PORTRAiture OF A Green SchoolYARD:

A NATURAL HISTORY OF CHILDREN’S EXPERIENCES

by

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A thesis submitted to the

University of Colorado Denver

in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

Educational Leadership and Innovation

2011
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ABSTRACT

Children in the United States are losing access to nature, yet previous research suggests that time in nature provides benefits for children's healthy development. Youth withdrawal from the natural world comes at a time in history when understanding environmental issues demands a knowledge of the natural environment and human's relationship to it. Schools have an opportunity to provide access to nature, but traditionally do not. This portraiture study investigated children's experiences in a schoolyard habitat at a public, traditional school with the purpose of illuminating how the fourth, fifth, and sixth grade students felt, knew about, and acted in the natural setting. The findings indicated five major benefits of a schoolyard habitat used as a classroom throughout the school day: (1) critical thinking and curiosity; (2) ownership and identity; (3) peace and calm; (4) respite and respect; and (5) adventure and imagination. Present in all of those distinct yet interrelated themes was intellect, movement, joy, trust and confidence, safety, comfort and familiarity, respect, and relationships between students and between students and teachers. The study concluded that children’s physical, intellectual, and emotional selves were all actively benefiting from the time in the habitat, that a balance of free and promoted action naturally occurred for students and teachers, and that the habitat was a place of kindness and respect. The study has implications for research and practitioners in children’s sense of place, schooling, environmental literacy, and portraiture as a methodology to research children’s experiences of place.

This abstract accurately represents the content of the candidate's thesis. I recommend its publication.

Signed

Carole G. Basile
DEDICATION

I dedicate this thesis to my husband Shannon and daughter Skyler True out of gratitude for their momentum, motivation, and most of all, inspiration during this incredible journey. I am so grateful for who they are. For my parents whose advice was always to love what I do and do what I love. Thank you for providing me with a love of learning.
I am grateful for Carole Basile; I am grateful for her support and guidance both in my research and throughout my educational career. I am grateful for Louise Chawla; I am grateful for her guidance and for helping me formulate my research questions. Thank you to the members of my committee for their contributions and insights and to my cohort of colleagues in the EDLI program for their wisdom and laughter.
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CHAPTER I

THE NATURAL HISTORY OF A GREEN SCHOOLYARD

In the American society of the twenty-first century children are withdrawing from nature, spending more time inside than ever before, more disconnected from the natural world than any generation before them (Louv, 2005). Meanwhile, a global ecological crisis, with consequences for natural and human systems, requires more attention and appreciation (Bowers, 1993; Kahn, 2010; Kellert, 2002). Schools have an opportunity to reconnect children to the places that they inhabit, including social connections and connections to nature. Schools are heading away from local places and towards generalized national curriculum because of a focus on academic achievement often measured in high-stakes tests, school days packed with instruction and little time for play or free exploration, especially outdoors (Gruenewald, 2003; Moore and Cooper Marcus, 2008). When children do go outside at school, they could be faced with bleak areas that seldom inspire their imagination (Moore, 1974; Titman, 1994). Two movements resist these alarming trends. From the field of education, place-based education (Gruenewald, 2003a, 2003b; Smith, 2002; Sobel, 2004) is an approach to schooling that uses the local natural and human communities to provide the lessons for student learning. From the field of planning and design, naturalized areas are being constructed in schoolyards as a way to increase children’s contact
with nature (Blair, 2009; Hutchinson, 2004). In both movements, there is an effort to reconnect children and nature.

**Themes and Background**

The central theme of this dissertation is that children need nature. Children need nature for healthy development physically, mentally, academically, socially, and emotionally (Hart, 1979; Moore, 1997; Moore & Cooper Marcus, 2008; Wells, 2000). Children need nature to develop an ethic of care about the natural world (Chawla, 1999, 2006; Wells & Lekies, 2006) and to develop a healthy sense of place in their local communities (Gruenewald, 2003b). The empirical and theoretical body of evidence supporting the need for nature in childhood is growing based upon the claim that nature is disappearing from childhood experiences (Louv, 2005). The body of literature about children and nature is comprised by a breadth of academic fields including: geography, planning and development, children's wellness, ecological psychology, environmental education, and formal schooling.

With a breadth of research interest in children and nature, there are many opportunities for deep understandings of how children benefit from contact with the natural world. The gap in the wide body of literature about children and nature that was addressed by this study was how children experience nature in the context of the school day within a part of the schoolyard that was created as a natural area with native plants and trees called the “habitat.” This study drew on the seminal work of Hart (1979) who found ways that children experience their place defined by
children’s ranges in their neighborhoods, what they did in their activities, how they felt and what they knew about their places. His study was replicated to discover experiences children have in other locales including Cele’s work on children’s experiences of Norwegian cities (2006). This dissertation also drew on the work of Titman (1994) and Moore (1974, 1986) who found that asphalt schoolyards are often bleak and uninviting to children. The conceptual framework of the study was that children need nature for healthy development but due to many obstacles, their time in nature is decreasing on average (Louv, 2005). Schools could provide access to nature (Moore & Cooper Marcus, 2008), but typically do not (Gruenewald & Manteaw, 2007; Moore, 1974; Titman, 1994). In 2010, Stanley conducted a three-year study of children’s time in a natural schoolyard during recess. At the time of my dissertation, there was not an inquiry into children’s experiences of nature provided in a school setting during class time. By developing an empirical narrative portrait of a natural schoolyard, the objective was to understand the experiences children have in a schoolyard habitat. Based on the advice of Chawla (2007) for studies of children and nature, the theoretical framework of this portrait was from the ecological psychology of James Gibson (1966, 1979), Eleanor Gibson (1969), and Edward Reed (1996a, 1996b).
Statement of the Problem

Decreased exposure to nature during childhood poses serious problems. Addressed in this section are the issues of decreased environmental literacy, children's wellness, socio-cultural and physical obstacles to nature for children, and a public educational system that was generally not set up to handle the afore mentioned problems. The discussion will begin with environmental literacy.

Environmental Literacy

The problem facing every citizen in the world is that humans face looming and complex environmental problems (Bowers, 1993; National Science Foundation, 2009). In the last year, a major oil spill happened in the Gulf of Mexico, an earthquake and tsunami crippled Japan causing the meltdown of a nuclear power plant, and wildfires burned through Texas. These sensational events grabbed the attention of the popular media. Simply reading the newspaper requires a systems-based understanding of the natural world and humans relationship to, and reliance on it. The necessary life-long skills to process and think critically about such environmental issues cannot be assumed innate to children, nor can adults assume that children are capable of handling the emotional weight of such issues that threaten the well-being of all living things (Sobel, 1999). Understanding how these issues came to be and the complexities of solving them are a group of skills and knowledge called environmental literacy (Orr, 1992). National surveys over ten years found that the environmental literacy of the United States was severely deficient (Coyle, 2005).
A 2001 Roper report found that very few Americans understood natural systems enough to make decisions about environmental issues (Coyle, 2005).

The problem of environmental literacy came to the attention of federal and state policy. In 2009, Maryland Representative Sarbanes first introduced House Bill 2054 and Rhode Island Senator Reed first introduced Senate Bill 866: both titled the No Child Left Inside Act (NCLI). Neither bill passed so the legislation was reintroduced in 2010 and most recently in July, 2011. Specifically NCLI included federal funding for each state with an environmental literacy plan in place developed in collaboration with the state’s department of education. This environmental literacy plan includes the development and implementation of academic standards for environmental education and outdoor activities (Committee on Education and Labor, 2008). In response to even a hint of such funding, state environmental education organizations are working with political leaders, state education departments, and grassroots organizations to write environmental literacy plans that will create a way to bolster the knowledge, skills, and critical thinking about environmental issues. In Colorado, for example, House Bill 1131 (C.R.S. 24-33-109.5) titled Colorado Kids Outdoors passed in both the state House and Senate and was signed into law in May, 2010. This legislation motivated the draft of an environmental literacy plan; the plan will be implemented with the secure passage of NCLI and the federal funding to accompany the policy. This was not the only recent policy attention to focus on children and nature.
Children’s Wellness

Children’s wellness has become another issue of grave concern for American society. In the United States, there is a documented epidemic of childhood obesity (Strauss and Pollack, 2001). The causes are postulated to be fewer children walking to school, less time in unstructured play, less time at recess, and more time with electronic media while ingesting higher calorie foods (Anderson and Butcher, 2006). Children are growing up with lives that are increasingly sedentary which has a negative effect on their physical health (Moore & Cooper Marcus, 2008). In her initial year as First Lady, Michelle Obama began the Let’s Move campaign with the goal of ending childhood obesity in one generation (http://www.letsmove.gov). To kick-off the campaign, First Lady Obama planted a vegetable garden at the White House.

During her tenure as Lieutenant Governor, Barbara O’Brien of Colorado, was working toward a similar goal at a local level; Lieutenant Governor O’Brien wanted Colorado to become the healthiest state to combat national trends toward obesity (2010). Yet, children’s wellness is greater than physical issues.

Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD) is a diagnosis prevalent in American children (Froehlich, Lanphear, Epstein, Barbareis, Katusic, & Kahn, 2007) and is a disease that has shown improvement with access to nature. Symptoms of ADD/ADHD include inattention and impulsivity which impact a child’s learning in school, relationships with peers and family, and tendencies toward aggressive and anti-social behavior (Faber Taylor,
Medical treatment for ADD/ADHD relies on medications and behavior therapies, met with mixed results (Faber Taylor, et al., 2001). According to a study of prevalence of this diagnosis in children ages eight to fifteen, Froehlich, et al. (2007) found that income is a factor for children receiving medical treatment for ADD/ADHD. Green spaces and play in natural settings are a non-medical treatment showing relief from the symptoms of ADD/ADHD regardless of income, gender, age, community type and location (Kuo & Faber Taylor, 2004); so in the case of children’s wellness to address issues of obesity and mental health, the question becomes how accessible is nature in childhood?

Children’s Access to Nature

In 1997, Moore listed the barriers and restrictions to children’s time in nature: electronic media, parental fear of abduction or harm, traffic dangers, lack of natural space, less play time, changes in family structure, air conditioning, and the commercialization of play. Electronic media is a barrier to children’s time spent outdoors and in natural settings; among one of the effects is that electronic media is replacing direct experiences in nature with television shows and video games (Kellert, 2002). Young people’s use of electronic media has rapidly increased in the past five years. Youth ages eight to eighteen were found to increase their time with television content, music/audio content, computer, video games, print, and movies from six hours and twenty-one minutes per day in 2004 to seven hours and thirty-eight minutes per day in 2009 (Kaiser Family Foundation, 2010). The minutes per day did not
account for the media multi-tasking that allows for media users to consume more than one media at a time. When multi-tasking was accounted for in the minutes, young people in the United States spent eight hours and thirty minutes per day with electronic media (Kaiser, 2010). With immediate access to entertainment, especially as electronic media becomes more portable and more accessible financially, children simply may not be motivated to go outside (Moore, 1997).

