservation biologists, wildlife researchers, ecologists, international governments, universities, the media, and many other groups will have to play a part in controlling the growth and consumptive patterns of the human population, and devising the best plans to protect biodiversity. Education is just one tool, but one that can provide skills for children growing up in a world where it is

predicted that devastating shortages, toxins, and spread of disease will most likely be a part of their life because of human destruction of biodiversity.

Findings from this research are encouraging. They reveal significant increases in knowledge, level of care, and propensity for animal and environmental stewardship on a self-report survey and significant increases in actual knowledge on vignettes about animal treatment. Analyses of the three qualitative data sources revealed a great breadth and depth of the knowledge, type of care, and skills and propensity for wildlife and environmental stewardship that lend support for the survey findings. Two unexpected findings include campers' references to empathy and the use of transgression induction strategies to encourage and justify moral behavior toward animals. The findings of this study support the efficacy of a camp program where personal experiences with animals spark an interest in learning and promote human-animal bonds that support caring behavior and willingness to take conservation action.

This study contributes to the research supporting longer contact time with conservation education program participants. The research also supports the hypothesis that empathy could be a precursor to wildlife and environmental stewardship. Time spent with animals and in natural places is known to promote positive emotional feelings and protective tendencies in humans. While most research findings on the efficacy of environmental education were made outside China, the findings of this research support their applicability within the uniqueness of Chinese culture. The theoretical research and years of pilot programs that formed the foundation of the camp curriculum were based in large part on human universals of compassion, morality, and solid scientific knowledge of animals and natural systems. It is hoped that this research and the curriculum

foundations will help to shape the future of conservation education in China, and the world.

References

Altmann, J. (1974). Observational study of behavior: Sampling methods. *Behaviour, 48*, 499-509.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl, & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). New York: Springer.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Upper Saddle River, NJ: Prentice-Hall, Inc.

Alford, R. A., & Richards, S. J. (1999). Global amphibian declines: A problem in applied ecology. *Annual Review of Systematics and Ecology, 30,* 133-165.

Atiyah, M., & Press, F. (1992). The Royal Society and National Academy of Science on population growth and sustainability. In *Die Off*. Retrieved June 11, 2006, from: http://dieoff.org/page7.htm

Atkinson, S. (2005). *Practicum: does the conservation camp designed by Zoo Atlanta for the Chengdu Research Base of Giant Panda Breeding and Chengdu Zoo meet its stated outcomes?* Unpublished master's thesis, Lesley University, Cambridge, MA.

Bahk, C. M. (1997). The impact of presence versus absence of negative consequences in dramatic portrayals of alcohol drinking. *Journal of Alcohol and Drug Education, 42*(3), 18-26.

Ballantyne, R., Connell, S., & Fien, J. (1998). Factors contributing to intergenerational communication regarding environmental programs: Preliminary research finding. *Australian Journal of Environmental Education, 14*, 1-10.

Ballantyne, R., Fien, J., & Packer, J. (2001). Program effectiveness in facilitating intergenerational influence in environmental education: Lessons from the field. *The Journal of Environmental Education, 32*(4), 8-15.

Bandura, A. (1977). *Social learning theory*. Upper Saddle River, NJ: Prentice-Hall, Inc.

Bandura, A., & McDonald, F. J. (1963). The influence of social reinforcement and the behavior of models in shaping children's moral judgments. *Journal of Abnormal and Social Psychology, 67*, 274-281.

Bandura, A., Underwood, B., & Fromson, M. E. (1975). Disinhibition of aggression through diffusion of responsibility and dehumanization of victims. *Journal of Abnormal and Social Psychology, 9*, 253-269.

Banister, J. (2000). Population, public health and the environment in China. In R. L. Edmonds (Ed.), *Managing the Chinese Environment* (pp. 262-291). Oxford, England: Oxford University Press.

Basile, C. G. (2000). Environmental education as a catalyst for transfer of learning in young children. *The Journal of Environmental Education, 32*(1), 21-30.

Bekoff, M., & Jamieson, D. (1987). Interpretation and explanation in the study of animal behavior. Boulder, CO: Westview Press.

Bekoff, M. (2006). *Animal passions and beastly virtues: Reflections on redecorating nature.* Philadelphia: Temple University Press.

Bexell, S. M. (2003, September). Field conservation: Bridging gaps and building partnerships: Conservation education initiatives in China. In A. Peterson (Chair), *Cultural Sensitivity in Field Conservation.* Symposium conducted at the annual meeting of the American Zoo and Aquarium Association, Columbus, OH.

Bexell, S. M., Luo, L., Hu, Y., Maple, T.L., McManamon, R., Zhang, A., and Zhang, Z. (2004a). Conservation education initiative in China. In D. Lindburg, and K. Baragona (Eds.), *Biology and conservation of the giant panda*. Berkeley, CA: University of California Press.

Bexell, S. M., Yu, J., Feng, R. X., Yang, X. Y., & Xu, P. (2004b). [Instructor camp evaluation journals]. Unpublished raw data.

Bexell, S. M., Jarrett, O. S., Yang, J., & Tan, N. N. (2005, April). *Children and animals: Exploring empathic feelings with animals in four year olds in China and the United States.* Poster session presented at the biennial meeting of the Society for Research in Child Development, Atlanta, GA.

Bowers, C. A. (1993). *Education, cultural myths, and the ecological crisis.* Albany, NY: SUNY Press.

Braverman, M. T., & Yates, M. E. (1989, March). *Enhancing the educational effectiveness of zoos.* Paper presented at the Annual Meeting of American Educational Research Association, San Francisco, CA.

Bredekamp, S., & Copple, C. (Eds.). (1997). *Developmentally appropriate practice in early childhood programs servicing children from birth through age eight.* (Rev. ed.). Washington, DC: National Association for the Education of Young Children.

Brook, A. T. (2001, Spring). What is “conservation psychology?” *Population and Environmental Psychology Bulletin, 27*(2), 1-2.

Brown, L. R. (2006). *Plan B 2.0: Rescuing a planet under stress and a civilization in trouble*. New York: W. W. Norton & Company.

Bruner, J. (1985). Vygotsky: A historical and conceptual perspective. London: Cambridge University Press.

Bruvold, W. H. (1973). Belief and behavior as determinants of environmental attitudes. *Environment and Behavior, 5,* 202-218.

Burriss, K. G. (2005). The out-of-doors and development: A good match. In K. G. Burriss, & B. F. Boyd. (Eds.). *Outdoor learning and play ages 8-12.* Olney, MD: Association for Childhood Education International.

Burriss, K. G., & Boyd, B. F. (Eds.). (2005). *Outdoor learning and play ages 8-12.* Olney, MD: Association for Childhood Education International.

Carlson, J. E., & Baumgartner, D. (1974). The effects of natural resource camps on youths. *The Journal of Environmental Education, 5*(3), 1-7.

Carson, R. (1956). *The sense of wonder.* New York: HarperCollins Publishers, Inc.

Carter, B. J., Birnbaum, A. S., Hark, L., Vickery, B., Potter, C., & Osborne, M. P. (2005). Using media messaging to promote healthful eating and physical activity among urban youth. *Journal of Nutrition Education and Behavior, 37*(2), 98-99.

Cassils, J.A. (2004). Overpopulation, sustainable development, and security: developing an integrated strategy. *Population and Environment, 25*(3): 171-194.

Chaille, C., & Tian, X. L. (2005). Science and outdoor play in the elementary grades. In K. G. Burriss & B. F. Boyd (Eds.). Outdoor learning and play ages 8-12 (pp. 95-100). Olney, MD: Association for Childhood Education International.

China Consul of International Conservation and Environmental Development Newsletter (CCICED). (1997). *Copy Editor, 3*(1), 2.

China Statistics Press (2004). *2004 China statistics yearbook.* Retrieved June, 22, 2005 from National Bureau of Statistics in China: http://www.stats.gov.cn/english/statisticaldata/yearlydata/yb2004-e/indexeh.htm

Christy, W. R. (1983). An assessment of the effects of two residential camp settings on environmental attitude development. *Dissertation Abstracts International,* 44, 0282A. (University Microfilms No. 83-12304).

Chwala, L. (1994). In the first country of places: nature, poetry, and childhood memory. Albany, NY: State University of New York Press.

Chwala, L. (1999). Life paths into effective environmental action. *Journal of Environmental Education, 31*(1), 15-26.

Clarke, S. (2004). *Shark product trade in Hong Kong and Mainland China and implementation of the CITES shark listings*. TRAFFIC East Asia, Hong Kong.

Cohen, S., & Horm-Wingerd, D. (1993). Ecological awareness among preschool children. *Environment and Behavior, 25*(1), 103-120.

Conway, W. G., Hutchins, M., Souza, M., Kapetanakos, Y., & Paul, E. (2001). *The AZA field conservation resource guide.* Atlanta, GA: Zoo Atlanta.

Cortese, A. (1992). Education for an environmentally sustainable future. *Environmental Science and Technology, 26,* 1108-1114.

Costanza, R., & Daly, H. E. (1992). Natural capital and sustainable development. *Conservation Biology, 6*(1), 37-46.

Cowan, M., & Stapp, W. (1982). *Environmental education in action: International case studies in environmental education.* Columbus, OH: ERIC Clearinghouse. 326 pp.

Cowan, P. A. (1978). *Piaget with feeling: Cognitive, social, and emotional dimensions.* New York: Holt, Rinehart and Winston.

Coyle, K. J. (2004). *Understanding environmental literacy in America: And making it a reality*. Washington, D.C.: National Environmental Education & Training Foundation.

Darwin, C. (1998). *The expression of the emotions in man and animals* (3rd Ed.). Oxford, England: Oxford University Press.

De Graaf, J., Waan, D., & Naylor, T. H. (2001). *Affluenza: The all-consuming epidemic*. San Francisco, CA: Berrett-Koehler Publishers.

Dettmann-Easler, D., & Pease, J. L. (1999). Evaluating the effectiveness of residential environmental education programs in fostering positive attitudes toward wildlife. *The Journal of Environmental Education, 31*(1), 33-39.

de White, T. G., & Jacobson, S. K. (1994). Evaluating the effectiveness of residential environmental education programs in fostering positive attitudes toward wildlife. *The Journal of Environmental Education, 25*(4), 18-22.

Dewey, J. (1933). *How we think.* Chicago: Henry Regerney.

Dietz, S., & Adger, W. N. (2003). Economic growth, biodiversity loss and conservation effort. *Journal of Environmental Management, 68*, 23-35.

Dirzo, R., & Raven, P. H. (2003). Global state of biodiversity and loss. *Annual Review of Environmental Resources, 28*, 137-67.

Disinger, J. (1982). Environmental education research news. *The Environmentalist, 2*, 285-288.

Doll, J., & Ajzen, I. (1992). Accessibility and stability of predictors in the theory of planned behavior. *Journal of Personality and Social Psychology, 63*(5), 745-765.

Donohoe, M. (2003). Causes and health consequences of environmental degradation and social injustice. *Social Science and Medicine, 56*(3), 573-587.

Dresner, M., & Gill, M. (1994). Environmental education at summer nature camp. *The Journal of Environmental Education, 25*(3), 35-41.

Eagles, P. F. J., & Muffitt, S. (1990). An analysis of children's attitudes toward animals. *The Journal of Environmental Education, 21*(3), 41-44.

Economy, E. C. (2004). *The river runs black: The environmental challenge to China's future.* Ithaca, NY: Cornell University Press.

Edmonds, R. L. (2000). *Managing the Chinese environment*. Oxford, England: Oxford University Press.