Parents and children may also feel physical restrictions to natural spaces; Moore and Young (1978) found that even a road too dangerous to cross keeps children from local natural settings. Parents may not let children go outside, or stray too far outside because of what Louv (1990) called the “boogeyman syndrome.” Due to constant messages in American society that children are not safe when they are outside without an adult, the generalized response is parental anxieties that cause families to keep children close or inside. In his account of childhood throughout the historical periods of America, Mintz (2004) called the age of childhood beginning in the 1970’s Parental panics and the reshaping of childhood. He cited this socio-cultural shift as the reason for “[A]n upsurge in parental anxiety and to a hovering, emotionally intense style of parenting that made it more difficult for children to forge an independent identity and assert their growing maturity and competence” (p. 341). In response to this panic, middle-class families commit children to hours of after-school and weekend structured activities depriving children of time to simply hang out (Mintz, 2004). In her ethnographic account of childhood, Lareau (2003) called
this over-scheduled childhood “concerted cultivation” and cited reasons that extracurricular activities such as sports, dance, and music lessons correlate to success as an adult. Her study also found a divergent childhood of “natural growth;” Lareau identified lower income families had less structured activities for children to engage in. Their childhood was less supervised. While Lareau found less structured time related to fewer opportunities later in life, Louv (2005) and Mercogliano (2007) argued that down time to play and explore without adult structures allowed children to create self-confidence and agency. Free exploration and self-determination are associated with happiness in childhood (Carter, 2010), yet they are aspects of childhood that are minimized in hyper-protected lives (Mintz, 2004).

Adults, educators, caregivers, and policy-makers can no longer assume that childhood experiences include time in nature (Kellert, 2002; Moore, 1997; Moore & Cooper Marcus, 2008). Pyle (1993) referred to the vanishing of nature in childhood as the extinction of experience. Is this extinction, our societal withdrawal from nature, without consequences? Not according to Pyle (1993) and Louv (2005) who coined the term “Nature Deficit Disorder” to define a pathology related to time out of nature. Louv challenged the condition of childhood by juxtaposing it with his own:

Within the space of a few decades, the way children understand and experience nature has changed radically. The polarity of the relationship has reversed. Today, kids are aware of the global threats to the environment – but their physical contact, their intimacy with nature, is
fading. That's exactly the opposite of how it was when I was a child” (2005, p. 1).

Given the ecological dilemmas that children will face as adults, Louv’s point seems more urgent. It is critical to include the other physical place where children spend their time outside of their homes with their families: schools. What role does education play in ecological literacy and where do schools fit in the dilemma of children’s access to nature?

American Public Education

Schools have an opportunity to provide nature to children, but historically have not prioritized children’s time in nature as part of the daily or annual objectives. The required amount of time a child in the United States spends in school is approximately seven hours per day, 175 days per year, which equates to 15,925 hours over a schooling career from Kindergarten to high school graduation. As pressures increase on student achievement, the school day becomes more intensely academic and time for recess and other social periods for children is limited (Moore, 2006; Moore & Cooper Marcus, 2008). Since the passage of No Child Left Behind, “standardized” has become a word common in the language of schooling where all children are meant to achieve particular goals in all places leaving less instructional freedom and more scripted curriculum. The pressure on children to achieve academic standards, however, does not begin in Kindergarten. Schooling standards begin with
preschool, where the expectations of what children know and are able to do are inscribed into state law (CDE, 2011) when historically this was a time for children to become socialized through play and imagination. There is little if any room for going outside in school.

An unintended consequence of focusing only on children's time inside a classroom is a lack of attention to children's space for recess and play. Titman (1994) found that British schools with access to nature had students who felt more positive about the school; she found a "hidden curriculum" communicated from the condition of the school grounds. Moore (1974) described similar findings. There are messages conveyed by a schoolyard about the value of the children and their needs. When school grounds are one asphalt surface, the message conveyed is "control, authority, and unfriendliness" (Moore, 1997). Moore and Wong (1997) later investigated what happens when a schoolyard is designed, built, and utilized as a natural area; their study of a schoolyard in California that had been redeveloped as a natural setting found higher social interaction, higher self-confidence, and child friendliness. The students gained primary sensory experiences during the school day.

Place-based education calls for schooling to return to a grounding in the local environment, natural and built, where children are not consumers of scripted lessons on generic topics and themes but instead find relevant and meaningful connections to concepts within their own communities (Gruenewald, 2003b; Smith, 2001; Sobel, 2004). Moore (1986) claimed: "All sectors of the child's environment - at all
ecological levels - need to become the content and process of learning, instead of being viewed as a taken-for-granted backdrop” (p. 22). The ecological levels include family, neighborhood, community, and region as well as local flora, fauna, lifezones, and biomes. This integration of the local allows for learning through relevance. This approach to daily instruction comes from lines of inquiry generated by the students with their teachers, instead of national curriculum publishers.

Public schooling, in the industrial model operating in the United States today, does not include children’s connections to nature as a national objective as exemplified in place-based education. While there are grassroots and political movements to garner support for children’s time in nature, the structure of society is enabling fewer minutes for children in natural settings and less time to find the sense of wonder Rachel Carson (1962) wrote about more than fifty years ago. Children’s time in nature fosters an innate awareness of natural systems, an ethic of care for the natural world, an understanding of humans’ relationship to nature, and possibly, the greater capacity to think about our world’s looming environmental issues. The wellness of children and health of the environment that sustains them relates to the contact children have with nature. Schools have the opportunity to provide natural experiences to children by creating and utilizing naturalized schoolyards.

In looking to schoolyard naturalization and garden projects, it was possible to pivot from the larger problems to solutions. Small successes to reintegrate nature into childhood are happening as schools are beginning to green their schoolyards with
vegetable gardens, naturalized areas, or by giving children access to wild areas around the school (Blair, 2009; Dyment & Bell, 2008; Hutchinson, 2004; Moore & Wong, 1997; Stanley, 2010). Studies of these green schoolyards are building a reliable body of evidence that natural areas on school grounds are worthy efforts for healthy child development. Yet, studies of children’s perspectives are limited. With the greening of school grounds, what do we understand about how children experience these rich, diverse, accessible areas?

**Purpose of the Study**

The conceptual framework of this dissertation was that children need nature but have limited access to natural settings due to a variety of socio-cultural and physical factors. Schools have the opportunity to provide contact with nature (Moore & Cooper Marcus, 2008), but rarely is this an objective of the education system in the United States (Lieberman & Hoody, 1998). In schools that do have green schoolyards, the empirical research tends toward play in such spaces; the majority of these inquiries also come from a planning and design perspective as opposed to the lens of schooling. In studies about green schoolyards, there is a gap in qualitative studies about the experiences children have in nature at school. Based on Hart’s (1979) definition of experiences, there is a gap about how children know, act, and feel when they are engaged in activity in a green schoolyard that is accessed by the students and teachers as part of the school day.
Essentially, literature investigations of children and nature are from fields outside of formal education. Does this represent schooling’s lack of concern for children and nature? According to the critical theorist Gruenewald (2003b), it does. Literature examining children’s experiences of place are cast wider than a schoolyard, particularly of interest since Hart’s (1979) seminal study, was research methodology about uncovering how children experienced their neighborhoods and communities (Cele, 2006). Children’s schoolyard literature has plenty to offer for play in nature and began to address children’s intellectual development (Kellert, 2002) through class time spent in the schoolyard (Malone & Tranter, 2003). Stanley’s (2010) examination of children’s experiences in the woods of a Baltimore schoolyard created a portrait of children’s experiences during the school day focused on play time during recess. Therefore, the gap in the literature that I addressed was fundamental. How do children experience (know, act, and feel) a naturalized schoolyard during structured class time as part of the school day? Especially germane here is that the following study took place in a public, formal, traditional school. This was an area not yet covered. The purpose of my study was to understand the experiences of children in a green schoolyard defined as how children act, what they do, and what they know.

**Need for Study**

Over the past fifty years, research has proven the positive impact of nature on the wellness of human beings. Specific to children, time spent in nature, especially through play, has been shown to improve cognitive functioning (Faber Taylor, et al.,
2001; Kuo & Faber Taylor, 2008; Wells, 2000), resilience to stress (Wells & Evans, 2003), creativity (Fjortoft, 2004; Kirkby, 1989), physical development (Grahn, P., Martensson, F., Lindblad, B., Nilsson, P., & Ekman, A., 1997 cited by Chawla & Flanders Cushing, 2007), and social play (Kirkby, 1989). Direct contact with nature in childhood, especially with a positive role model, has been linked to environmental values and care later in life (Chawla, 1999, 2007; Wells & Lekies, 2006). A related body of literature investigated similar effects of nature on school grounds (Dyment & Bell, 2008; Malone & Tranter, 2003; Moore, 1974; Moore & Wong, 1997; Titman, 1994).

Research about naturalized schoolyards began in the 1970's when Robin Moore questioned the role of the schoolyard in safety, happiness, and wellness for children (Moore, 1974). Moore initially found that homogenous, barren schoolyards were detrimental to children’s needs. He later found that natural spaces “stimulate social interaction, and help children acquire knowledge of the biological world” (1986, p. 68). In his studies of a natural schoolyard project in Berkeley, California, Moore found a distinction in the way boys and girls used natural or built spaces in a playground and later concluded that children need diverse landscapes for healthy development (1986). He urged scholars in planning, design, and education to consider places for children to explore, play, gather, and share outside as part of school.
In 1994, Titman found that schoolyards convey a hidden message to children about how the school values children’s needs. Her investigation of the British Learning through Landscapes program found that external school environments are becoming increasingly important for children and that children’s attitudes about the school grounds affected their attitudes about the school as a whole. The children’s behaviors and attitudes were considerably effected by the conditions of the school grounds. Stanley (2010) found that children in a small, private Baltimore school preferred the schoolyard’s woods area during recess time over the playground with the play equipment. In short windows of time, children created complex communities from their play time inside of the woods.

In addition to the research on children’s playtime in schoolyards, several studies investigated the academic links of schoolyard learning and student achievement (Cronin-Jones, 2000; Cronin-Jones, Klosterman, & Mesa, 2006; Disinger, 1987; Malone & Tranter, 2003; Moore & Wong, 1997). In the study of five schools with diverse schoolyards in two Australian communities, Malone and Tranter (2003) found that school yards are excellent locations for children’s environmental experiences. Outdoor classrooms supported science curriculum, but only one of the schools supported children actively exploring and manipulating loose parts of the environment. They also found that teachers did not use the outdoor environment as learning areas tied to formal curriculum. Cronin-Jones, et.al (2006) did find, however, that when the schoolyard was used for instruction, elementary students showed
significant gains in standards-based knowledge on environmental science content as well as positive improvements on attitudes and behavioral intentions toward the environment. Cronin-Jones's (2000) earlier experimental design also showed an increase in environmental understandings when lessons were done in the schoolyard.

For green schoolyards that are used as outdoor classrooms, few phenomenological studies exist that investigated children’s experiences in nature as part of the school day. This is a critical gap because children who may or may not have access to nature experienced nature in a setting with supervision of a teacher. Is this experience as valuable as unstructured time in nature? Is it as valuable as unsupervised time in nature? Does time in a naturalized setting have similar benefits to children as free play in natural settings? There was a need for more qualitative research to answer these questions and so that educators implementing the growing trend of green schoolyards understand how students act, feel about, and know a natural area utilized as a classroom.

The research question guiding this dissertation was: what are the experiences of students in an established green schoolyard? Sub-questions of the research were:

- What were the daily activities of children in middle childhood (8-13 years) in a naturalized schoolyard implemented in a public school as a classroom setting?
- How did children feel while they were in class in the natural area of the schoolyard and how did they feel after their time outside?
• Did time in nature during the school day lead to a greater connection to the school community for children in middle-childhood?

• What were the benefits to children in middle-childhood of a natural area in the school’s yard?

The research questions were examined through the use of portraiture, a rigorous narrative methodology of qualitative research that was designed to allow for rich, textured stories of participants and the voice of the researcher (Lawrence-Lightfoot & Davis, 1997). The participants in the study were elementary students in fourth through sixth grade at one public elementary school with a naturalized area of the schoolyard currently used for science lessons and intermittent free-exploration days during science class. The data were collected through participant observation, videos of student’s time in the habitat, photographs and drawings by the students, semi-structured interviews, narrative “go-along” interviews (Carpiano, 2009; Kusenbach, 2003), a field notebook and Impressionistic Record (Lawrence-Lightfoot & Davis, 1997) kept by the researcher, and archival data.

The goal of this study was to create a narrative portrait of a very specific place on a school’s grounds to identify the benefits of natural settings to children during the school day, understand the implications of having time during the school day for children to connect with the natural world, and illuminate a naturalized schoolyard as a place that students go during class time as part of the structured school day as well as a place that children have access to for free exploration and discovery. Based on
the argument that understanding children’s experiences in places is essential to how we understand childhood, the overall aim of this study was to weave together a comprehensive story, or qualitative narrative, of a green schoolyard that illuminated themes between and among child participants and their time spent in a natural environment that was part of the school.

**Setting of the Study**

The study was conducted at a public, traditional, formal elementary school in Colorado roughly twenty miles from Denver in a growing predominantly middle-class rural/suburban area called Carsonville. Carson Elementary served approximately five hundred students from a wide range of socio-economic demographics. The predominantly white students came from subsidized apartments in the historic town as well as new developments of $300,000 homes. The school opened in 1983 and the red brick building has undergone one major renovation when the school’s enrollment began to climb due to new housing development in early 2000. The front of Carson Elementary was typical of 1980’s public architecture in Colorado and the playground on the west was one large grass field, a blacktop area with scuffed-paint white markings for games like four square and tether ball, and fixed metal and plastic playground structures in a wood chip pit. The playground of Carson Elementary was typical of the areas Titman (1994) and Moore (1974) were

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1 In order to protect the identity of the participants in the study, all names of people and places have been changed.
critical of. What was atypical of the elementary school was the view from the school grounds. Carson Elementary sat high on one of many hills in the area and looked out to the west where an uninterrupted view of the Rocky Mountains from Pikes Peak to the south to Longs Peak to the north. Directly south of the school was a globally significant geological formation called Carson Rock; this formation contained relics representing sixty million years of pre-history when the area was a rainforest, a marshy swampland, covered by super-heated volcanic ash, and cut by catastrophic floods. Hiking trails made the formation accessible to local residents and the town; a star on top of the rock was lit up during the holiday season and an American flag adorned the top of the rock. This formation was a major landmark of the region and a five minute walk from Carson Elementary.

When Carson Elementary underwent the addition of a library on the east side of the building, the natural area behind the school leading to a major drainage in the area was damaged due to the construction. In 2004, a concerned class of fourth grade students, their teacher, and a parent who was also a school district science resource teacher, discovered a National Wildlife Federation Schoolyard Habitat training and received a map for a process to design, develop, and build a naturalized schoolyard area. Since that time, the school began to refer to this area affectionately as the “habitat” and became used by every teacher in the school for class, students with special needs, a science specials class, and a place where teachers had lunch. Children
were not allowed in the habitat during recess or during unsupervised times during the day.

The habitat was officially an area on 1/4 acre of the school's property; a gravel trail connected the library to a butterfly garden, young ponderosa pine tree forest, and a pond with a dock and student seating called “the rock steps.” The habitat was not visible from any view of the school except from the street behind the school leading to surrounding neighborhoods. Surrounding the habitat was a thick wall of scrub oak or Gambel's oak, a common plant to the arid shrubland ecosystem of Carsonville. A break in the scrub oak led down a hill to a drainage that was technically not part of the habitat, but became an extension of the place and was used for classes. At the bottom of the hill was a seasonal stream that connected to the town's main water way. In both the drainage and the habitat, it was common to find evidence of black bears, coyotes, mule deer, foxes, raccoons, and a cacophony of native and migratory birds.

The habitat was designed for the school as well as the community. There were purposefully no fences or walls keeping children out or in. Many students walked through the drainage to get to their homes and many children walked to the habitat as a community space.

**Definition of Terms**

The empirical and theoretical body of evidence supporting nature in childhood is growing founded upon the notion that nature is disappearing from childhood experiences (Louv, 2005). Comprising the body of literature about children and
nature is a breadth of fields interested in the topic including geographers, planning and development professionals, ecological psychologists, environmental educators, and educators from formal schooling. Before synthesizing the literature, the definitions of terms are articulated to create a common language between the fields.

Unique fields interested in children’s time and contact with nature use different terms. The benefits of nature have been studied using participants of all ages including children, adolescents, college students, and adults. This study focused on children and defined this period of life as ages five to twelve, a period of middle-childhood identified by Cobb (1959) and supported by numerous studies and articles since (Moore, 1986; Sebba, 1991; Sobel, 1990; White, 2004) as a formative time when humans are open and bond to the stimuli available in nature. Nature is available to children in settings including urban, rural, and suburban places; nature was defined in this review of the literature as wildlife, plants, abiotic features of ecosystems, and natural events such as the weather (P. Kahn & Kellert, 2002, p. xiii). Green space was a setting that included some arrangement of natural features. Now that the definitions are established, the research that supported the need for nature in childhood will be explored.
CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study was to understand children’s experiences in a schoolyard habitat. The premise was that children need nature for healthy development and an ethic of care for the natural world, but societal and physical obstacles keep children from direct contact with nature. Schools have an opportunity to provide access to nature, but do not. Empirical and theoretical research came from children’s geographies and children’s places, planning and design, child development, ecological psychology, place-based education, child wellness and medicine, and environmental education all with the concern for the disappearing wildness of childhood experiences. This chapter will review the current literature from these broad fields and synthesize the findings in a conceptual framework that guided my research. Next, the chapter will review research from the ecological psychology of James Gibson (1966, 1979), Eleanor Gibson (1969), and Edward Reed (1996a, 1996b); these bodies of work are based on evolutionary theory and a realist philosophy and served as an appropriate lens for investigating children’s experiences in nature (Chawla, 2007). The chapter will conclude by identifying the gaps in the literature that justified a qualitative inquiry of children’s experiences of a natural
setting that was part of the school day. To begin, the literature identifying the benefits of nature in childhood is examined.

**Nature and Childhood**

Nature provides for healthy childhood development (Faber Taylor & Kuo, 2006). Empirical evidence for the claim that children need nature is not as straightforward as it first appeared. Studies of children’s places investigated play and learning; the studies revealed that nature was a critical component of places that children preferred for play, as well as natural compositions of children’s places for exploration, socialization, and movement. Children may not have access to natural areas for unstructured exploration due to a variety of factors. Before investigating the limitations to nature, it is useful to understand the body of literature supporting the claim that nature is a critical part of childhood. Evidence suggested that nature provides affective, cognitive, and physical benefits to children in addition to promoting a sense of stewardship and values related to a sense of place.

**The Benefits of Nature**

Pediatric physicians Burdette and Whitaker (2005) argued that time outside increased children’s unstructured free play; from a medical perspective, they concluded that free play in nature was critical to childhood wellness. Burdette and Whitaker defined play as, “the spontaneous activity in which children engage to amuse and occupy themselves” (p. 46). In the definition of wellness, Burdette and Whitaker included physical health, social, emotional, and cognitive development. In
her studies of school grounds and children’s time in nature for academic purposes, Dyment (2005) supported these domains of childhood wellness and added two more benefits to children: academic growth and relationships with the natural world. Sobel (1999) argued that the nature relationship piece is formative during middle-childhood; if children will be asked to make difficult choices about the environment when they are older, appreciation of nature is a critical awareness of childhood. The claim that children need nature may sound simplistic, but mounting empirical evidence affirms that nature provides children with fundamental holistic benefits: social, emotional, cognitive, and physical nourishment critical to healthy development.

Indirect contact with nature has benefits to children. With views of nature, children experienced less stress (Wells & Evans, 2003) and more self-control (Faber Taylor, Kuo, & Sullivan, 2001b). Neighborhood compositions that included nature had benefits to children. The number of trees in a shared area was related to a greater sense of community and the amount of children’s play in public housing developments (Taylor, Wiley, Kuo, & Sullivan, 1998). Not only did natural settings promote more play; in addition, children who played in natural settings experienced healthier forms of social play (Faber Taylor, Kuo, & Sullivan, 1998; Kirkby, 1989) and more agility and balance playing on uneven surfaces like rocks (Fjortoft, 2001; Grahn, et.al., 1997 cited by Chawla & Flanders Cushing, 2007). Natural settings for play exhibited the benefits of direct contact with nature. Furthermore, varying levels of contact with natural settings provided a restorative effect that relates to the
attentional functioning of children, particularly those diagnosed with Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD).