Ehrlich, P. R., & Wilson, E. O. (1991). Biodiversity studies: Science and policy. *Science, 253*, 758-761.

Elkington, J., & Lee, M. (2005, August 23). China syndromes: Will hard-won environmental and social gains survive China's economic rise? In *The Daily Grist*. Retrieved January 3, 2006, from: http://www.grist.org/biz/fd/2005/08/23/china/

Elvin, M. (2004). *The retreat of the elephants: An environmental history of China*. New Haven, CT: Yale University Press.

Erwin, T. L. (1982). Tropical forests: Their richness in Coleopteran and other arthropod species. *Coleopteran Bulletin, 36*, 74-75.

Fazio, R. H., & Zanna, M. (1978a). Attitudinal qualities relating to the strength of the attitude-behavior relationship. *Journal of Experimental Social Psychology, 14*, 398-408.

Fazio, R. H., & Zanna, M. (1978b). On the predictive validity of attitudes: The roles of direct experience and confidence. *Journal of Personality, 46*, 228-243.

Fien, J. (1995). Teaching for a sustainable world: The environmental and development education project for teacher education. *Environmental Education Research, 1*(1), 21-33.

Flay, B. R., Hu, F. B., Siddiqui, O., Day, L. E., Hedeker, D., Petraitis, J., Richardson, J., & Sussman, S. (1994). Differential influence of parental smoking on adolescent initiation and escalation and smoking. *Journal of Health and Social Behavior, 35*(3), 248-265.

Fossey, D. (2000). *Gorillas in the mist.* Boston: Mariner Books.

French-Lee, S., Bexell, S. M., Korkmaz, N., Konantambigi, R., & Jarrett, O. S. (2003, February) *University sponsored childcare in four countries: Implications for play theory and practice*. Paper presented at the meeting of The Association for the Study of Play, Charleston, SC.

Gardner, G. T., & Stern, P. C. (1996). *Environmental problems and human behavior.* Boston: Allyn and Bacon.

Gigliotti, L. M. (1990). Environmental education: What went wrong? What can be done? *The Journal of Environmental Education, 22*(1), 9-12.

Gilbertson, K. (1991). Environmental literacy: Outdoor education training and its effects on knowledge and attitude toward the environment. *Dissertation Abstracts International, 51*(12), 4018. (University Microfilms N. AAC 9111708).

Glaser, B. G., & Strauss, A. L. (1967). The discovery of grounded theory. Chicago: Aldine.

Glaser, B. G., & Strauss, A. L. (1999). *The discovery of grounded theory: Strategies for qualitative research.* New York: Aldine de Gruyter.

Gil-Perez, D., Vilches, A., Edwards, M., Praia, J., Marques, L., & Oliveira, T. (2003). A proposal to enrich teachers' perception of the state of the world: First results. *Environmental Education Research, 9*(1), 67-90.

Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education, 7*(1), 22-30.

Goodall, J. (2000). *In the shadow of man.* Boston: Mariner Books.

Griffin, D. R. (2001). *Animal minds: Beyond cognition to consciousness.* Chicago: University of Chicago Press.

Gray, D. (1985). *Ecological beliefs and behavior: Assessment and change.* Westport, CT: Greenwood Press.

Ham, S. H., & Sewing, D. R. (1988). Barriers to environmental education. *The Journal of Environmental Education, 19*(2), 17-23.

Hammond, P. M. (1995). Magnitude and distribution of biodiversity. In V. H. Heywood (Ed.). *Global biodiversity assessment*. Cambridge, UK: Cambridge University Press.

Hancocks, D. (2001). *A different nature: The paradoxical world of zoos and their uncertain future*. Berkeley, CA: University of California Press.

Harkness, J. (2000). Recent trends in forestry and conservation of biodiversity in China. In R. L. Edmonds (Ed.). *Managing the Chinese environment* (pp. 187-210). Oxford, England: Oxford University Press.

Harris, M. B., & Evans, R. C. (1973). Models and creativity. *Psychological Reports, 33*, 763-769.

Hart, R. (1997). *Children's participation: The theory and practice of involving young citizens in community development and environmental care*. London: Earthscan Publications.

Helton, W. S., & Helton, N. D. (2005). Changing animal and environmental attitudes with evidence of animal minds. *Applied Environmental Education and Communication, 4*(4), 317-324.

Heywood, V. H. (1995). *Global biodiversity assessment*. Cambridge, UK: Cambridge University Press.

Hilton-Taylor, C. (2004). 2004 *IUCN red list of threatened species*™. Retrieved May 30, 2005 from *The IUCN Species Survival Commission*: http://www.iucnredlist.org/

Hoage, R. J. (1989). Introduction. In R. J. Hoage (Ed.). *Perceptions of animals in American culture*. Washington, D. C.: Smithsonian Institution Press.

Hoage, R. J., & Moran, K. (Eds.) (1998). *Culture: The missing element in conservation and development.* Dubuque, IA: Kendall/Hunt Publishing Company.

Hoffman, M. L. (1979). Development of empathy and altruism. *Developmental Psychology, 15*, 607-623.

Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice.* Cambridge, UK: Cambridge University Press.

Horsley, A. D. (1977). The effects of social learning on attitudes and behavior toward environmental conservation. *Environment and Behavior, 9*, 349-384.

Houlahan, J. E., Findlay, C. S., Schmidt, B. R., Meyer, A. H., & Kuzmin, S. L. (2000). Quantitative evidence for global amphibian population declines. *Nature, 404*, 752-755.

Irwin, P. (2003). A strategic review of international animal protection. In *The State of the Animals II: 2003*. (pp. 1-8) Downloaded June 30, 2006 from http://files.hsus.org/web-files/PDF/soa_ii_chap01.pdf

Elkington, J., & Lee, M. (2005, August 23). China syndromes: Will hard-won environmental and social gains survive China's economic rise? In *The Daily Grist*. Retrieved January 3, 2006, from: http://www.grist.org/biz/fd/2005/08/23/china/

ICA (2005, June 25). U.S. Intelligence report forecasts India and China will be major powers. In India, China and America Institute website. Retrieved June 25, 2005 from: http://www.icainstitute.org/

Jacobson, S. K. (1991). Evaluation model for developing, implementing, and assessing conservation education programs: Examples from Belize and Cost Rica. *Environmental Management, 15*(2), 143-150.

Jacobson, S. K. (1995). *Conserving wildlife: international education and communication approaches.* New York: Columbia University Press.

Jenkins, M. (2003). Prospects for biodiversity. *Science, 302*, 1175-1177.

Johnson, R. T., & Johnson, D. W. (1986). Action research: Cooperative learning in the science classroom. *Science and Children, 24,* 31-32.

Jordan, J. R., Hungerford, H. R., & Tomera, A. N. (1986). Effects of two residential environmental workshops in high school students. *The Journal of Environmental Education, 18*(1), 8-21.

Jordan, J., & Seger, L. (2001, September 8). *Environmental literacy evaluation*. Paper presented at the annual meeting of the American Zoo and Aquarium Association National Conference, St. Louis, MO.

Joy, M. (2005). Humanistic psychology and animal rights: Reconsidering the boundaries of the humanistic ethic. *Journal of Humanistic Psychology, 45*(1), 106-130.

Kahn, K. H., & Cangemi, J. P. (1979). Social learning theory: The role of imitation and modeling in learning socially desirable behavior. *Journal of Education, 100*(1), 41-46.

Katcher, A. & Wilkins, G. (1993). Dialog with animals: It's nature and culture. In S. R. Kellert, & E. O. Wilson (Eds.). *The Biophilia hypothesis.* (pp. 173-197) Washington, D.C.: Island Press.

Kellert, S. R. (1978). *Policy implications of a national study of American attitudes and behavioral relations to animals* (U.S. Fish and Wildlife Service, Stock Number 024-101-00482-7). U.S. Government Printing Office, Washington, D.C. U.S. Department of the Interior.

Kellert, S. R. (1980). American attitudes toward and knowledge of animals: An update. *International Journal for the Study of Animal Problems, 1*(2), 87-119.

Kellert, S. R. (1993). Introduction. In S. R. Kellert, & E. O. Wilson (Eds.). *The Biophilia Hypothesis*. (pp. 20-27) Washington, D. C.: Island Press.

Kellert, S. R. (1997). *Kinship to mastery: Biophilia in human evolution and development*. Washington, D. C.: Island Press.

Kellert, S. R., & Wilson, E. O. (Eds.). (1993). *The Biophilia Hypothesis*. Washington, D. C.: Island Press.

Kogler, H. H., & Stueber, K. R. (2000). *Empathy and agency: The problem of understanding in the human sciences.* Boulder, CO: Westview Press.

Krasny, M. E., & Lee, S. K. (2002). Social learning as an approach to environmental education: Lessons from a program focusing on non-indigenous, invasive species. *Environmental Education Research, 8*(2), 101-119.

Kruse, C. K., & Card, J. A. (2004). Effects of a conservation education camp on campers' self-reported knowledge, attitude, and behavior. *The Journal of Environmental Education, 35*(4), 33-45.

Lasher, M. (1998). A relational approach to the human-animal bond. *Anthrozoos, 11*(3), 130-133.

Leakey, R., & Lewin, R. (1995). *The sixth extinction: Patterns of life and the future of humankind.* New York: Doubleday.

Leeming, F. C., Dwyer, W. O., Porter, B. E., & Cobern, M. K. (1993). Outcome research in environmental education: A critical review. *The Journal of Environmental Education, 24*(4), 8-21.

Levin, S. A. (Ed.). (2001). *Encyclopedia of biodiversity*. San Diego: Academic.

Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill, NC: Algonquin Books of Chapel Hill.

Lovei, G. L. (2001). Modern examples of extinctions. In S. A. Levin (Ed.). *Encyclopedia of biodiversity* (Vol. 2, pp. 731-743). San Diego, CA: Academic.

Ma, X., & Ortolano, L. (2000). *Environmental regulation in China: Institutions, enforcement, and compliance*. Lanham, MD: Rowman & Littlefield Publishers, Inc.

Mannion, A. M. (2000). The existentialities of biodiversity conservation. *Arch. Fur Nat.-Lands, 39*, 81-102.

Marshdoyle, E., Bowman, M. L., & Mullins, G. W. (1982). Evaluating programmatic use of a community resource: The zoo. *The Journal of Environmental Education, 13*(4), 19-26.

Martin, P., & Bateson, P. (1993). *Measuring behavior*. Cambridge, UK: Cambridge University Press.

Martin, P. S., & Klein, R. G. (Eds.). (1984). *Quarternary extinctions: a prehistoric revolution*. Tucson: University of Arizona Press.

Mascia, M. B., Brosius, J. P., Dobson, T. A., Forbes, B. C., Horowitz, L., McKean, M. A., & Turner, N. J. (2003). Conservation and the social sciences. *Conservation Biology, 17*(3), 649-650.

Maslow, A. H. (1954). *Motivation and personality*. New York: Harper Row.

Masson, J. M., & McCarthy, S. (1996). *When elephants weep: The emotional lives of animals*. New York: Delta Press.

May, R. M. (1990). How many species? *Philosophical Transactions of the Royal Society, B330*, 293-304.

May, R. M. (2000). The dimensions of life on Earth. In P. H. Raven & T. Williams (Eds.). *Nature and human society: The quest for a sustainable world* (pp. 30-45). Washington, D.C.: National Academy Press.