Early studies of adults found that nature had a restorative effect on the ability to concentrate, cognitive ability, and control (Berman, Jonides, and Kaplan, 2008; S. Kaplan, 1995). Based on this early work, the predominant findings in research directly investigating the benefits of nature on children’s cognition dealt with children’s ability to concentrate. Wells (2000) found that an improvement of natural views in children’s homes predicted higher levels of concentration as demonstrated using the Attention Deficit Disorders Evaluation Scale (ADDES). Faber Taylor and Kuo (2004) found that children with ADHD had better abilities to concentrate after a walk in the park; their findings indicated that twenty minutes in a park setting were equivalent to the results of common medication, concluding that the walks are “doses of nature” treatment. Faber Taylor, Kuo, and Sullivan (2001a) suggested that this restorative effect had implications for schools that require further investigation, whereby allowing children a break in a natural setting may foster more focus and concentration once back inside the classroom.

*Sense of Place*

Perhaps what is beyond quantification is the joy and wonder nature holds for children’s explorations. Kellert (2002) called this inseparable blend of affect and intellect: values, which were firmly developed by children’s direct contact with nature through exploration, discovery, and imagination. Kellert cited middle childhood as a
time when children become more sensitive to nearby nature because of their willingness to expand their explorations into local places without the supervision of parents or adults. Mercogliano (2007) and Carter (2010) argued that this type of unstructured play without the interference of adults builds self-determination. This development, which provides for skills later in life, is stimulated by the critical thinking and decision making that comes from such independent ventures along with the development of a sense of place. Children begin to understand the places they inhabit through direct contact with them.

To understand children’s explorations of their local places, Hart (1979) designed an ethnographic study of elementary age children in a small New England town. Hart’s seminal study inquired into children’s knowledge, action, and feelings of a landscape. His findings indicated the highly personal way that children experienced their places, referred to as “phenomenal landscapes” (p. 5). Hart’s study was groundbreaking because of the way his methodology made children’s place perceptions accessible to adults through rich description of children’s knowledge, feelings, and actions in “the horizon of their known world” (p. 91). Thus, Hart created a new understanding of how children experienced their local natural and built environments. The study included children’s experiences of natural settings in their spatial behavior; Hart found nature to be a significant part of the participant’s place knowledge and place values and feelings.
Children’s time in nature was referred to by Wilson (1997) as “sense of place experiences” (p. 191). Charles, Louv, Bodner, Guns & Stahl (2009) included “a diminished sense of place and community” (p. 19) in their long list of childhood problems associated with less time spent in nature. A sense of place was defined as a connection and knowledge of a particular locale (Orr, in Hutchinson, 2004), or “the pattern of reactions that a setting stimulates for a person (Steele, 1981, p. 12). Through experiences in nature, children foster their sense of place (Louv, 1990; Smith, 2002; Sobel, 2008); Wilson (1997) argued that sense of place supports children’s cognitive development, fosters creativity and imagination, and promotes children’s sense of self (p. 191). The relevance of place to the study of children in nature is the argument from this body of literature that direct experiences with local nature foster a child’s sense of place, which in turn supports healthy development.

Stewardship

Finally, children and nature have a reciprocal relationship. Contact with nature benefits children, which in turn provides children with an ethic of care for nature. Studies tracing environmental values from adulthood back to childhood through memories of significant experiences explained action on behalf of the environment stemming from two common denominators: positive experiences in nature as children and positive role models in nature exploration (Chawla, 1998, 1999). Sebba (1991) found that embodied experiences in nature during childhood remained a significant memory in adulthood, and Wells and Lekies (2006) found that childhood experiences
with nature had a positive relationship to adult environmental actions. Chawla (1988) stated that “children’s concern for the natural world is shaped through opportunities for direct contact with it” (as cited in Moore, 1997, p. 16). The environmental issues children will face as adults are complex and numerous and will require that citizens making decisions care for the natural world and understand the intricate interdependencies that humans have as part of ecological systems. Yet, even with mounting ecological issues faced by today’s society, nature is disappearing from childhood (Louv, 2005; Mintz, 2004; Moore, 1997).

**Obstacles Limiting Nature in Childhood**

A surmounting body of evidence indicates that children need nature, yet children in the United States are losing access to nature and face many obstacles in nature exploration and play (Charles, et al., 2009; Louv, 2005; Mintz, 2004; Moore, 1997; Valentine & McKendrick, 1997; Wyver, Bundy, Naughton, Tranter, Sandseter, & Ragen, 2010). Carter (2010) claims that children have lost a staggering eight hours per week of unstructured free play over the last twenty years (p. 140). It is clear that nature cannot be assumed as part of childhood experiences anymore, so what are the reasons for such a striking decline? Evidence pointed to parental fear, electronic media, physical obstacles and a lack of natural settings available to children including nature as part of school grounds.

A striking example of limited access to nature and play was put forth in a comprehensive history of childhood in the United States, where Mintz (2004) titled
the current century as one of “parental panic,” generalizing the anxiety parents feel for children’s overall safety as an era of childhood in American history. In Mintz’s explanation of this anxiety, he described the condition of present day American society where parents are afraid to let their children play outside, especially outside without adult supervision. This conclusion was supported by others (Louv, 1990; Valentine & McKendrick, 1997; Wyver, et.al, 2010). According to Mintz, parental anxiety was founded on an increase in media coverage of child abduction, kidnapping, and sexual predation of children. Louv (1990) referred to this as the “bogeyman syndrome.” Parents are afraid to let children play outside impacting how often children explore without adult supervision and increasing the commercialization of play places that are inside and contained.

Another factor interrupting children’s access to nature is the increased use and lure of electronic media (Louv, 2005; Mercogliano, 2007; Mintz, 2004). In one of the most comprehensive studies on children and electronic media, Rideout, Foehr, and Roberts (2010) surveyed 2,000 American children ages eight to eighteen on their daily use of electronic media defined as music, television, computers, video games, movies, and on-line print. Their findings indicated a stunning increase of electronic media consumption in the last five years. The participant’s surveyed spent an average of eight hours and thirty minutes per day, seven days per week, with electronic media when time spent with more than one media source (media multi-tasking) at a time is accounted for (p. 2). This statistic was an increase of one hour and seventeen minutes
from a similar survey conducted in 2004. The increase in electronic media consumption between 1999 and 2004 was only two minutes. Rideout, et.al. explained the increase by the accessibility of electronic media to children considering price, availability, and new platforms including mobile media and a shift of television programs from the actual television to the Internet; children can access television programming from a mobile device such as an iPod or a cell phone. Children are spending more time in an electronic setting and less time in a natural one.

Another national study had grave implications to the children and nature movement; in a survey of adult American attitudes and beliefs about children’s time in nature, a common belief of the participants considered nature to be more than thirty minutes away from their urban and suburban homes (Fraser, Heimlich, & Yocco, 2010). These results implied that “local” does not include nature. In addition to nature being perceived as far away, a lack of natural play space for children that was near home and available for children limited children’s access to nature (Charles, et.al, 2009; Moore & Cooper Marcus, 2008). Other obstacles included family recognition of the importance of nature play, negative messages about nature, and children’s lack of independent mobility in their communities (Moore & Cooper Marcus, 2008). Lastly, although schools were typically central to communities with children, even schoolyards are devoid of nature or places for exploration (Moore, 1974; Titman, 1994).
Green Schoolyards

Public American schools in the United States are not focused on children’s time in nature (Greenwood, 2010). Public schooling functions as an industrial model, where nature and the schoolyard are typically viewed as nonessential to the curriculum (Dyment, 2005). Schoolyards covered in asphalt were “dead territories” (Moore, 1974) where children had little nature and very little else to stimulate their imaginations (Titman, 1994) and sensorial experiences (Moore & Cooper Marcus, 2008). With many obstacles children faced to access nature, green schoolyards gave children entry to nature exploration (Malone & Tranter, 2003a; Moore, 1974). In a three-year study of five schoolyards in Australia, Malone and Tranter (2003a) found cognitive play and environmental learning occurred when the school ground was designed from a school philosophy of children in nature, where the grounds afforded loose parts for children to manipulate and change, and where children were allowed and encouraged to freely explore in an unstructured way (2003a, 2003b, 2005).

Some schools in the United States are greening their schoolyards (Hutchinson, 2004). Moore and Wong’s (1997) Natural School Yard research described how a school transformed a homogenous asphalt schoolyard into a diverse interactive natural area, and investigated how children’s time in the schoolyard was enhanced. The project that began in the 1970’s intended to understand the influence of playing and learning in nature in a schoolyard; the schoolyard was planned, designed, built,
and utilized by the school’s children, teachers, and community including university faculty. As the schoolyard project evolved, empirical inquiries into the academic growth of the students and teachers showed increases in student engagement, motivation, and academic growth. Teachers developed true interdisciplinary curriculum based on the content and processes offered by the “Yard” and the parent community became more involved. Blair (2009) cited similar local and statewide programs where school gardens were in place or being promoted (pp. 15-16); the schools with existing green projects were showing an increase in “science achievement and behavioral improvement” (p. 33) and positive effects on higher order cognitive skills. Lieberman and Hoody (1998) correlated academic gains in social studies, science, language arts, and math using metrics on standardized test scores to schools that used the environment as an integrating context for learning. The literature indicated that the benefits of green schoolyards go beyond academics and mirror the overall benefits of nature examined above.

Kirkby (1989), in her study of a preschool’s play area in Seattle, Washington, found that natural areas with ten percent refuge characteristics, defined as cover in the environment that enabled the child to “see without being seen” (p. 7), promoted more creative play in children by offering a child-sized place for privacy. This play was determined to have cognitive play behaviors and themes (p. 11). In Norway, Fjortoft (2004) found that natural landscapes had a strong relationship to children’s spontaneous play by affording children a wider variety of possibilities for play.
Dyment and Bell (2008) found that green schoolyards in Canadian urban, suburban, and rural settings promoted more physical activity and more physical options for children who may not be drawn to sports or games. And most recently, Stanley (2010) observed that children’s play in a natural area of the schoolyard was connected to creative independent play, and a sense of caring for and competence in the local environment.

Stanley (2010), Malone and Tranter (2003a), and Hart (1979) used ethnographic methods to uncover children’s experiences of green schoolyards and childhood places, yet the literature up until this point is lacking ethnographic and narrative inquiries into natural settings and a sense of place from children’s perspectives in schools that use natural schoolyards as part of the academic day (Blair, 2009; Ellis, 2004; Hutchinson, 2004; Malone and Tranter, 2005). Based on Stanley’s (2010) study of children’s play in nature in a schooling context, a useful theoretical framework for investigating the complex systems that influence school settings came from Bronfenbrenner’s ecological systems theory.