May, R. M., Lawton, J. H., & Stork, N. E. (1995). Assessing extinction rates. In R. M. Lawton & R. M. May (Eds.). *Extinction rates* (pp. 1-24). Oxford, England: Oxford University Press.

Mayer, M. (1994). Evaluating the outcomes of environment and school initiatives. In Organization for Economic Cooperation and Development (Ed.). *Evaluating innovation in environmental education* (pp. 89-103). Paris: OECD.

McKeown-Ice, R. (2000). Environmental education in the United States: A survey of pre-service teacher education programs. *The Journal of Environmental Education, 32*(1), 4-11.

McKinney, M. L. (1999). High rates of extinction and threat in poorly studied taxa. *Conservation Biology, 13,* 1273-81.

McVay, S. (1993). Prelude: A Siamese connexion with a plurality of other mortals. *The Biodiversity Hypothesis*. (pp. 3-19). Washington, D. C.: Island Press.

Melby, J. N., Conger, R. D., Conger, K. J., & Lorenz, F. O. (1993). Effects of parental behavior on tobacco use by young male adolescents. *Journal of Marriage and the Family, 55*(2), 439-454.

Melson, G. F. (2000). Studying children's attachment to their pets: a conceptual and methodological review. *Anthrozoos, 4*(2), 91-99.

Melson, G. F. (2001). *Why the wild things are*. Cambridge, MA: Harvard University Press.

Miles, J. (1991). Twenty going on one hundred: What now for environmental education? *Clearing Magazine*, 69, pp. 6-9

Miles, J. C. (1986/87). Wilderness as a learning place. *Journal of Environmental Education, 18*(2), 33-40.

Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Mitchell, R. M., Thompson, N. S., Miles, H. L. (1996). *Anthropomorphism, anecdotes, and animals.* Albany, NY: State University of New York Press.

Moore, R. (1997). *Natural learning*. Berkeley, CA: MIG Communications.

Moss, C. (2000). *Elephant memories: Thirteen years in the life of an elephant family.* Chicago: University of Chicago Press.

Munson, B. H. (1994). Ecological misconceptions. *The Journal of Environmental Education, 25*(4), 30-34.

Myers, G. (1998). *Children and animals: Social development and our connections to other species.* Boulder, CO: Westview Press.

Myers, O. E., & Saunders, C. D. (2002). Animals as links toward developing caring relationships with the natural world. In P. H. Kahn and S. R. Kellert (Eds.). *Children and Nature: Psychological, sociocultural, and evolutionary investigations.* Cambridge, MA: The MIT Press.

Myers, O. E., Saunders, C. D., & Garrett, E. (2003). What do children think animals need? Aesthetic and psychosocial conceptions. *Anthrozoos, 9*(3), 305-325.

Nabhan, G. P., & Trimble, S. (1994). *The geography of childhood: Why children need wild places.* Boston: Beacon Press.

National Environmental Education Act of 1990, Pub. L. No. 101-619, § 104 Stat. 3325 (Nov. 16, 1990).

Noddings, N. (2006). *Critical lessons: What our schools should teach*. New York: Cambridge University Press.

Olson, M. E., Lodwick, D. G., & Dunlap, R. E. (1992). *Viewing the world ecologically*. Boulder, CA: Westview Press.

O'Riordan, T. (1976). Attitudes, behavior and environmental policy issues. In I. Altman & J. F. Wohlwill (Eds.). *Human behavior and environment: Advances in theory and research* (Vol. 1, 99, 1-33). New York: Plenum.

Orr, D. W. (1995, May/June). Educating for the environment: higher education's challenge of the next century. *Change, May/June*, 43-46.

Orr, D. W. (2004). *Earth in mind: On education, environment, and the human prospect.* Washington, D. C.: Island Press.

Ottman, L. (1998). Why teach toddlers and preschoolers? It is not educational and is a waste of time! *AZA Annual Conference Proceedings*, 170-175.

Palmer, M. (2000). Environmental regulation in the People's Republic of China: The face of domestic law. In R. L. Edmonds (Ed.). *Managing the Chinese environment* (pp. 64-84). Oxford, England: Oxford University Press.

Partridge, E. (1984, Summer). Nature as a moral resource. *Environmental Ethics, 6,* 101-130.

Patton, M. Q. (1996). *Utilization-focused evaluation: The new century text.* Thousand Oaks, CA: Sage Publications.

Pepper, S. (2000). *Radicalism and education reform in 20th century China: The search for an ideal development model.* Cambridge, UK: Cambridge University Press.

Piaget, J. (1969). *The child's conception of the world* (J. Tomlinson & A. Tomlinson, Trans.). In C. K. Ogden (Ed.). International library of psychology, philosophy and scientific method. Totowa, NJ: Littlefield, Adams & Company. (Original work published 1929).

Piaget, J. (1997). *The moral judgment of the child* (M. Gabain, Trans.). New York: Simon & Schuster.

Pimentel, D, & Wilson, C. (1997). Economic and environmental benefits of biodiversity. *Bioscience, 47*(11), 747-757.

Plous, S. (1993). Psychological mechanisms in the human use of animals. *Journal of Social Issues 49*(1) 11-52.

Poisson, M. (Ed.). (2001). *Final report of the International Workshop on the Reform in the Teaching of Science and Technology at Primary and Secondary Level in Asia: Comparative References to Europe, Beijing, 2000*. Geneva: International Bureau of Education.

Pomerantz, G. A. (1991). Evaluation of natural resource education materials: Implications for resource management. *The Journal of Environmental Education, 22*(2), 16-23.

Poole, J. (1998). An exploration of a commonality between ourselves and elephants. *Etica & Animalia, 9,* 85.

Preston, S. D., & de Waal, F. B. M. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences, 25,* 1-72.

Primack, R. B. (1998). *Essentials of conservation biology*. Sunderland, MA: Sinauer Associates, Inc.

Raphael, P. (1999). *Teaching compassion: A guide for humane educators, teachers, and parents.* Alameda, CA: The Latham Foundation for the Promotion of Humane Education.

Ratloff, J. (2005, October 15). A galling business: The inhumane exploitation of bears for traditional Asian medicine. *Science News, 168,* 250-252.

Raven, P.H. (1997). *Nature and human society: The quest for a sustainable world*. Washington, D. C.: National Academy Press.

Raven, P. H., & McNeely, J. A. (1998). Biological extinction: Its scope and meaning for us. In L. D. Guruswamy, & J. A. McNeely (Eds.). *Protection of global diversity* (pp. 13-32). Durham, NC: Duke University Press.

Regan, D. T., & Fazio, R. H. (1977). On the consistency between attitudes and behavior: Look to the method of attitude formation. *Journal of Experimental Social Psychology, 13*, 38-45.

Reid, W. V. (1992). How many species will there be? In T. C. Whitmore, & J. A. Sayer (Eds.). *Tropical deforestation and species extinction*. London: Chapman and Hall.

Ross, D. M., & Driver, B. L. (1977-1978). Benefits of residential and nonresidential youth summer camps. *Journal of Outdoor Education, 22*, 14-20.

Ross, L. (2000). China: Environmental protection, domestic policy trends, patterns of participation in regimes and compliance with international norms. In R. L. Edmonds (Ed.), *Managing the Chinese environment* (pp. 85-111). Oxford, England: Oxford University Press.

Schaaf, C. D. (1994). The role of zoological parks in biodiversity conservation in the Gulf of Guinea Islands. *Biodiversity & Conservation, 3*, 962-968.

Schor, J. B. (1998). *The overspent American: Why we want what we don't need*. New York: HarperPerennial.

Sebba, R. (1991). The landscapes of childhood: The reflection of childhood's environment in adult memories and in children's attitudes. *Environment and Behavior, 23*(4), 395-422.

Serrell, B. (1981). The role of zoological parks and aquariums in environmental education. *The Journal of Environmental Education, 12*(3), 41-42.

Shapiro, J. (2001). *Mao's war against nature: Politics and the environment in revolutionary China*. Cambridge, UK: Cambridge University Press.

Shepard, C. L., & Speelman, L. R. (1985). Affecting environmental attitudes through outdoor education. *The Journal of Environmental Education, 17*(2), 20-23.

Shepard, P. (1996). *The others: How animals made us human*. Washington, D. C.: Island Press.

Shi, L. J & Zhang, C. Q. (2005, September 21). Thoughts about improving laws protecting animals. *Guangming Daily*. Retrieved June 21, 2006, from http://www.gmw.cn/01gmrb/2005-09/21/content_307455.htm

Shuman, D. K. & Ham, S. H. (1997). Toward a theory of commitment to environmental education teaching. *The Journal of Environmental Education, 28*(2), 25-32.

Sia, A. P., Hungerford, H. R., & Tomera, A. A. (1985). Selected predictors of responsible environmental behavior. *Journal of Environmental Education, 17*(2), 31-36.

Smil, V. (1993). *Global ecology: Environmental change and social flexibility*. London: Routledge.

Smith, F. D. M., May, R. M., Pellew, R., Johnson, T. H., & Walter, K. R. (1993). Estimating extinction rates. *Nature, 364*, 494-96.

Smith, G. (1992). *Education and the environment: Learning to live with limits.* Albany, NY: State University of New York Press.

Sobel, D. (1996). *Beyond ecophobia: Reclaiming the heart in nature education*. Great Barrington, MA: The Orion Society.

Song, W. (2004a). Traditional Chinese culture poses difficulty for new animal welfare laws. In *Animal Legal and Historical Center*. Retrieved June 14, 2005, from: www.animallaw.info/articles/archsongculture2004.htm

Song, W. (2004b). Traditional Chinese culture and animals. In *Animal Legal and HistoricalCenter*. Retrieved June, 14, 2005, from: www.animallaw.info/nonus/articles/arcnweiculturalatt2005.htm

Stapp, W. (1978). An instructional model for environmental education. *Prospects, 8*(4), 495-507.

Thompson, K. L. & Gullone, E. (2003). Promotion of empathy and prosocial behaviour in children through humane education. *Australian Psychologist 38*(3), 175-182.

Tilbury, D. (1994). The critical learning years for environmental education. In R. A. Wilson (Ed.). *Environmental Education at the Early Childhood Level* (pp. 11-13). Troy, OH: North American Association for Environmental Education.

Tilman, D. (2000, May 11). Causes, consequences and ethics of biodiversity. *Nature, 405*, 208-211.

Tilson, R., Hu, D., Muntifering, J., & Nyhus, P. J. (2004). Dramatic decline of wild South China tigers *Panthera tigris amoyensis*: Field survey of priority tiger reserves. *Oryx, 38,* 40-47.

Totten, S., Sills, T., Digby, A., & Russ, P. (1991). *Cooperative learning: A guide to research.* New York: Garland.

Tu, W. (1998). The continuity of being: Chinese visions of nature. In M. E. Tucker & J. Berthrong (Eds.), *Confucianism and ecology: The interrelation of heaven, earth, and humans*. Cambridge, MA: Harvard University Press.

Turiel, E. (1983). *The development of social knowledge: Morality and convention.* Cambridge, UK: Cambridge University Press.

UNESCO. (1977). Needs and priorities in environmental education: An international survey. *ENVED No. 6.* Paris: UNESCO.

UNESCO-EPD. (1997) *Environment and Society: Education and public awareness for sustainability.* Paris:Author.

UNITED NATIONS. (1992). UN Conference on Environment and Development: Agenda 21 Rio Declaration, Forest Principles. Paris: UNESCO.

U.S. Commission on Ocean Policy. (2004, April). *Preliminary Report of the U.S. Commission on Ocean Policy Governors' Draft.* Washington, D. C.: U. S. Commission on Ocean Policy.

Uzzell, D., & Rutland, A. (1993, July). *Intergenerational social influence: Changing environmental competence and performance in children and adults.* Discussion paper presented at the Second International Workshop on Children as Catalysts of Global Environmental Change, University of Braga, Portugal.

Uzzell, D. (1994). *Children as catalysts of environmental change.* (Final rep.) London: European Commission Directorate General for Science Research and Development Joint Research Centre.

Van Dijk, P. P., Stuart, B. L., & Rhodin, A. G. J. (2000). Asian turtle trade: Proceedings of a workshop on conservation and trade of freshwater turtles and tortoises. Phnom Penh, Cambodia, 1-4 December 1999. *Chelonian Research Monographs*, Number 2. Lunenburg, MA: Chelonian Research Foundation.

Vermeer, E. B. (2000). Industrial pollution in China and remedial policies. In R. L. Edmonds (Ed.). *Managing the Chinese environment* (pp. 228-261). Oxford, England: Oxford University Press.

Volk, T., Hungerford, H., & Tomera, A. (1984). A national survey of curriculum needs as perceived by professional environmental educators. *The Journal of Environmental Education, 16*(1), 10-19.

Von Glaserfeld, E. (1998). Cognition, construction of knowledge, and teaching. In M. R. Matthews (Ed.). *Constructivism in science education* (pp. 11-30). Netherlands: Kluwer Academic Publishers.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wang, T. (2002, February). On basic concepts of cooperative learning. *Education Research, Feb*. Retrieved June 21, 2006, from http://www.edu.cn/20030212/3077288.shtml

Weil, Z. (2004). *The power and promise of humane education*. Gabriola Island, BC: New Society Publishers.

Wilson, E. O. (1984). *Biophilia: The human bond with other species*. Cambridge, MA: Harvard University Press.

Wilson, E. O. (1986). The current state of biological diversity. In E. O. Wilson (Ed.). *Biodiversity* (pp. 3-18). Washington, D.C.: National Academy Press.

Wilson, E. O. (1999). *The diversity of life*. New York: W.W. Norton & Company.

Wilson, R. A. (1992). The importance of environmental education at the early childhood level. *International Journal of Environmental Education and Information, 12*(1), 15-24.

Wilson, R. A. (1993). *Fostering a sense of wonder during the early childhood years.* Columbus, OH: Greyden Press.

Wilson, R. A. (1994). (Ed.). *Environmental education at the early childhood level.* Troy, OH: North American Association for Environmental Education.

Wilson, R. A. (1996). Environmental education programs for preschool children. *The Journal of Environmental Education, 27*(4), 28-33.

World Association of Zoos and Aquariums. (2003). *Our mission.* Retrieved May 17, 2005, from http://www.waza.org/about/index.php?main+about&view=values

Wu, Z. (2002). Green schools in China. *The Journal of Environmental Education, 34*(1), 21-25.

Zelezny, L. C. (1999). Educational interventions that improve environmental behaviors: A meta-analysis. *Journal of Environmental Education, 31*(1), 5-14.

Zhou, Z. H. & Jiang, Z. G. (2004). International trade status and crisis for snake species in China. *Conservation Biology, 18*(5), 1386-1394.

Zu, S. X., Li, P. J., & Su, P. F. (2005). Animal welfare consciousness of Chinese college students: findings and analysis. *China Information, XIX*(1), 67-95.

APPENDICES

APPENDIX A

Consent Form Approved by Georgia State University IRB August 17, 2005 - August 15, 2006

GEORGIA STATE UNIVERSITY Institutional Review Board
Georgia State University
Department of Early Childhood Education

Parental Permission Form

Title: STUDENT KNOWLEDGE GROWTH, DEVELOPMENT OF EMPATHY, AND CHANGE IN BEHAVIOR TOWARD ANIMALS THROUGH PARTICIPATION IN A WILDLIFE CONSERVATION EDUCATION CAMP IN MAINLAND CHINA

Principal Investigator: Faculty Supervisor: Olga S. Jarrett
Student Principal Investigator: Sarah M. Bexell

I. Introduction:
While your child is attending camp, he/she will participate in many fun and interesting activities that are designed to help the students gain knowledge of animals and have empathy for animals and that will provide them with skills to help animals. The students will take part in writing about their experiences through responding to stories about animals, writing responses to questions in journals, and responding to surveys about their thoughts and feelings about animals, nature, and their experience at camp. We are writing to you to request your permission to use your child's responses for research on the effectiveness of the camp and curriculum. Your child's participation in the study will last five days, the length of camp. Up to 120 students will participate in the camps and their evaluation in July and August of 2005.

II. Procedures:
Your child will be asked to fill out a survey before and after camp. Your child will also be asked to respond in writing to four short stories about animals before and after camp. Completion of the survey and responses to the stories will take approximately 45 minutes each time. Throughout camp, the students will participate in many activities during which they will be observed to see whether they are enjoying and learning from the activities. At the end of camp, your child will be asked to respond in writing to questions about his/her thoughts on camp. This will take about 30 minutes to complete. Your child and 29 peers will learn from their camp instructors and camp coordinators. The activities will be done at the camps at the Chengdu Zoo and Chengdu Research Base of Giant Panda Breeding, depending on which location you chose.

III. Risks:
There are no expected risks to your child from participating in this research.

IV. Benefits:
Your child will benefit from the procedures in that the survey, stories, and open-ended questions will assist the students' reflection on all they have learned and help them start to internalize and be able to use their new knowledge and skills.
Also, the curriculum being tested is designed to help students to start thinking differently about animals, the natural environment, and what each citizen can do to help preserve animals and nature. With the drastic global biodiversity loss we are experiencing today, your child will be a pioneer in learning and sharing knowledge and skills to help preserve the life forms that sustain and enrich our lives.

V. Voluntary Participation and Withdrawal:
Participation is voluntary. We will ask your child verbally whether it is OK for us to use his/her responses for analysis. Your child can refuse our use of his/her writing. If he/she decides to be in the study and later changes his/her mind, he/she has the right to tell us at any time. Whatever the students decide, they will not lose any benefits they are entitled to during camp.

VI. Confidentiality:
Your child's data will be kept private. We will use a study number rather than his/her name on study records. His/her name and other facts that might point to a specific child will not appear when we present this study or publish its results. The findings will be summarized and reported in group form. Your child will not be identified personally.

VII. Georgia State University Disclaimer: N/A

VIII. Contact Persons:
Contact Dr. Olga S. Jarrett in the United States at ojarrett@gsu.edu or (01) 404-651-0959 if you have questions about this study. In China, contact, Sarah Bexell, at (86-28) 83507901 (in care of Luo Lan) or (86-28) 86418837 (home).
If you have questions or concerns about your child's rights as a participant in this study, you may contact the Institutional Review Board (IRB), which oversees the protection of human research participants. Susan Vogtner, in the Office of Research Integrity in the United States, can be reached at (01) 404-463-0674.

IX. Copy of Form to Subject:
We will give you a copy of this form to keep.
If you are willing to allow your child to participate in this research, please sign below.

_____ _____
Your Child's Name Date

_____ _____
Parent/Guardian Date

_____ _____
Principal Investigator Date

APPENDIX B

Introduction to Conservation Stewards Camp Training Manual

Welcome!

We are pleased that you are a part of the Conservation Stewards Camp team. To get you started, we would like to introduce you to the philosophy of this unique educational and inspirational camp program. All the activities were designed thoughtfully to encourage student curiosity, knowledge and admiration for animals and the natural world.

Young people today rarely have time to spend in nature or with animals. Human cultures the world over are finding this is not only a detriment to their young people, but also to the natural world that sustains and inspires us. This program is designed to get students connected with animals on a personal level in order to foster environmental stewardship.

Over the years, conservation educators have learned the hard way that teaching people about the suffering of animals and nature, without giving people a way to help, often causes people to distance themselves from the situation because it is too sad, scary, or overwhelming. We want our program participants to care first, and then feel empowered to help and protect the animals and natural places they will come to love and admire. We hope that you will enjoy this journey along with them, and enjoy knowing that you are inspiring the young people of your country to preserve and love the beauty of the natural world.

This training manual is divided into three major sections:

1) Foundations of Camp and the Curriculum;
2) Camp Logistics; and
3) The Units.

I. Foundations of Camp and the Curriculum

Rationale of the Curriculum

The loss of biodiversity is the only truly irreversible global environmental change the Earth faces today (Dirzo & Raven, 2003). For the past 300 years, recorded extinctions for a few groups of organisms reveal rates of extinction at least several hundred times the rate expected on the basis of the geological record. Social scientists and educators must work with conservation biologists and find a way to inform, and effectively influence, humanity in order to preserve the life support systems that sustain all living things, including ourselves.

As concerns over the health of the planet escalate, educators are asked to contribute to public awareness of the problems our planet faces in order to enable citizens to participate in well-grounded decision-making (Gil-Perez, et. al., 2003). In spite of appeals, attention paid by teachers the world over to the present and future state of the world is still scarce. This probably represents a serious missing link in teacher education and therefore, public knowledge. The world is in great need of effective conservation education programs for all ages. This conservation education curriculum, delivered through five-day camps, represents our efforts to provide training to instructors, and exemplary learning experiences for today's youth.

The Chengdu Research Base of Giant Panda Breeding, the Chengdu Zoo, and Zoo Atlanta have been collaborating on the development of conservation education programs and departments since 2000. Through our relationships, we have piloted many innovative programs including kindergarten programs, volunteer programs, middle and high school programs, and teacher workshops. These programs were designed to increase conservation awareness and conservation action on key conservation issues facing China.

Philosophy of the Curriculum

The foundation of the Conservation Stewards camp curriculum is based on many fields of inquiry, as well as four years of observations, investigations and pilot programs in schools and informal science settings in both China and the United States. Investigations into what children and families need to learn and be exposed to in order to develop a caring attitude toward animals and the environment underlies the creation and evaluation of this program. The rate of loss of wildlife and natural places on Earth demands that adults start taking responsibility for fostering the next generations' attitudes and beliefs about the natural world to promote reverence and preservation. In the United States, environmental education has been practiced since the 1960's, but unfortunately has not yet been mainstreamed. Many extremely good curricula have been produced and used effectively for short-term gains, but there remains a profound lack of understanding of the natural world, and a lack of true stewardship ethic in the vast majority of Americans. In China, the environmental and conservation education movement is very young. Green clubs are appearing on university campuses, NGOs have begun doing their best to disseminate curriculum and training, and in 1997 it was proclaimed that all schools in China would teach environmental education. However, the infrastructure (teacher training, materials, and support) to accomplish this has not been put in place. Curriculum reform currently underway in China includes as one of its six priority areas of development: "infusion of environmental and ecological education into every course and into other non-formal methods of education, and it should become a logical and integral part of the new educational content" (Poisson, 2001). Traditional beliefs lying in neo-Confucianism and Taoism teach compassion for all living things (Tu, 1998), yet this is not the frame of mind of most citizens in China (Economy, 2004). The time is ripe and critical for the implementation of new philosophies and curriculum. Infrastructure must be created in both the United States and China, and well-founded attempts at figuring out

how to get the masses to think, behave, and *feel* differently, is critical for the preservation of natural life on Earth.

One foundation for this curriculum is the Biophilia hypothesis (Wilson, 1984). Wilson believes that humans have an innate interest and connection to nature and animals. Evolutionarily we are connected to nature and are hardwired to be attracted to nature (for safety as well as serenity). We often forget that we cannot survive without the natural world, which provides all of our resources, as well as our most provocative sources of beauty and inspiration. Children all over the world have very few experiences in nature and with animals. Children need exposure to nature and animals to sustain their interest, trust, and ultimately, concern. Our program is designed to provide these experiences, as well as advise teachers and families on how and why they should provide these experiences for children.