**A Framework for Schooling**

Bronfenbrenner’s ecological systems theory was useful to make sense of the nested systems surrounding children in a public school (Stanley, 2010). Bronfenbrenner’s theory was comprised of nine propositions within five nested systems often described as analogous to Russian nesting dolls. His propositions contained natural and cultural systems that comprised aspects of a child’s lived world.
(Bronfenbrenner, 1979). Each child had a unique constellation of experiences comprised of their place and experiences in the microsystem. Borrowing from Stanley’s (2010) framework for children, schooling, and nature, Bronfenbrenner’s model was a useful tool when considering the complex intricacies of self, home, community, school, government, and economics at work in public education. This

![Diagram of Bronfenbrenner's Ecological Systems Theory](image)

**Figure 1.** Bronfenbrenner’s Ecological Systems Theory shown as nested systems and drawn with concentric rings representing each contextual system of a child’s world.
model was also helpful to frame the qualitative portrait of a natural schoolyard providing structure for the internal, physical, and historical context (Lawrence Lightfoot & Davis, 1997). This model began with the child at the center and worked out into the relative spheres of influence (Figure 1).

A child is an animate organism (E.J. Gibson & Pick, 2000), exploring the world in the context of a family, and a home setting. The child's movements in the microsystem are comprised of abundant experiences in the context of a neighborhood, classroom, and school. Each individual child comes to a classroom that also exists as a particular system, part of what Bronfenbrenner called the meso-system. In this system, classrooms and teachers functioned within the policies of the school dictated by the school district. At the next level, moving out in scale, the exo-system of the child included the state educational system, its funding, and the policy made by a state government. The state system resided and functioned within a national educational system and policies. These policies included No Child Left Behind (U.S. P.L. 107-110, 2001) which implemented nation-wide standardized testing to account for student achievement through quantitative data. At the macro-system level, overarching beliefs and values wrapped around the other nested systems. Relevant to schooling was the overall value of education to attain gainful employment, college readiness, and financial success based on the values of capitalism and the broader American society. An investigation of children in a school setting was complicated by the systems that impact the students without their knowing. The students' experiences
in a schoolyard were influenced by the school’s values about children’s time out of the classroom, the policies for the school grounds, the funding available for projects involving the schoolyard, and the community’s values about children’s time in the schoolyard. Consideration of these nested systems were especially important to school-based research because of a culture of standardized academic achievement.

In an invitation to investigate children in schools beyond academic achievement, Rathunde (2009) invited scholars to examine an embodied approach to education. A criticism of the traditional approach to schooling was that mind was viewed separate from body and the only concern was mastery of pre-determined core knowledge that was abstract and learned in isolation (Greenwood, 2010; Gruenewald & Manteaw, 2007; Rathunde, 2009). An embodied approach to education included experiences in inquiry and nature rooted in “body-environment interactions” (p. 70). Rathunde’s call for the consideration of nature echoed Moore (1997) who described children as “experiential beings [who] learn together with their environment through their senses” (p. 210). While Bronfenbrenner’s ecological systems theory facilitated a frame for schooling, a theoretical lens built on embodied experiences was necessary to understand children’s experiences out of the traditional school building. An inquiry into children’s experiences of a schoolyard required a theoretical framework that explained embodied experiences.
Ecological Psychology

Hart's (1979) seminal study of children’s places, including natural and built aspects of their community, defined experience as what children know, act, and feel in a physical time and space. Based on Chawla’s (2007) recommended framework for children and nature studies, the ecological psychology of James Gibson (J.J. Gibson, 1966, 1979) and Eleanor Gibson (E.J. Gibson, 1969), and Edward Reed (1996a, 1996b) were helpful to understand the experiences of children in a natural schoolyard. The theories will be explained here to identify the scaffolded nature of thought, the overlaps, and compliments of ecological theory.

Early thinking about psychology saw the environment (physical world) and the individual (psychological phenomena) as functioning separately from one another (Heft, 2001; Reed, 1996a). William James had an alternative realist explanation adding the first consideration of evolution to psychology (Heft, 2001) that the individual and the environment cannot be viewed as separate, but that humans use the senses to explore the world and select information (Chawla, 2007). Ecological psychology is not “the study of something in the animal but the study of the animal in its world...it is the study of how animal’s encounter their surroundings” (Reed, 1996a, p. 184). In other words, the human mind and body do not function distinctly from the environment, rather humans encounter the world through the reality of direct experiences (Heft, 2001).
Based on James’s evolutionary approach to psychology, animals use information perceived in the environment to build knowledge and modify behavior. Perceptual learning occurs when humans actively explore their surroundings independently of another’s direction to do so (E.J. Gibson, 1969). The experience is unique to each individual as is the information that is selected: “we encounter the world through an ongoing stream of pure experience which contains many-faceted possibilities for knowing. From this stream of information, we select what we attend to” (Chawla, 2007, p. 149). The actions of the body are the experience (Heft, 2001, p. 174). James also noted that our sensations give us spatial awareness (Reed, 1997, p. 211); we select information from a vast array of what is offered as information in our environment in an embodied way through our senses and explore the world in this way.

Human beings obtain information through immediate experiences; this information is ecological gathered by the senses in direct experiences (Reed, 1996b). Selection of the information available in the environment is an open-ended process. One experience in a particular setting will not allow an individual the opportunity to attend to all of the information possible in the setting. J.J. Gibson (1966) found the ability for an individual to move throughout a space gave an infinite variety to how a perceiver could understand a place (Heft, 2001). This concept of possible knowledge encouraged J.J. Gibson’s (1979) concept of affordances, often used as a framework for understanding the role of nature in childhood (Chawla, 2007; Kirkby, 1989; Kytta,
Affordances are the properties of the environment actively detected for function to the individual; affordances are variables that can be selected and used in a way that matches the form and needs of individual. “Which affordances can be perceived depend minimally on characteristics of the individual’s body (e.g., weight, leg length, arm reach), and that individual’s potential for action” (Heft, 2001, p. 197). Children’s environments are perceived based on the affordances available to them. An example illustrating this concept is a child who finds tree with low branches in a park, discovers through exploration that she can reach the lowest branches and climb up into the limbs. The tree affords climbing by that child who is tall enough and light enough and strong enough to climb. Not every individual in that setting will perceive the structure of tree as an affordance for climbing and not every individual will select the tree as information.

In the 1950’s, James and Eleanor Gibson proposed the specificity theory stating that information available was rich and valuable instead of deplete of meaning (E.J. Gibson & Pick, 2000). Parallel to the importance of selection, specificity theory also stated that information has value whether it is selected by the individual or not. Ecological information has intrinsic value even when that value is not assigned to it by a human perceiver; this is a core tenant of evident in environmentalism and one that supports advocacy work in conservation (Chawla, 2007). In addition, there is a strong action element to specificity theory of ecological psychology making it unique from other developmental theories of the time. Perceptual development is the active
identification and recognition of new information in an environment; as an individual actively detects changes and shifts in an environment through embodied experiences, the individual corresponds more closely with the environment (E.J. Gibson, 1969; E.J. Gibson & Pick, 2000). The classic example of how this discernment develops in adults is in very specific, developed skills such as wine tasting (E.J. Gibson, 1969; J.J. Gibson, 1966; Heft, 2001; Reed, 1996a).

Based on studies with visual information, J.J. Gibson (1966) claimed that perception is information selected through an optic array (what is in the field of vision and available to be selected), keeping in mind that perception is not limited to vision, but an ongoing stream of sensory information. According to Heft (2001), J.J. Gibson’s contribution to perceptual systems was that the system is an active process of sensory information that is exploratory. “With the idea of a perceptual system, J.J. Gibson (1966) proposed a radical reformulation of the standard view of sensory processes. ‘System’ is a critical term employed here to underscore the synergism and reciprocity of perceiving and acting” (Heft, 2001, p. 177). Gibson reinforced James’s idea that perceptual systems function as a constant stream, similar to a stream of consciousness. In addition, each sense (i.e., sights, sounds, smells, textures, tastes) is not divided into individual channels of information but perceptual systems are an embodied experiential activity with “origins in the activity of the body” (Heft, 2001, p. 178). Therefore, perception is an active, ongoing process and perceptual learning is
an intrinsic attention to changes in the environment and the ability to learn through experiences and encounters with the environment.

These encounters and experiences are necessary for human development because ecological information “helps to unite the organism with its environment” (Reed, 1996a, p. 52). Based on studies with human infants, Reed describes that the way humans build informational knowledge and select information from the environment begins in infancy and develops through a process of stages. These encounters with the world happen in interaction frames and state that a frame occurs around a selected site in a populated environment with unique and intricate behavioral patterning (Reed, 1996a, p. 129). Frames build on J.J. Gibson’s optic array concept and help explain what is meant by array being more than visual. When I look around without moving my head, there is an infinite amount of information populating that particular perspective coming in a constant flow through all of my senses; this is my frame of interaction with the environment. Frames are shown to humans as infants, which Reed called “promoted” actions and eventually found independently of a guide in what Reed refers to as “free” action (1996a).

Promoted action is a frame of interaction that is emphasized by an adult to an infant. The field of promoted action is the face-to-face frame, where the adult is the information in the babies environment that the baby responds to and mimics (Reed, 1996a). The baby has an optical array of information and the adult fills the interaction frame with her face using different expressions such as smiling and touching her nose
to the nose of the baby. When an object and a person are in the infant’s frame of interaction, the performatory frame, the information available to the infant includes more information. The adult interacting with the infant and making faces uses a colorful toy. Frames are inclusive as well as exclusive; an adult will include a face or object for the baby as easily as the adult will exclude information from the infant. This is especially interesting when revisiting the concept of optic array (J.J. Gibson, 1966) because infants may not have developed the muscles or motor coordination to turn their heads; the inability to select even the visual information relies on the adult to select the view of the environment for the child. Consider an infant in a car seat or bouncing chair facing in a fixed direction. Reed claims that promoted action is a powerful force in human development and can only operate when interaction frames are available.

As infants develop and become more mobile, the frames of interaction begin to include more information from the environment and more choice about what is perceived. Reed’s concept of free action develops in babies around six months of age and begins to include vocal sounds as information. The environment contains more textured information as the sensory awareness develops. The final frame discussed by Reed (1996a) is the tridacdic frame that includes more complex information of two people plus one object. It is important to note once again that perceptual development occurs because of action; according to E.J. Gibson and Pick (2000), the critical component of perceptual learning is movement and interaction with the world when
information is sought out and used to stay in contact with the environment. The tridacdic frame includes action as the motor skills of the infant develop.