Another foundation of our program is an idea we call multiple points of contact with the same animal, based on the research of Dr. Gene Myers (1998) and the philosophical writings of Paul Shepard (1996). We believe that children must develop trust of new animals they meet, and the animals must be allowed time to trust the child. They acquire this trust after observing how each other reacts in different situations. With multiple experiences, the animal and the child can predict each other's behavior. Consistency of behavior is established (understanding the personality of the animal/the child) and both can predict and trust the outcomes of future interactions. Our program will provide multiple points of contact with animals to provide continually repeated experiences that allow an animal to become a familiar individual and foster trust.

Another critical component of the curriculum is based on social learning theory (Bandura, 1977). Instructors will be taught to model caring and interest in animals as sentient beings. Our programs also seek parental support outside the program to model and foster compassionate feelings for animals. If families are not included in the learning process, it is predicted that many ideas and behaviors that are taught during camp will be lost in a relatively short period of time in most participants.

A hypothesis we feel has strong merit and promise for this program is that a cross-cultural continuity of concern or empathy [with animals] in children may exist (Turiel, 1983; Hoffman, 2000; Myers, 1998). The literature documents empathy in young children across cultural lines; most children express empathic feelings toward the suffering or discomfort of other people or animals. As children develop cognitively, they realize there are inconsistencies in what we say and what we do to animals and the environment, which causes discontinuity of concern. Our curriculum and programs will be designed to capture and maintain foundational empathy and concern. Our methods will be tested to see if in fact this empathy for animals exists, and whether it can be fostered in program participants.

To connect with an animal we believe children need to first appreciate and love an animal, and not be faced with the sadness caused by the plight of animals (Sobel, 1996). Our programs are designed to foster the human-animal bond in participants as well as

provide concrete ways to care for animals and nature. Knowledge on situations for animals in the wild will be available and presented in appropriate contexts to develop healthy concern, but the focus is on love and compassion for animals, and caring for them both in captivity and the wild.

Some of the components we believe are critical to the success of our program are that we give personal information about animals so that children can see them as individuals, not just a species (make them real). We also highlight similar traits between children and animals (Raphael, 1999). We emphasize special and exceptional traits of animals. People often are more interested in, and in turn, protective of, animals that are 'intelligent', strong, fast, cute, etc. (Hoage, 1989) and all living things have special qualities that help them survive.

We also provide shared experience time with animals and children's peers (Katcher and Wilkins, 1993). When peers are allowed to interact while learning about a new topic, it has been found that this fosters learning and authentic development of knowledge and moral attitudes about the new topic. When an adult teaches students a new topic, they learn what that adult thinks and feels, but when learning with a peer, the students can develop ideas together, without biases that adults (often inadvertently) bring to the learning situation.

In our program, we will build upon basic compassion to get participants to be able to provide complete care for animals, know animals are sentient beings, and know not to harm animals. Students will also observe and understand individual animal behavior; realize how intelligent animals are, and how caring animals are to each other, and in some cases to people. Students will learn that animals should be treated with respect. Students will also learn that they can have a mutually satisfying (life enriching) relationship with an animal, and how to make informed pet decisions. It is also imperative that students learn how to make informed eating and consumption decisions. We also take concern to the next level and foster students understanding of issues animals face in the wild and help them understand that their actions can impact animals in the wild. Each person on Earth has a moral responsibility toward the health and happiness of animals, as well as for the health and happiness of the next generation.

References

Bandura, A. (1977). *Social Learning Theory*. Prentice Hall.

China Consul of International Conservation and Environmental Development

Newsletter. (1997). Volume 3(1), 2.

Economy, E.C. (2004). *The river runs black: the environmental challenge to China's future.* Ithaca, NY: Cornell University Press.

Hoage, R. J. (1989). *Perceptions of Animals in American Culture.* Washington, D. C.: Smithsonian Institution Press.

Hoffman, M.L. (2000). *Empathy and moral development: implications for caring and justice.* Cambridge: Cambridge University Press.

Katcher, A. & Wilkins, G. (1993). Dialog with animals: It's nature and culture. In S. R. Kellert, & E. O. Wilson (Eds.). *The Biophilia hypothesis.* Washington, D.C.: Island Press.

Myers, G. (1998). *Children and animals: Social development and our connections to other species.* Boulder: Westview Press.

Poisson, M. (Ed.) (2001). *Final report* of the International Workshop on the Reform in the Teaching of Science and Technology at Primary and Secondary Level in Asia: Comparative References to Europe, Beijing, 2000. Geneva, IBE, 2001. Available at: http://www.ibe.unesco.org/National/China/NewChinaPdf/Iichina.pdf

Raphael, P. (1999). *Teaching Compassion: a guide for humane educators, teachers, and parents.* The Latham Foundation for the Promotion of Humane Education.

Shepard, P. (1996). *The Others: How animals made us human.* Washington, D.C.: Island Press.

Sobel, D. (1996). *Beyond Ecophobia: Reclaiming the heart in nature education.* Great Barrington, MA: The Orion Society.

Turiel, E. (1983). *The development of social knowledge: morality and convention.* Cambridge: Cambridge University Press.

Wilson, E. O. (1984). *Biophilia: The bond with other species*. Cambridge: Harvard University Press.

Objectives of Conservation Stewards Camp

The objectives of this program are high with many fun adventures along the way to keep us strong and motivated. We hope that by knowing the objectives of the camp, you can use them to guide you in your teaching and modeling. Your students will look up to you, and your actions and feelings are critical to the success of this program.

This camp consists of five overall units: Facility Tour, Caring for Animals, Animal Observations, Animal Expert Presentations, and Discover Natural Wonders. Facility Tour introduces campers to your facility and your animals so that they are comfortable in their new surroundings. Caring for Animals teaches campers how to provide comprehensive care for animals in your program, as well as pets. Caring for Animals is also designed to facilitate emotional bonds between your campers and program animals. Animal Observations teaches campers about the importance of animal behavior research, how to conduct animal behavior research, and that campers can learn to understand and predict an animals behavior if they take the time to get to know them. Animal Expert Presentations features presentations by people who have close relationships with animals. This lesson is founded on social learning theory and modeling and is designed to help children understand the relationships and respect that can form in human-animal relationships through elders they respect. Discover Natural Wonders introduces campers to the wonders of the natural world, the magnitude of biodiversity on Earth and what it does for us, and conservation issues facing the planet today and what they can do to help.

Many of the objectives are stressed in several of the units to be sure students grasp all of the important concepts, as well as have fun!

Knowledge:
Students will:
K1. Know how to take complete care of animals based on specific needs
K2. Know animal are individuals
K3. Know animals are intelligent
K4: Know that animals have feelings
K5. Know all animals have value
K6. Know animals are connected to their environment
K7. Know the health of the environment is important for all living things
K8. Understand that biodiversity is important
K9. Know positive conservation choices they can make

Empathy:
Students will:
E1. Be aware of the emotional bond that can form between people and animals
E2. Identify the emotional well being of an animal based on its behavior
E3. Express that they appreciate the value of biodiversity
E4. Have an emotional connection to the health of the natural world (positive feeling)

Action:
Students will:
A1. Model respectful behavior toward animals during camp
A2. Have an increased interest in providing complete care for a pet
A3. Have increased interest in making positive conservation choices in their daily lives (i.e. consumptive choices, pet choice, respect for wild animals, litter)
A4. Have an increased interest in talking about positive environmental choices with others
A5. Have an increased interest in sharing their compassion for animals

Teaching Philosophy and Strategies

Best Practices for Teaching

The best teachers understand that the manner in which students receive information is critical in ensuring that they understand and embrace it. It is especially important in this program that instructors encourage curiosity, excitement and fun while supporting students in the lessons. We have created a few guidelines that will help instructors reach this goal.

It is essential that instructors help students create a personal connection to the learning experience. To do this:

- Call students by name and ask them to share their personal knowledge and experiences. Many times all they share may not be completely correct, but in supporting and guiding their answers, you can increase their comfort level and facilitate learning.
- Pose open-ended questions to find out what they know. You can then use this information to determine the right level of information to provide and how to make your teaching age appropriate.

- Connect information to what students already know. Each unit has learning goals, but these will not be effective unless you have a basic understanding of what students already know.
- Always support any answer to a question. Address misconceptions or incorrect answers as teachable moments rather than something wrong or incorrect.
- **Present material using different senses. Have the children see, hear, smell, and touch so they can experience the material more completely. Encourage their exploration.**
- Promote family learning and empower students by giving them specific ways in which they can affect change.

It is essential that instructors help students create a personal connection to the animals. To do this:

- Use names and personal information about the animals.
- Promote special qualities of the animals like their role in the environment and cool adaptations.
- Use specific child friendly examples.
- Draw connections and parallels between people and animals such as appearance, behavior, social structure and needs.

Finally, it is essential that instructors model positive behavior and attitudes toward animals and the material they are teaching. All of the units and lessons involve animals and positive feelings about animals. You may or may not have had these experiences in your life. However, it is essential that you model appropriate respect and interest in the animals, their needs, their value and their role in the environment. Moreover, instructors need to ensure that students are having FUN! This is not school, but instead intended to be time for inspirational discovery. Many times, for students it is the learning that is done while they are having fun and involved in an experience that truly impacts them. So remember to model fun by having fun yourself!

Teaching Practice – Teach a lesson to your peers! (in development)

Become an expert on one lesson and teach it to the group
Responsibilities
Classroom management
Be an engaging teacher – teaching skills

II. Camp Logistics

Camp Orientation Template (in development)

Each institution will have to create their own, so we can develop a template from what we know about camp orientation in the U.S., i.e. H.R. issues, institution philosophy, uniform, schedules, ‘chain of command’, etc.)

Camper Rules (in Chinese)

First Aid Training (in Chinese)

Technology Training (in Chinese)
Digital cameras, Audio and video recorders, Copier, Laminator

Instructor Journals (in development)
(Explanation of how to use them and what they will be used for by the design team and host facilities)

III. The Units
Note: Trainers will conduct each activity fully with camp instructors to prepare them to teach and feel comfortable with each lesson.

Each unit is planned to connect students with animals. As humans have come to rely more and more on technology and the human built world, we have become disconnected from the natural world and the other living creatures we share the planet with. That disconnect causes us to forget our needs for other living things, both physically and emotionally. We also forget that other living things have thoughts and feelings similar to ours. This program is designed to allow young people to connect with and understand animals and to foster the beginning of a conservation ethic in program participants.

Each unit has multiple lessons that can be taught at different times throughout your camp. It is important to try to teach the lessons in the order they appear in the manual because they build on each other. The units should not be taught all in one day, but broken up by lessons from other units for variety of activities for your students, and you! A sample schedule is provided in the Appendix of this manual to help guide you in scheduling your camp.

Unit One – Tour of Your Facility and Meeting the Animals

BACKGROUND INFORMATION – Asian Turtle Crisis; Animal Natural History Fact Sheets: Giant Panda, Red Panda, zebra, giraffe, ring-tailed lemur, bears, golden monkey; stereotypies; exhibit design; animal nutrition

You will tour the facility with your trainers. Your students will take this tour on the first day of camp. You want your students to become comfortable and focused on the fun and excitement of camp and be introduced to the animals as individuals. You will learn about the individual animals' personal history and personalities from your trainers and animal staff. You will become familiar with the layout of your facility and learn the location of each of the animals. You will participate in this activity much like your students will so that it should be easy and fun for you to teach this unit. You, just as your students will during camp, choose an animal, observe the animal for a few minutes, and introduce the

animal to the other instructors during the tour. You will learn how to evaluate what your students learned and experienced using the "Who Am I?" Student Activity Sheet and how to record your observations of the students in your instructor journal.

Unit Two – Caring for Animals

This unit is designed with two major goals. One is to teach young people how to take care of small animals directly. Many animals are bought as pets before people realize how to take care of them and how much of a commitment it is. While pet ownership can be one of the most rewarding relationships people can have, if undertaken without full knowledge of the commitment, the relationship often ends in suffering, death, abandonment and sadness. This unit will teach children how to go about making good pet decisions, as well as fostering bonds between children and animals that are nearly impossible without direct contact, knowledge and understanding of the animals on an individual basis. Students will learn how, and help to take care of animals during the program and get to know their personalities through their own observations and time spent with the animals. Only when we understand are we really able to care about another individual. When we care, we want to protect and nourish others. This is what this unit is designed to do.

BACKGROUND INFORMATION: Pet Information; Animal Care: Choosing a pet, How to care, Modeling, Enrichment, Nutrition, Neutering & Spaying, How long animals live, Commitment, Veterinary Care; Enrichment Items

---

Unit Three – Animal Observations

Humans have always observed animals. Observing animals has been a source of survival and enjoyment throughout all of humanities existence. In the past there was probably a heavy focus on observing animals for survival, we needed to know their patterns to avoid being their prey, to learn how they found foods and medicines so that we could also use those resources, and also to learn how best to catch them for food. Today humans observe animals for many reasons, the two we will focus on in camp are 1) to better understand and appreciate the intimate lives of animals to facilitate bonds with them, and 2) to teach our students some behaviors that scientists need to understand in order for animals to survive in our increasingly populated and hostile world.

Overview

This is one of three lessons where students observe an animal. Students learn about animal behavior research and its importance. Using basic observation techniques, students will recognize that animals behave similar to how we behave, so by observing animals we can learn to identify and interpret their behaviors. Animals also have special behaviors that make them unique. Students will begin to learn how to tell individual animals apart based on physical appearance. Students will be evaluated through their

completed Animal Observations Behavioral Data Student Activity Sheet and instructor observations recorded in instructor journals.

BACKGROUND INFORMATION: Animal Behavior Research – brief background and why it is pertinent to the success of this program

---

Unit Four - Animal Expert Presentations

People who live and work closely with animals have a unique insiders view into an animal's mind. Strong bonds form between humans and animals that become extremely important in the lives of both. In training you will hear stories about humans that have close friendships with animals, and you will have the opportunity to share stories about any animal friends you may have or have had. Throughout camp, and later after camp, you will hopefully want to share stories of friendships between humans and animals. As you will learn from animal experts in your camp training, animals can provide inspiration, companionship, security, and awe.

BACKGROUND INFORMATION: Conservation Choices – "What Would You Do?" (Scenarios that instructors will present to students during walking time, lunch, snack, etc. to get them thinking about situations they could encounter where they could make a choice that would help animals.)

Unit 5 – Discover Natural Wonders

In this unit, you and your students will begin to see the connections between animal welfare, natural ecosystems, human's place in nature, human impact on nature and other living things, and how humans can help wildlife and nature through daily personal choices and actions. People vary rarely get to spend time in natural places and we have lost touch with the fact that our very survival depends on nature and every service I provides. This unit will provide a glimpse in to that forgotten world that will inspire awe, reverence, compassion and knowledge to make a difference in the survival of other living things on Earth.

BACKGROUND INFORMATION: Biodiversity Information in Chinese with English outline; Pet Trade; General Plant and Animal Identification

English (to be continued…)

English	Hello, how are you?	Hi!	Alligator
Animal	Adaptation	Bear	Bee
Behavior	Biodiversity	Bird	Butterfly
Camel	Cat	Cheetah	Chimpanzee
Chinese Salamander	Clouds	Crane	Conservation
Deer	Mandarin Duck	Dog	Ecology
Ecosystem	Elephant	Enclosure	Enrichment
Environment	Fish	Flower Food	

Forest	Frog	Giraffe	Giant Panda
Golden Pheasant	Golden Monkey	Gorilla	Goat
Grassland	Hippopotamus	Horse	Habitat
Insect	Jaguar	Keeper	Lake
Lion	Lizard	Monkey	Mountains
Nature	Nest	Observe	Ocean
Parakeet	Peacock	Pet	Rain
Rabbit	Red panda	Research	Rhinoceros
River	Scientist	Seahorse	Shark
Snake	Snow leopard	Soil	Snow
Species	Spider	Swan	Sunshine
Takin	Tiger	Tree	Turtle
Valley	Veterinarian	Vocalization	Water
Wetland	Whale	Wildlife	Yak
Yangtze crocodile	Yangtze river dolphin	Zebra	Good-bye!

APPENDIX C

Chengdu Conservation Stewards Camp Survey

CODE #

How much do you KNOW about the following…

*(**1**- Know nothing to **7**- Know everything) – CIRCLE ONE NUMBER*

1. Things you can do to protect the environment.	1	2	3	4	5	6	7
2. Things you can do to protect animals.	1	2	3	4	5	6	7
3. The social lives of animals.	1	2	3	4	5	6	7
4. Results of keeping wild animals as pets.	1	2	3	4	5	6	7
5. The importance of wild animals to their environments.	1	2	3	4	5	6	7
6. How to take proper care of pets.	1	2	3	4	5	6	7

How much do you CARE about the following…

*(**1**- Don't care to **7**- Care a lot) – CIRCLE ONE NUMBER*

7. Wildlife in your local area.	1	2	3	4	5	6	7
8. Wildlife habitat in your local area such as fields, forests, rivers, or wetlands.	1	2	3	4	5	6	7
9. Wildlife from other countries such as bald eagles, giraffe, gorillas, and zebras.	1	2	3	4	5	6	7
10. Wildlife habitat in other countries such as tropical forests, tundra, reefs, and wetlands.	1	2	3	4	5	6	7
11. Going swimming in a lake.	1	2	3	4	5	6	7
12. Protecting the natural environment.	1	2	3	4	5	6	7
13. Protecting your local wildlife.	1	2	3	4	5	6	7

CARE continued…Remember: *(**1**- Don't care to **7**- Care a lot) – CIRCLE ONE NUMBER*

14. Protecting wildlife in other countries.	1	2	3	4	5	6	7
15. Getting to go hiking in the forest.	1	2	3	4	5	6	7
16. Pet animals such as dogs, cats, and birds.	1	2	3	4	5	6	7
17. Relationships between people and animals.	1	2	3	4	5	6	7
18. Getting to spend time in nature.	1	2	3	4	5	6	7
19. Individual animal's happiness.	1	2	3	4	5	6	7

Do you plan to do any of these things in the next month?

*(**1**- Don't plan to at all to **7**- Definitely plan to) – CIRCLE ONE NUMBER*

20. Use recycled paper, glass, or plastic.	1	2	3	4	5	6	7
21. Pick up litter.	1	2	3	4	5	6	7
22. Buy products made from wildlife.	1	2	3	4	5	6	7
23. Encourage others to not buy wild animals as pets.	1	2	3	4	5	6	7
24. Purchase items with less of packaging.	1	2	3	4	5	6	7
25. Encourage others to protect the environment.	1	2	3	4	5	6	7
26. Help animals you see in your daily life.	1	2	3	4	5	6	7
27. Allow my friends to litter.	1	2	3	4	5	6	7
28. Visit a park.	1	2	3	4	5	6	7
29. Encourage others to help animals.	1	2	3	4	5	6	7
30. Write a letter to a newspaper or company asking them to support the prevention of harmful activities to the environment or animals.	1	2	3	4	5	6	7
31. Stop to pet a dog on the street.	1	2	3	4	5	6	7
32. Other action(s) to help wildlife or the environment. If other action(s), please list: _____	1	2	3	4	5	6	7

APPENDIX D

The Human-Animal Interaction Vignettes

You will be presented with four stories to respond to with your own thoughts. Each story is broken into two parts. You will respond to the first part of each story and hand it in, then get the second part of the story to respond to. There are no right or wrong answers, we would just like to know your thoughts about each story. Do not put your name on any of the sheets, we want you to speak freely and honestly, no one will know what you said. (Place your research number at the top of each page.) At the end of camp, you will have the chance to respond to these stories again.

1.a. You are walking home from school one day. You are getting close to home and you see a boy playing with a puppy. He is tossing it in the air and sometimes he drops it all the way to the ground. What would you do? Why?

1.b. Now, think for a minute about how the puppy felt when the boy was doing that. When you are ready, write down how you think the puppy was feeling and why.

2.a. You are hanging out with your friend over summer holiday. She/he decides she wants to get a bunny as a pet. She gets permission from her parents and buys a bunny in a little purple cage on the street. You both love the pretty little bunny and name her Xiao Bai. In a couple of weeks, Xiao Bai dies. How do you feel? Why?

2.b. What would you do in the future if a friend of yours wanted to get a pet bunny? Why?

3.a. You see a female dog on the street who is going to have puppies soon. She does not have a place to live and is very thin. You approach her and she is friendly. You take her home and ask your parents if you can care for her while she has her puppies and when the puppies are old enough you will find good homes for her and the puppies. They agree. How would you feel? Why?

3.b. When the puppies are old enough you find good homes for all the puppies and the mother dog. You tell all the new owners how to take proper care of dogs. How would you explain that to them?

4.a. In your neighborhood, there is a shop owner that keeps a dog to protect his shop. The dog has puppies and you love to go play with them. As the puppies grow up, they wander away. Later, you see that one of the puppies has died in the street. It looks very thin and you fear that it died of starvation. What do you think that the shop owner should do? Why?

4.b. What do you say to the shop owner?

5.a. You and your friend are in the pet market and see this really beautiful bird. Your friend saves enough money to buy it and gets permission from his/her parents to get it as a pet. You both love to watch it and talk to it and try giving it different kinds of food to try. The bird does not seem to want to eat anything and soon becomes very sick. Your friend does not want the bird to die, and decides to release it on the edge of the city. Do you think this a good idea, and why?

5.b. What would you say to a friend in the future who wanted to get a bird as a pet?

6.a. Your school goes on a field trip to the mountains. You go hiking in nature and see animals and plants. You see waterfalls and one day after a rain shower you see a rainbow. How does this make you feel? Why?

6.b. When you go home you tell your parents all about your trip. What do you tell them?

APPENDIX E

Example of a Daily Student Behavior Ethogram

Student Behavior	**Monday**	**Notes**
Shouted at animals		
Fed animals (at inappropriate time)		
Made negative comment about an animal (e.g., pandas are lazy, monkeys are stupid, snakes are ugly)		
Littered		
Picked a plant		
Killed an insect or spider		
Asked someone to not bother animals		
Expressed concern for an animal		
Asked someone not to litter		
Asked someone not to feed the animals		
States they want to teach others about something they learned about animals		
Independently demonstrates proper care of an animal		

Student Behavior	**Monday**	**Notes**
Recognizes one of the animals on an individual basis		
States how smart an animal is		
Demonstrates respect for an animal in camp		
Discusses a positive environmental choice with another student		
Expresses a positive emotion about an animal or nature		
Expresses how they think an animal is feeling based on their observation of the animal		
Expresses worry for an animal		
Expresses worry for the natural environment		
Other		

Directions for Assistant Camp Instructors: Each time you see one of your students doing one of the behaviors listed, place a tally mark in the box on the day that it occurs. When possible, make notes in the Explanation section about the situation you observed. Do not mention the name of the child who performed the behavior.