Application of Ecological Psychology

Affordances, perceptual learning, and interaction frames are relevant tools to investigate children’s experiences in a natural schoolyard. Reed’s emphasis on experiences for perceptual learning and development in children can be related to the work of Stephen Kellert (2002) on the cognitive, affective, and emotional development in children explicitly through children’s experiences in nature. In order to directly connect perceptual learning to children’s time in nature, I will borrow on Kellert’s (2002) categories of experiences. Kellert offers a useful conceptual framework that organizes the impact of children’s experiences in nature to the type of experience had. His framework is specifically drawn from middle-childhood, another useful component of his work.

Experiences of nature are organized into direct contact, indirect contact, or vicarious proximity to nature. Direct contact, according to Kellert (2002) is “environments occurring largely outside and independent of the human built environment - that is, plants, animals, and habitats that function, for the most part, apart from continuous human input and control” (p. 118) (wilderness, greenbelts, unmitigated fields). Direct experiences are unplanned and unstructured, this category of acting and doing comes from free exploration throughout the setting. Indirect experiences are mediated by human design and include nature centers, zoos, parks but
include the child being physically in the environment. Indirect experiences include domesticated animals, flower and vegetable gardens; in both examples, human mediation is critical to the survival of the organisms. Vicarious experiences are removed from nature, including electronic images of nature on a television or in a video game or print media including books and magazines.

Kellert’s organization of direct, indirect, and vicarious experiences offer a useful application of Reed’s interaction frames in the context of children in nature. When a child is directly experiencing nature through fields of free action, there is a unique frame of information possible as opposed to when a child is indirectly experiencing nature in a promoted frame of interaction. Reed argues (1996b) that an issue with television and electronic media is that the promoted field of action is fixed, mediated for the individual without a choice of changing perspectives freely. This concept, referred to as montage, is also limiting of perceptual learning because the frame is shifted in an unnatural way from one side of the scene to another and back again. Therefore, electronic media is not experience. For the purposes of this study, vicarious experiences will not be included although it is a rich area for research (Kellert, 2002).

Another useful aspect of Kellert’s (2002) conceptual framework is the idea that children’s affective, physical, and cognitive development are supported through direct and indirect experiences in nature. Kellert’s (2002) work indicates the affective (evaluative), physical and cognitive development as a progression of stages; because
this study is focused on the whole embodied experience, I will not partition the children’s experiences into stages (Stanley, 2010, p. 107) but will use them as loose categories of benefits nature offers to children. These categories of benefits are widely supported by the literature on children and nature.

Summary

The literature up until this point calls for a deeper understanding of how and why children experience natural settings and how schools can play a role for children growing up with less exposure and immersion in nature. The ecological psychology of James Gibson (1966, 1979), Eleanor Gibson (1969), and Edward Reed (1996a, 1996b) provide an optimal theoretical framework to investigate children’s experiences in nature (Chawla, 2007) and Bronfenbrenner’s ecological systems theory provides a theoretical frame to understand the systems with influence on children in a public school. Nature supports children’s cognitive functioning (Charles, et al., 2009; Faber Taylor & Kuo, 2006; Wells, 2000), motor development (Fjortoft, 2004), self-discipline (Faber Taylor & Kuo, 2006), and social/emotional development and mental health benefits (Charles, et al., 2009; Faber Taylor & Kuo, 2006). Nature benefits children and their communities later in life (Chawla, 2009). With a surmounting body of evidence that children need nature, children in the United States are losing access to nature and face many obstacles in nature exploration and play (Charles, et al., 2009; Louv, 2005; Mintz, 2004; Moore, 1997). Schools have opportunities to provide natural experiences as part of the mandatory school day
(Moore & Wong, 1997), yet nature falls low on the priorities of schools due to a constellation of factors including high-stakes testing and academic achievement (Gruenewald, 2004). As Stanley (2010) demonstrated, schools function within nested systems that influence a child’s experience during the school day. Despite the focus of public schooling on what occurs inside the building, there is an interesting, yet limited, body of research specific to schoolyards and children’s natural experiences, or lack there of.

Literature examining children’s experiences of place are cast wider than a schoolyard, particularly since Hart’s (1979) seminal study that developed a useful research methodology uncovering how children experience their neighborhoods and communities (Cele, 2006). Children’s schoolyard literature has plenty to offer for play in nature, and children’s intellectual development through class time spent in the schoolyard (Tranter & Malone, 2003a). Stanley (2010) created an excellent perch for this study in her examination of children’s choices for recess in a built or natural setting as well as the children’s experiences in the Baltimore schoolyard. Therefore, the gap in the literature was fundamental. How did children experience (know, act, and feel) a naturalized schoolyard during class time during the school day? Especially germane here was that this dissertation study took place in a public, formal, traditional school. This was an area not yet covered.
CHAPTER III

METHODOLOGY

"I believe that people are more than the sums of their traits, that places are more than a physical inventory, and that the complex interactions between those people and those places are most profitably described through constructing stories" (Childress, 2000a, p. 182).

The research question guiding this inquiry was: how do elementary students feel, act, and know in a green schoolyard during the school day? This chapter describes the methodology that was used to conduct the study. It is divided into the following subsections: (a) portraiture; (b) research design; (c) participants; (d) data sources; (e) data collection procedures; (f) data analysis procedures; (g) limitations; (h) significance of the study; and (g) summary.

Portraiture

With regard to the central theme of place in my study of children’s experiences, a method that honors context was appropriate, because as Gruenewald (2003b) claimed, "[p]henomenologically, places are the ground of direct human experience" (p. 623). Portraiture, a narrative qualitative approach to research, stemmed from a strong foundation of phenomenology and hermeneutic tradition, and recognized the setting or context as crucial to the researcher’s design and procedure. This strong acknowledgment of context made portraiture a logical preference of narrative inquiry to understand children’s relationships to the schoolyard; due to the acknowledgment of the researcher’s voice, portraiture was a fitting methodology for
me as a teacher and researcher in the setting. The final portrait was of a place, the habitat at Carson Elementary constructed through a collage of fourth, fifth, and sixth grade children’s interactions and ways of knowing it.

Portraiture is a form of narrative inquiry rooted in the orientation of phenomenology and ethnography’s immersion in a setting. The intention of portraiture in this dissertation was to record and illuminate stories in the form of a portrait framed by the setting and anchored in an anticipatory framework. Like a work of art constructed of canvas and acrylic paint, the final piece reflected experiences of the readers in a holistic aesthetic narrative. The method involved active and attentive listening for a story; the story was created inclusive of the researcher’s voice in a variety of levels of involvement. Themes were identified and then woven into a whole piece (Lawrence-Lightfoot, 2005; Lawrence-Lightfoot & Davis, 1997). The five essential features of portraiture are: (a) context; (b) voice; (c) relationship; (d) emergent themes; and (e) aesthetic whole. The next sections will briefly describe each feature and its relationship to phenomenology; then each element will be revisited in the explanation of the research design.

Context

Portraiture’s roots in phenomenology and the tradition of hermeneutics created a method appropriate for studies of place. J. Cresswell (2007) described phenomenological study as a method which “describes the meaning for several individuals of their lived experiences of a concept or a phenomenon” (p. 58).
Lawrence-Lightfoot and Davis (1997) described portraiture as a “method of qualitative research that blurs the boundaries of aesthetics and empiricism in an effort to capture the complexity, dynamics, and subtlety of human experience and organizational life” (p. xv). As place is more complex than simply location, context is more than physical setting. There are three aspects of the portrait’s context: (a) historical; (b) personal; and (c) internal. Context primed the canvas, it was the foundation of the investigation and influences the final narrative. Historical context established the institutional culture and history, origins and values and “places the portrayal in a setting that transcends the limits of the aesthetic space” (p. 74); personal context established the explicit “background, agenda, and presence” (p. 61) in the study drawing on the portraitist’s life experiences, and internal context established the physical and temporal details where the portrait was composed (Lawrence-Lightfoot & Davis, 1997). Each facet was shaped as data was gathered. Context was a constant source of attention for the researcher throughout the data collection and assembly of the final portrait and was separated as its own chapter (Chapter 4) to clarify the habitat as a setting of Carson Elementary, how the habitat was created from its inception, and the internal context of a teacher and researcher in the school.

Voice

The researcher was vigilant to the context and to her voice. “Voice is the research instrument, echoing the self (or “soul” as Oscar Wilde would put it) or the
portraitist” (Lawrence-Lightfoot & Davis, 1997, p. 85). The researcher used voice to identify her location in the story being told; the position of the researcher’s voice ranges from the periphery as an observer to a literal voice in a conversational exchange. The portraitist shared where she was in a scene and what she observed, her bias, and the subject’s response to her presence. Voice in the final portrait resonated the researcher’s epistemology, ideology and methodology; voice represented the researcher’s stance as a witness, as interpretation, as preoccupation, as autobiography, as discerning other voices, and as voice in dialogue.

Relationship

Lawrence-Lightfoot and Davis (1997) argued that rich, deep connections between participant and observer honored the individuals and the research. In order to build rapport and trust, relationships with participants were the center of the approach. The rapport and trust was built through: (a) the search for goodness; (b) through empathetic regard; and (c) by developing clear boundaries (Lawrence-Lightfoot & Davis, 1997, p. 141). Goodness developed by allowing portraits to exude what was working in a setting as opposed to searching for what was wrong. In her explanation of this fundamental concept of portraiture, Lawrence-Lightfoot explained goodness emanating from her concern for “the general tendency of social scientists to focus their investigations on pathology and disease rather than on health and resilience” (Lawrence-Lightfoot & Davis, 1997, p. 8). The search for goodness fosters empathetic regard in the portraitist for her actors by taking the threat of blame from
those telling the story and allowing the researcher to sense the experience from the actor’s view. Freeman and Mathison (2009) also discussed the concept of goodness: “a belief in the intelligence, worth, and capability of each student is a must when working with children” (p. 84). In addition to the allowance for goodness, empathetic relationships created trust and insight. Davis explained, “Empathy is seen as the channel of emotional resonance, the vehicle for gaining a deep understanding” (Lawrence-Lightfoot & Davis, 1997, p. 147). The intimacy (Lawrence-Lightfoot & Davis, 1997) of these relationships demand boundaries between actor and portraitist to satisfy the ethical responsibility and responsibility to the validity of the study.