Appendix F
Research Base Instructor Training Schedule

Monday, July 11, 2005

9:30-10:00 Welcome and Introductions
10:00-11:15 Survey and Vignettes – Explanation of camp evaluation procedures and the research
11:15-11:20 Break
11:20-12:00 I7's presentation
12:00-1:30 Lunch and Rest
1:30-3:30 Facility Tour
3:30-3:45 Break
3:45-4:15 Biodiversity Talk
4:15-5:15 Caring for Animals – Lesson 1
5:15-5:45 Explain and Assign Lesson Teach Backs

Tuesday, July 12, 2005

9:00-9:15 Meet and go over days' activities
9:15-10:15 Animal Observations – Lesson 1
10:15-11:15 Caring for Animals – Lesson 2 (cover all special topics)
11:15-12:00 Animal Expert Presentation – Lesson 1
12:00-1:30 Lunch and Rest
1:30-2:00 Conservation Choices Lecture and Activity Explanation
2:00-4:00 handcraft read training manual, and work on Teach Backs
4:00-5:00 Discover Natural Wonders – Lesson 1
5:00-6:00 Best Teaching Practices
6:00 Dinner
7:00-8:00 Pet Trade and Pet Care

Wednesday, July 13, 2005

9:00-9:15 Meet and go over day's activities
9:15-10:00 Animal Observations – Lesson 2, watching your animal
10:00-11:00 Caring for Animals – Lesson 3
11:00-12:15 Discover Natural Wonders – Lesson 2
12:15-1:30 Lunch and Rest
1:30-2:30 Prepare Your Lesson for Teach backs (work on own)
2:30-3:45 Discover Natural Wonders – Lesson 3
3:45-4:00 Break
4:00-4:45 Discover Natural Wonders Activities – Overview
4:45-5:30 Animal Expert Presentation - #2

Thursday, July 14, 2005

9:00-9:15 Meet and go over schedule for day
9:15-10:30 Facility Tour Teach-back - Instructors
10:30-12:00 Animal Observations Lesson 3
12:00-1:30 Lunch and Rest
1:30-3:30 Animal Expert Presentations – Lesson 2
3:30-3:45 Break
3:45-5:00 Animal Observations Teach-backs - Instructors
5:00-5:45 Animal Expert Presentations Teach-backs - Instructors

Friday, July 15, 2005

9:00-9:15 Meet and go over schedule for day
9:15-11:15 Caring for Animals Teach-backs - Instructors
11:15-12:00 Discover natural Wonders Teach-backs Part 1 - Instructors
12:00-1:30 Lunch and Rest
1:30-3:00 Discover Natural Wonders Teach Backs Part 2 - Instructors
3:00-3:30 Group Discussion on Teaching of Lessons
3:30-3:45 Break
3:45-4:45 Plan camp logistics, camp schedule, and wrap up
4:45-5:30 Surveys, vignettes and post camp questionnaire

Chengdu Zoo Instructor Training Schedule

Saturday, July 30, 2005

9:30- 10:00 Welcome and Introductions
10:00-11:15- Survey and Vignettes- Explanation of camp evaluation procedures and the research
11:15-11:20 Break
11:20- 12:00 Review Camp Philosophy and Goals
12:00-1:30 Lunch and Rest
1:30-3:30 Facility Tour
3:30-3:45 Break
3:45-4:15 Biodiversity Talk
4:15-5:15- Caring for Animals- Lesson 1
5:15-5:45 Explain and Assign Teach backs

Sunday, July 31, 2005

9:00-9:15 Meet and go over day's activities
9:15-10:15 Animal Observations- Lesson 1
10:15-11:15 Caring for Animals- Lesson 2

11:15-12:00 Animal Expert Presentation- Lesson 1
12:00-1:30 Lunch and Rest
1:30- 2:00 Conservation Choices Lecture and Activity Explanation
2:00-3:00 Crafts
3:00-4:15 Discover Natural Wonders
4:15-5:00 Best Teaching Practices
5:00-5:45 Pet Trade and Pet Care

Monday, August 1, 2005

9:00-9:15 Meet and go over day's activities
9:15-10:30 Animal Observations- Lesson 2
10:30-11:30 Caring for Animals- Lesson 3
11:30-1:00 Lunch and Rest
1:00-2:30 Discover Natural Wonders- Lesson 2
2:30-4:00 Discover Natural Wonders- Lesson 3
4:00-4:45 Discover Natural Wonders- Overview of Supplemental Lessons
4:45-5:30 Animal Expert Presentations- Lesson 2

Tuesday, August 2, 2005

9:00-9:15 Meet and go over day's activities
9:15-10:30 Facility Tour Teach Back- Instructors
10:30-12:00 Animal Observations- Lesson 3
12:00-1:30 Lunch and Rest
1:30-3:30 Animal Expert Presentations- Lesson 2
3:30-3:45 Break
3:45-5:45 Caring for Animals Teach Back- Instructors

Wednesday, August 3, 2005

9:00-9:15 Meet and go over schedule for day
9:15-10:30 Animal Observations Teach Back- Instructors
10:30-11:15 Animal Expert Presentations Teach Back- Instructors
11:15-12:00 Discover Natural Wonders Teach Back- Instructors
12:00-1:30 Lunch and Rest
1:30-3:00 Discover Natural Wonders Teach Back- continued- Instructors
3:00-4:00 Classroom Management & Discussion on Teach Backs
4:00-5:00 Surveys, Vignettes, and post-camp questionnaire
5:00-5:45 Plan camp logistics, schedule, wrap up

Appendix G
General Daily Schedule for Research Base Camp

7:00am Wake up, wash, dress
7:30am Breakfast*
8:30am Morning Meeting (Announcements and schedule of days' activities from Camp Director)
9:00am-12:00pm Morning Activities
12:00pm Lunch*
12:30-2:30pm Rest
2:30-6:30pm Afternoon Activities
6:30-7:30pm Dinner* and Rest
7:30-10:00pm Evening Activities
10:00pm Bedtime

*All meals were taken in the Research Base restaurant, served in traditional Sichuan style by waitresses at a charge of 50 RMB/day/camper.
Note - Campers stayed in the Panda Hotel on the grounds of the Research Base, rated a two star hotel meaning the accommodations are very basic. Campers slept in tents one night.

General Daily Schedule for Zoo Camp

7:00am Wake up, break down tents, get dressed, eat breakfast*
8:30am Morning Meeting (Announcements and schedule of days' activities from Camp Director)
9:00am-12:00pm Morning Activities
12:00pm Lunch*
12:30-2:00pm Rest
2:00-6:00pm Afternoon Activities
6:00-7:00pm Dinner* and Rest
7:00-10:00pm Evening Activities and Set Up Tents
10:00pm Bedtime

*All meals brought in from same restaurant at a charge of 10 RMB/day/camper. Campers brought their own dishes and utensils and washed them after every meal.
Note – Campers slept in tents every night inside education building. On Thursday night tents were set up outside in the Children's Zoo.

Appendix H
Qualitative Codebook

Themes

KNOWLEDGE

1. Knowledge About Animals **(KKAA)** (15 sub themes)
2. Knowledge of Human Responsibilities Toward Animals **(KHRTA)** (11 sub themes)
3. Knowledge of Nature **(KON)** (3 sub themes)
4. Knowledge of Negative Impacts Humans Have on Animals **(KNIH)** (9 sub themes)
5. Knowledge of the Human-Animal Bond **(KOHAB)** (7 sub themes)
6. Knowledge of Skills to Help Animals **(KSHA)** (7 sub themes)
7. Knowledge Incorrect – **(KN)** – camper states incorrect knowledge about animals (e.g., all stray dogs have rabies, captive birds should be let go, etc.)

CARE

1. Care about nature **(CANT)** (8 sub themes)
2. Care about Animals **(CAA)** (17 sub themes)
3. Care about other people's thoughts and actions toward animals **(COTA)** (4 sub themes)
4. Camper states they don't care about something, or don't like something **(CN)**

PROPENSITY

1. Propensity to tell someone the right thing to do for animals or environment **(PTRD)** (20 sub themes)
2. Propensity to personally do something for animals **(PPDS)** (10 sub themes)
3. Propensity to use a good communication strategy to encourage another person to do the right thing for animals **(PGCS)** (9 sub themes)
4. Camper states that can't do something about a situation involving animals **(PN)**

EMERGENT THEME

<u>Empathy</u> **(E)** – camper expresses how they think an animal feels/is thinking

OTHER CODES

N/A – campers answer did not make sense

DK – camper states they do not know what to say

Quantitative Rubric

THEMES WITH SUBTHEMES

1. Knowledge About Animals **(KKAA)** (15 sub themes)

<u>Knowledge Animal Behavior</u> (**KAB)** – camper notes knowledge of behavior of animals

Knowledge Animal Needs (**KAN)** – campers states their knowledge of what animals need (not how to provide care, but what animals need, esp. wild animals)
Knowledge Animal Physiology (**KAP)** – camper notes knowledge of animal physiology
Knowledge Animal History (**KAH)** – camper talks about the history of an animal
Knowledge Animal Mind (**KAM)** – camper states they know that animals think/something about animal mind
Knowledge Animals (**KA)** – camper states they are learning things about animals (states nothing specific)
Knowledge Animal Life (**KAL) -** camper states the most important thing they learned was that animals have their own lives
Knowledge Importance Animals **(KIA)** – camper learned the importance of all animals (i.e., food chain/web)
Knowledge Animal Freedom **(KAFr)** – camper learned/knows that animals need freedom too/belong in nature
Knowledge Emotions **(KE)** – camper learned/knows that animals have emotions/feelings
Knowledge Animal Appearance **(KAA) -** camper states something positive about animals' appearance e.g., lovely, good, etc
Knowledge Meat Animals **(KMA)** – camper would talk about meat being from animals
Knowledge Animals' State **(KAS)** – camper expresses knowledge of an animals' physical state
Knowledge Neuter Spay **(KNS)** – camper states knowledge that neutering or spaying helps animals
Knowledge Animals Feel Pain **(KAFP)** – camper acknowledges that animals feel pain

2. Knowledge of Human Responsibilities Toward Animals **(KHRTA)** (11 sub themes)

Knowledge Animal Care (**KAC)** – camper notes knowledge of how to provide care for animals, pertaining to captive situations
Knowledge Human Care (**KHC)** – camper states they have learned how to or how to show an animal that they care about it (e.g., through proper touch, not hurting or scaring it)
Knowledge Look After Animals **(KLAA)** – camper states that he/she/people should look after animals
Knowledge Protect Animals **(KPA)** – camper learned/states that we should protect animals
Knowledge Don't Feed **(KDF)** – camper learned we should not feed animals carelessly
Knowledge Buying Pets **(KBP)** – camper learned that buying a pet is a big commitment and/or shouldn't do if wild animal
Knowledge Cherish **(KC)** – camper states that animals should be cherished/cared about
Knowledge Don't Hurt **(KDH) -** camper states that we can't hurt animals
Knowledge Don't Tease **(KDT)** – camper states that the most important thing they learned was to not tease animals or knowledge that we shouldn't
Knowledge-Moral Behavior Animal **(K-MBA)** – camper has knowledge of moral behavior toward animals

Knowledge-Moral Human Responsibility **(K-MHR)** – camper states they know that humans have responsibilities toward animals, esp. if they take them in as a pet

3. Knowledge of Nature **(KON)** (3 sub themes)

Knowledge Nature Interesting (**KNI) -** camper states that nature is interesting
Knowledge Biodiversity **(KB)** – camper states they learned about biodiversity
Knowledge-Moral Protect Environment **(K-MPE)** – camper states that humans should protect the environment

4. Knowledge of Negative Impacts Humans Have on Animals **(KNIH)** (9 sub themes)

Knowledge Human Destruction (**KHD)** – camper states they understand that humans have destroyed nature/wildlife
Knowledge Animals Died **(KAD)** – camper knows/has learned that animals are dying out
Knowledge Animal Abuse **(KAAb)** – camper expresses concern about/awareness of human abuse of animals
Knowledge Habitat Loss **(KHL)** – camper would talk about what happens to animals when they lose their habitat or it becomes degraded
Knowledge Human Harm **(KHH)** – camper expresses that they know a human action harms animals physically or mentally (or both)
Knowledge Humans Lack proper care Knowledge **(KHLpcK)** – camper expresses that they know many humans do not know how to properly care for animals
Knowledge Animal Trade Harm **(KATH)** – camper states knowledge of animal trade and that it is harmful to animals
Knowledge Consequences Improper Choices **(KCIC)** – camper states consequences of human improper choices for animals
Knowledge-Moral Human Selfishness **(K-MHS)** – camper states they know human selfishness is wrong and hurts animals

5. Knowledge of the Human-Animal Bond **(KOHAB)** (7 sub themes)

Knowledge Human Animal **(KHA)** – camper learned that humans and animals are equal
Knowledge Own Emotions Animals **(KOEA)** – campers states they know about their own emotions toward animals
Knowledge Know Animals (**KKA)** – camper states they are getting to know animals (personally)
Knowledge Animal Friends **(KAF)** – camper learned/knows that animals are our friends/we can bond with animals
Knowledge Animals Benefit Humans **(KABH)** – camper states that animals benefit humans
Knowledge Animal Trust **(KAT) -** camper states the most important thing they learned was that animals will trust you if you treat them well
Knowledge Love Animals **(KLA) -** camper states the most important thing they learned was that they love animals

6. Knowledge of Skills to Help Animals **(KSHA)** (7 sub themes)

Knowledge Can Prepare (**KCP)** – camper correctly states that they know how to prepare to get and care for a pet by reading/learning
Knowledge Yes Observation (**KYO)** – camper states they can tell how an animals is feeling by observing carefully
Knowledge Can't Observation (**KCO)** – camper states they can't tell how an animal is feeling by observing it
Knowledge Without Camp (**KWC)** – camper states they can learn about animals from books (or Internet) without animals at camp
Knowledge Camp Child Animals (**KCCA)** – camper states that it is impossible to know/know about animals without camp
Knowledge Observe & Interpret **(KOI)** – camper learned how to observe animals and interpret their behavior
Knowledge Communication Skill **(KCS)** – camper states a good strategy for communicating with humans about animals

7. Knowledge Incorrect – **(KN)** – camper states incorrect knowledge about animals (e.g., all stray dogs have rabies, captive birds should be let go, etc.)

CARE

1. Care about nature **(CANT)** (8 sub themes)

Care Feel Nature Mysterious (**CFNM)** – camper states that nature is mysterious
Care Feel Good (**CFG)** – camper feels good from being in nature
Care Feel Good New (**CFGN)** – camper states that they feel good because this is a new experience to be in nature
Care Appreciate Nature (**CAN)** – camper states they appreciate nature (e.g., there are beautiful things in nature, nature is very interesting)
Care Likes Listen (**CLL)** – camper states they like to listen to nature
Care Likes Discovery (**CLD)** – camper states they like discovering things in nature

2. Care about Animals **(CAA)** (17 sub themes)

Care Happy (**CHP)** – camper expresses that they are happy about (getting to know animals, getting to have animals in their life)
Care Likes Animal Particular (**CLAP)** – camper states that they like a certain animal
Care Concern for Animal **(CCA)** – camper expresses concern for an animal's health or well-being
Care Sad About Animal **(CSAA)** – camper states they are sad about something that happened to an animal
Care Guilt for Animal **(CGA)** – camper states they feel guilty about something that has happened to an animal
Care Animal Recognition **(CAR)** – camper states they were happy when they thought an animal recognized them
Care Animal Friend **(CAF)** – camper states they are happy thinking about someone having a new animal friend
Care Animal Dignity Bury **(CADB) –** camper states an animal must be buried, in so doing expressing deep respect and care for the animals' dignity

Care Positive Attitude Change **(CPAC)** – camper states the change in their thoughts about animals is good/positive
Care Animal Contact **(CAC)** – camper was changed due to getting to have contact with animals
Care Social Learning Theory **(CSLT)** – camper states they appreciate animals more because of the hard work of their instructors
Care Knowledge Mind Fosters Care (**CKMFC)** – camper states that a new understanding of an animals' mind/behavior fosters their care/love for the animal
Care Knowledge Animals Intelligent **(CKAI)** – camper states they appreciate animals more because instructors told them animals are intelligent
Care Knowledge Change Mind **(CKCM)** – camper states that their new knowledge of animals changed their mind (how they think about animals)

3. Care about other people's thoughts and actions toward animals **(COTA)** (4 sub themes)

Care Human Behavior (**CHB)** – camper notes that they care about human behavior toward animals
Care Parent Support **(CPS)** – camper states they care about their parents support to care for an animal
Care Others Understanding Animals **(COUA)** – camper states they care about other people understanding animals
Care Others Feelings Animal **(COFA)** – camper states they care about another persons feelings about an animal

4. Camper states they don't care about something, or don't like something **(CN)**

Care Likes Nothing (**CLN)** – camper states they like nothing or did not learn what they like about nature
Care Feel Nothing (**CFN)** – camper states they have no feeling about nature
Care No **(CN)** – camper states they do not care about an animals' situation
Care Attitude Negative Animals **(CANA)** – camper states a negative attitude about animals

PROPENSITY

1. Propensity to tell someone the right thing to do for animals or environment **(PTRD)** (20 sub themes)

Propensity Tell **(PT)** – camper generally states they will tell others what they can do for animals
Propensity Tell Protect Animals **(PTPA)** – camper states they will tell others to protect animals
Propensity Tell Know Animals **(PTKA)** – camper states they will tell others that we should get to know animals (because then we might want to help them more?)
Propensity Tell Make Enrichment **(PTME)** – camper states they will tell others the importance of enrichment for animals and to provide it
Propensity Tell Animal Freedom **(PTAF)** – camper states they will tell others that animals need freedom/should be in nature

Propensity Tell Take Proper Care **(PTTPC)** – camper states they will tell someone to take proper care of an animal
Propensity Tell How Take Proper Care **(PTHTPC)** – camper states how they will tell someone how to take proper care of an animal or how the person can learn (e.g., books)
Propensity Tell Take Responsibility **(PTTR)** – camper states they will tell someone to take responsibility for a situation an animal is in that they created
Propensity Tell Bury Animal **(PTBA)** – camper states they will tell someone to bury a dead animal
Propensity Tell Make Reconciliation **(PTMR)** – camper states they would tell someone to apologize to/reconcile a misdeed to an animal
Propensity Tell Care Animal **(PTCA)** – camper states they will tell someone to care about/cherish an animal, or that they should
Propensity Tell Neuter Spay **(PTNS)** – campers states they will tell someone they should neuter or spay their dogs or cats
Propensity Tell Find Home **(PTFH)** – camper states they will tell someone to find a good home for an animal
Propensity Tell Protect Environment **(PTPE)** – camper states they would tell someone we need to protect the environment
Propensity Tell Don't Hurt **(PTDH)** – camper states they will tell others not to hurt animals
Propensity Tell Don't Feed **(PTDF)** – camper states they will tell others to not feed animals carelessly
Propensity Tell Don't Tease **(PTDT)** – camper states they will tell others to not tease/bully animals
Propensity Tell Don't Yell **(PTDY)** – camper states they will tell others to not yell/shout at animals
Propensity Tell Don't Buy **(PTDB)** – camper states they will tell others to not buy wild animals or pets or not to get a pet
Propensity Tell Negative Words **(PTNW)** – camper states they will tell others not to say negative things about animals

2. Propensity to personally do something for animals **(PPDS)** (10 sub themes)

Propensity Touch/Treat Gently **(PTG)** – camper states they want to treat or touch animals gently
Propensity Improve Treatment **(PIT)** – camper states that camp improved the way they treat animals
Propensity Stop Hurting **(PSH)** – campers states they would stop someone who was hurting an animal
Propensity Don't Buy Pet **(PDBP)** – camper states they will not buy a pet (because it would not be good for the animal)
Propensity Care Properly for Animal **(PCPA)** – camper states they will take proper care of an animal
Propensity Find Home **(PFH)** – camper states they will find a good home for an animal
Propensity Take Responsibility **(PTR)** – camper states they would take responsibility for an animal that someone else is not caring for properly
Propensity Bury Animal **(PBA)** – camper states they will bury an animal who has died

Propensity Learn Care First **(PLCF)** – camper states they will learn how to care for an animal before they get one as a pet
Propensity Protect (**PPR)** – camper states they want to protect nature

3. Propensity to use a good communication strategy to encourage another person to do the right thing for animals **(PGCS)** (9 sub themes)

Propensity Remind Consequences **(PRC)** – camper states they will tell someone to consider the possible consequences of their actions toward an animal before they make a decision to do something
Propensity Ask Someone Can Care **(PASCC) -** camper states they will ask someone to consider whether they really can care for an animal properly (esp. in the case when someone is considering getting/taking in a pet)
Propensity Tell Animal Life **(PTAL)** – camper states they will tell someone that animals have a life
Propensity Tell Feelings **(PTF)** – camper states they will tell someone about animal's feelings
Propensity Tell Animal Friends **(PTAFd)** – camper will tell someone that animals are our friends, sometimes mentioning we should treat them as we would a friend
Propensity-Moral Tell Wrong **(P-MTW)** – camper states they will tell someone that it is morally wrong to do something
Propensity Use (EMPATHY)_Transgression Inductions **(PUETI) -** camper states they will ask someone to think about the feelings (physical or emotional) of an animal in order to try to get them to do the right thing for an animal
Propensity Use (SYMPATHY) Transgression Inductions **(PUSTI) -** camper states the condition of an animal and asks or states how they would feel in that situation in order to get the person to think about proper actions toward animals
Propensity Question Someone's Thoughts/Morals/Actions **(PQST)** – camper states they would questions someone's thoughts/morals/actions toward animals to get them to think about behaving better toward them

4. Camper states that they can't do something about a situation involving animals **(PN)**

Propensity No **(PN)** – camper states they will not do anything about an animal's situation (e.g., because too shy, it's too troublesome)

EMERGENT THEMES
Empathy **(E)** – camper expresses how they think an animal feels/is thinking
The researcher believes that the type of empathy that was demonstrated in the camper's responses was cognitive empathy. Preston and deWaal (2002, p. 5) define cognitive empathy as "Apart from being emotionally affected, the subject cognitively understands the object's predicament and situation. This implies perspective-taking and attribution." Campers possibly experienced personal emotional changes similar to what the animals in the vignettes were experiencing ('true' empathy), but that cannot be determined from these data. However, campers did demonstrate a strong understanding of what the animals in the stories must have been feeling, both physically and emotionally, acknowledging a belief in animal mind.