As in phenomenological inquiry, portraiture seeks to find the essence of the experience or event; portraiture, however, allows the actors in the story to become co-creators of the narrative by building relationships with participants. Recognizing the challenge of building boundaries in relationships with participants, Lawrence-Lightfoot and Davis (1997) suggested a written or oral agreement between the researcher and the participant identifying each role and responsibility to the study as a way to establish and maintain personal boundaries for both individuals. The intimacy of the relationships also called for reciprocity, an exchange for the time and energy of the participants who offered their stories. Reciprocity can be attained by the researcher giving something back to the participants both tangible, i.e. a service, experience, or document or intangible, such as the valuable time to reflect on lived
experiences (Lawrence-Lightfoot & Davis, 1997). Freeman and Mathison (2009) discussed reciprocity specifically with child participants; tangible compensation for children’s time depends on their age and could include gift cards, books, or pizza parties while the intangibles include the power to make choices throughout the study and the time spent with researchers (p. 83). Lawrence-Lightfoot and Davis (1997) explicitly guided researchers in the steps to building relationships: “thoroughly prepare for site visits, interact with the actors on the scene with dignity and care, and guard the relationships that are established throughout the writing of the final portraits” (p. 173).

*Emergent Themes*

Not uncommon to qualitative research (Creswell, 2007), the final portrait of the green schoolyard was developed in an iterative and generative process (Lawrence-Lightfoot & Davis, 1997, p. 185). The portraitist developed anticipatory themes from a theoretical framework that helped guide the eye of the researcher when entering the site. This guide was flexible, leaving the researcher open to the stories that presented themselves in the setting. Building on the practice of ethnography, portraitists allow themes to emerge by listening for:

1. Repetition in words or artifacts;
2. Repetition of metaphors or symbols;
3. Themes in rituals or the organization;
4. Patterns from a variety of data sources; and
5. Patterns after several iterations of coding while paying mindful attention to dissonance from the themes (Lawrence-Lightfoot & Davis, 1997, p. 193).

The themes were distilled from data sources such as interviews, participant observations, documents such as drawings and writing, and field notes with a constant thread of reflection, questioning, and planning in what was called the “Impressionistic Record” (Lawrence-Lightfoot & Davis, 1997, p. 188). This persistent daily record allowed the researcher to go beyond coding and to link themes inductively in a rigorous and consistent way (Miles & Huberman, 1994).

Aesthetic Whole

The blend of empirical research and narrative art became whole in the final assembly of the green schoolyard portrait. Lawrence-Lightfoot and Davis (Lawrence-Lightfoot & Davis, 1997) described four distinct processes that were used to achieve this finale:

1. Conception is the development of the bigger story;
2. Structure refers to the process of sequencing and layering the themes that build the story;
3. Form reflects the stories that connect the reader to the structure, and
4. Coherence is the final assembly of structure and form into conception with “the articulation of clear and consistent voice and perspective” (pp. 252-256).
The aesthetic whole was the narrative that draws the reader to the experience; the experience of the reader is resonance described as a “yes, of course” response (Lawrence-Lightfoot & Davis, 1997, p. 247). Lawrence-Lightfoot and Davis (1997) set out a specific operation to build a skeleton where the themes were supported by relevant dimensions of the data, then supported by evidence as well as stated dissonance (p. 263). Each step of the process in building the final narrative portrait was reflective and substantially addressed the trustworthiness of this approach, discussed later at length, specific to the data collected and analysis conducted in the research design.

In review, this methodology has been applied in educational settings (Lawrence-Lightfoot, 1983) because of the “probing, layered, and interpretive” (Lawrence-Lightfoot, 2005, p. 5) nature reflective of constructivism, and was appropriate for this study because the concept of place was woven throughout the design as well as final story. While Gruenewald (2003b) asked us to learn from places by asking what happened here and what it could teach us, Lawrence Lightfoot (1997) asked us to “begin by asking What is happening here, what is working, and why?” (p. 142). Both investigators called for a deep probing into places and human relationships with them.
Research Design

Carson Elementary School was a traditional, public school with grades ranging from preschool to sixth grade. The school had a schoolyard habitat that included a butterfly garden and pond and was used as an outdoor classroom shared by all of the students in the school. Middle childhood was identified and theorized to be a critical time in a child's life for relating to the natural world (Cobb, 1959; Sobel, 1990). Cobb (1959) identified the age range of five years to twelve years as a time with children relate to the natural world in an intuitive "highly evocative way" (p. 538). Kellert (2002) referred to this age as a time when development is enhanced by

Table 1
Carson Elementary Student Demographics by Ethnicity (male/female/total)

<table>
<thead>
<tr>
<th>Grade 4</th>
<th>White, not Hispanic</th>
<th>Hispanic</th>
<th>Black, not Hispanic</th>
<th>Asian or Pacific Islander</th>
<th>American Indian or Alaskan Native</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31/35/66</td>
<td>3/4/7</td>
<td>0/2/2</td>
<td>1/2/3</td>
<td>0</td>
<td>78</td>
</tr>
<tr>
<td>Grade 5</td>
<td>26/20/46</td>
<td>2/1/3</td>
<td>2/1/3</td>
<td>0</td>
<td>0</td>
<td>52</td>
</tr>
<tr>
<td>Grade 6</td>
<td>233/30/63</td>
<td>4/5/9</td>
<td>3/0/3</td>
<td>1/1/2</td>
<td>0</td>
<td>77</td>
</tr>
<tr>
<td>Total by ethnicity</td>
<td>175</td>
<td>19</td>
<td>8</td>
<td>5</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Total female</td>
<td>85</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>101</td>
</tr>
<tr>
<td>Total male</td>
<td>90</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>106</td>
</tr>
</tbody>
</table>
various modes of connection to the natural world. James, Jenks and Prout (1998) asserted that more studies of this period in childhood are necessary. Based on the work of these scholars, the children selected for the study were in fourth, fifth, or sixth grade at Carson Elementary School and were nine years to thirteen years old. Using the setting as the frame, the researcher employed the stories of students that emerged from their experiences in the naturalized area. The researcher analyzed the students’ stories using portraiture, a narrative method of inquiry with strong foundations in the interpretive hermeneutic tradition of phenomenology. The rest of this chapter will establish the research and lay out the study design, including how participants were selected, and the researcher’s dual role in the study as both the portraittist and as a teacher in the school. Data sources and data collection procedures are explained, and trustworthiness, risk, and implications are discussed.

Participants

A brief summation of the student population of Carson Elementary 1 was taken from the community where the neighborhood school is placed. Carsonville is a historic rural agricultural town recently sprawling with suburban development. The median age of this family oriented suburb is thirty six years and the most recent report of median household income was seventy thousand dollars according to the town’s Chamber of Commerce (2007). Carson Elementary was unique to the town’s

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1 In order to protect the identity of the student participants, the names of the school, town, and students were changed.
total demographic because it drew on the lowest economic area of town; the areas feeding into the elementary school are the oldest neighborhoods and those with predominantly apartment housing. The student demographics of Carson Elementary (Table 1) were predominantly white; the socio-economics of the area were more diverse than the ethnic/racial composure of the school.

The participant selection was based on Carson Elementary School’s habitat use as presented by the stories of fourth through sixth grade students in that particular setting at that particular school. Miles and Huberman (1994) explain sampling as “taking a smaller chunk of a larger universe” (p. 31). All of the students at Carson use the habitat during the school day and shared the phenomenon of habitat experiences. The guiding research questions surrounded experiences of the children in the space. To create a deep narrative about the habitat, the selection of participants was designed to narrow down the participants as their stories began to emerge in the study (Miles & Huberman, 1994). This participant selection was borrowed from Hart (1979) and Childress (2000). In his ethnographic study, Hart (1979) included all of the children in the small town as his first sample, then purposively selected twenty children from eight families based on the location of their home, gender, and age as his sub-sample. Finally, Hart purposively selected two families from his sub-samples to include in the final report. Childress (2000) chose eleven teenagers from a public high school based first on those who were interested, then narrowed his sample...
Table 2

Participant Sample by Group, Time Commitment, and Selection Criteria

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of participants</th>
<th>Time Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students (total n=207)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Sample</td>
<td>n=106</td>
<td>Science specials class and homeroom class time in the habitat; 4th, 5th, 6th grade students with consent/assent</td>
</tr>
<tr>
<td>2. Sub-sample</td>
<td>n=56</td>
<td>And 30-45 minutes during lunch (Interview 1); And member check; gender, years at Carson, and emergent stories from participant observations</td>
</tr>
<tr>
<td>3. Key Actors</td>
<td>n=20</td>
<td>And another 30-45 minutes during lunch (Go-from sub-sample where stories emerged)</td>
</tr>
</tbody>
</table>

For a portraiture rooted in phenomenology, Onwuegbuzie and Leech (2005) and Creswell (2007) propose that six to ten participants allow for deep analysis. The ideal participants were accessible to the researcher, shared in experiencing the phenomenon, and were willing to illuminate the experience in the investigation (Creswell, 2007) and these participants emerged into groups throughout the data collection.
Figure 2. The process and data of selecting participants narrowing down the larger group of consenting/assenting actors to a sub-sample and finally to a smaller group of Key Actors.

The procedure used to select participants was progressive with a conceptual form like a funnel (Figure 2). Selection was a deliberate process to narrow a large sample population in one bounded setting into a manageable selection of student actors in a sub-sample group, and finally into a smaller group of Key Actors for deep analysis. For the student participants, there were three levels of participation each level narrowing the number of subjects: (a) sample, (b) sub-sample, and (c) Key Actors. Each sample group contributed to the data at varying levels of depth or richness (Table 2).
Sample

The student body of fourth to sixth grade students at Carson Elementary were from eight classrooms, each with approximately twenty-six students, equaling just over two-hundred children. The researcher’s advantage of being a teacher in the school included having rapport with all of the students and being familiar to families. Participation was formally requested by the researcher from all of the fourth, fifth, and sixth grade students; this group was called the Sample. Out of 207 total students, 106 students returned consent and assent to participate for a first sample size that was just over fifty percent of the total population.

Communication to recruit the Sample group happened two ways: (a) letters went home with students asking them to return consent and assent forms with parent and student signatures; (b) a reminder email was sent out. Permission from all families to participate was requested for two reasons: to open up opportunities to observe all students and avoid limiting who became the subjects of the portrait based on randomization (Miles & Huberman, 1994). The second reason was to allow for greater anonymity of the final subjects in the study; approaching a small group of students initially could lead to identification once the final portrait was shared with the community. By asking all families for permission to participate, deducing who the participants were became more difficult and the confidentiality of students was more likely.
Sub-sample

The sub-sample was purposively selected from the initial sample of participants. When the consent/assent forms were returned, the researcher scheduled the first interviews with groups of students from the same classes and grade levels. Within each grade level, students were selected for the first semi-structured interviews based on the following criteria:

1. Gender,
2. Length of time in the school (i.e., more than two years or less than two years),
3. Participant observations and emergent stories.

The criteria represented the basic school demographics meant to include all of the students’ perspectives who experience the place. "Portraitists must always be ready for moments of revelation, insight, and vulnerability that suddenly transform the discourse and lead to unanticipated rapport and intimacy" (Lawrence-Lightfoot & Davis, 1997, p. 139). Based on the advice of Lawrence-Lightfoot and Davis, the participant observations revealed actions or reactions of participants that the researcher was interested in finding out more about through the interview process. Using the purposive criteria and emergent stories, the researcher chose approximately three to ten students from seven of the eight classrooms, thus forming the sub-sample. Fifty-six members of the sub-sample participated in at least one semi-structured interview over the study period.
Figure 3. Multiple data sources informed the portrait of children’s experiences in the habitat.

Key Actors

Key Actors were purposively selected from the sub-sample to represent the variety of stories that emerged in the first three months of the data collection in participant observations and interviews. Several of the Key Actors represented a deviant voice (Lawrence-Lightfoot & Davis, 1997) and were chosen to provide a balance to the final portrait. Key Actors represented the students’ demographics as identified by the selection criteria. The smallest sub-set of participants was comprised of 4th grade (n=5), 5th grade (n=6), and 6th grade (n=9) students. Carson Elementary had three fourth and sixth grade classrooms and two fifth grade classrooms.
respectively. The mean age of the Key Actor group was 10.8 years. Of the 20 participants, eleven were male and nine were female. The ethnicity of the Key Actor group fairly represented the general population of Carson Elementary. Four of the children were non-white students equaling twenty percent of the Key Actor group; in Carson Elementary’s intermediate classrooms, fifteen percent of the children are non-white students\(^2\). Four of the Key Actors had been at Carson Elementary less than two years and sixteen Key Actors attended Carson for two or more years. The breakdown of the Key Actor group accurately represented the total student population for these selected criteria. The purpose of this smaller sample was to give the researcher a meaningful and manageable sample group for rich, deep stories (Greene & Hill, 2005). The data gathered from the Key Actors differed from the sub-sample in two ways: 1) the researcher focused observations on the Key Actors’ interactions in the habitat more than the other participants to follow up on stories from the data, and 2) Key Actors participated in go-along interviews (Carpiano, 2009; Cele, 2006; Trell & Van Hoven, 2010) in addition to the initial interviews. Twenty go-along interviews were conducted from the Key Actor group, but varied in length depending on the availability of the students. In the final composition of the portrait, the data collected from the participants in the sub-sample was as rich as the data collected through observations of the Key Actor group, aside from the go-along interviews. The

\(^{2}\) Specific race/ethnicity of each student is not specified in order to protect the identity of the participants.
aesthetic whole represented the Key Actors' experiences equally with the sub-sample participants' experiences (who were not filtered into the Key Actor group). There was no need for the distinction of these two groups in the end.

**Risk**

The inherent risk of the research design was also a benefit of the rapport that the researcher had with students previous to the study. The students may have desired a place in the study and may have had anxiety about the Key Actor participant selection. Hart (1979) recognized similar rapport issues when children that he did not pay attention to became jealous, and he reported that the jealous feelings created resentment of those children toward Hart. He attempted to remediate this issue by reviewing his field notes and adding up who he spent time with and the length of time spent together. This log of participant observation worked to keep his attention on the participants equally and in addition, worked to signal his bias toward one group of children. For this study, a similar log of student contact time and data from each participant was tracked carefully throughout the study. The risk of envy and coercion was addressed by including all students in the research activities whether they had consented to participate in any level of the study or not. Data was gathered during normal class time in the habitat and through drawings that the entire class did as an activity. The distinction of participants and non-participants in the study was based on the work that became data (i.e., drawings of participant students). Data was collected on consenting/assenting children. Children consented to participate were those
observed during Wonder Days in the habitat although all children in that classroom were out participating in the activity. These were days without specific formal learning objectives or lesson plans where the students went outside with the science teacher and freely explored the habitat. Interviews were done in private and scheduled privately between the researcher and the participants.

Data Sources

Data sources included the Impressionistic Record, participant observation, videos, interviews, walking narrative interviews, photographs, drawings and event maps, and artifacts from the habitat’s history (Figure 3). Through the process of data collection, the children had a partnership role in the research as co-creators of the portrait. Alternative and creative data sources aided in eliciting responses from children and gave them a non-verbal way to communicate with the researcher (Danaher & Briod, 2005; Scourfield, Dicks, Drakeford, & Davies, 2006). In the following section, the data sources will be described in detail, beginning with the largest data source: participant observations.

Participant observations

Participants in the sub-sample (which included the Key Actors) were observed in the habitat during science class and during classroom time outside. Participant observations happened two ways: 1) by accompanying the class from the classroom to the habitat and back inside again, or 2) by sitting in one place in the habitat (on the hill or on the rock steps) and observing multiple classes enter, use, and leave the
habitat. The first style of observations was scheduled each month, several weeks in advance with the science teacher, Mrs. Hudson, during weekly check-in meetings. Mrs. Hudson’s science specials schedule alternated every three weeks between primary (1st-3rd) and intermediate (4th-6th) grades. During each three week rotation, the data collection goal was to observe each intermediate classroom in the habitat one time. In sum, participants were observed during twenty-four science classes in the habitat, including the introduction in the science classroom. Participant observations were also spontaneous; they were conducted during class time with the students’ classroom teachers. Having a rapport with the fourth, fifth, and sixth grade teachers afforded quick emails or text messages by cell phone when a class was going into the habitat. On most occasions, students were observed during those periods. Two teachers had regularly scheduled habitat times; Mrs. Murray and her class went into the habitat every Wednesday morning at ten o’clock for nature journaling and Mrs. Foster’s class went outside every Monday at nine o’clock in the morning. Most of those periods in the habitat were observed. In sum, participants were observed during eighteen classroom periods in the habitat over seven months. Four of the observations were Mrs. Murray’s nature journaling times. As in the science specials classes, the introduction inside the classroom and the debrief after the time in the habitat was observed. The second style of observations, recording the activity in the habitat throughout the day, occurred on three separate dates throughout the study. The days were set up to compare the amount of classroom activity in the habitat in different
seasons and weather conditions including a snowy day in February, a cool spring day, and a warm day late in May.

Participant observations evolved throughout the course of the study. Initially, a list of participants in the greater sample was referenced during class time observations to insure the notes being recorded were from students with consent to participate in the study. As familiarity with participants in the sample increased, the sub-sample was selected and the use of video was incorporated. Beginning in January, the movements and behaviors of each child in the sub-sample were recorded using a base map of the habitat during observations. This data provided a cross-reference for what children reported to visit and do during interviews. As the Key Actor sample was selected, the observations focused on those children’s movements, actions, behaviors, and words. Children in the sub-sample, or even the larger sample, were also peripherally observed, especially in later data analysis of video. The evolution of participant observation guided the deeper explorations of the data collection as a whole, documented in the Impressionistic Record.

Participant observations became easier over the course of the study, yet a steady balance between teacher and researcher was diligently maintained. Data collected through participant observation expects the researcher to stand back, to have as little contact with the subjects as possible and not interfere in observable situations (Adler & Adler, 1994; Freeman & Mathison, 2009), yet portraiture allows the flexibility to engage with participants by including the researcher’s voice in the
narrative. As a researcher and a teacher at Carson Elementary, a dual role was maintained by working part-time as a teacher and freeing up part of the school day for research without any other responsibilities to the school. This proved to be an effective way to maintain both roles, although like Stanley (2010), the ease of being the researcher and not the teacher came simply with time. The role of researcher required a way to observe the interactions of the students without being distracted by classroom management situations that sometimes arose. This balance grew steadier over time through a paradox of simultaneously being there and not being there. The there/not there approach, as it came to be known in the Impressionistic Record, explained that as a researcher, observations were made from afar, yet as someone in the least-adult role, observations and discoveries were made through interactions with children. In October and November, the students who were accustomed to the researcher as the person of authority, would approach the researcher with questions about going inside to use the restroom and directions about the boundaries. As time went on, the students stopped asking the researcher and relied on the classroom teacher for the information. The most difficult adjustment of teacher to researcher was for teachers interacting with the researcher during participant observations. Colleagues first, they were accustomed to conversations with the researcher during the time in the habitat. With ample activity and distractions happening in such a large space, the use of video was employed to aid in capturing the experiences of the students.
Videos

Based on Stanley’s (2010) success with the use of videography in participant observations, video data was collected for two reasons: (a) during participant observations to capture interactions that the researcher may not have witnessed during the direct participant observation time, and (b) to involve students in the research as co-creators of the narrative. In Stanley’s research on children’s preference of play choices at recess in a wooded area or on a built playground, she set up the video camera to capture incidental and intentional footage (p. 64). Intentional footage was captured when Stanley (2010) set up the camera with a set frame and recorded the events purposively; incidental footage was captured from a video camera attached to her belt. Borrowing on this technique, intentional and incidental video footage was captured in each participant observation. After a few failed attempts to gain data with any value using a camera attached to a belt, incidental video footage was taken by carrying the digital video camera through the habitat or by giving the video camera to a participant to record his or her activities. When a participant was engaged in an activity with other study participants (especially the case in one class where most of the students had consent to participate) the researcher would give the students a video camera with instructions on its use. Because the action of the students was spontaneous, so was the video recording done by the students. Some children narrated the video, while other children interviewed other students, with the students’
permission. This technique was employed with boys traveling into the wooded area around the habitat where it was difficult for the researcher to stay with them.

Stanley used student created footage training five key informants on use of the video cameras, then each informant was asked to capture one twenty minute period on the playground at recess (Stanley, 2010, p. 65). Borrowing from this technique, six sixth grade Key Actors were trained on the video cameras for a work day in the habitat where all sixth grade classes were working in the space as well as planting trees with the rest of the school. The six students were asked to record the activities in the habitat using Stanley’s (2010) protocol that included asking permission before anyone was recorded, keeping the video camera in an unobtrusive place, capturing the “natural activity” as opposed to children performing for the camera, and respecting anyone’s right to not be recorded (p. 65). Three of the six participants used the video cameras during that particular work day.

Interviews

Two types of interviews occurred: semi-structured interviews with participants in the sub-sample group and go-along interviews of Key Actors. All interviews were conducted in the habitat, except in several instances where the weather was too severe. In the circumstance of weather, the library that overlooked the habitat through large windows or the science classroom were used, depending on the librarian’s class schedule. Interviews took place during the students’ lunch period; all interviews were recorded and transcribed. Interviews were scheduled with students as soon as the
participants were selected for the sub-sample with the goal of one interview per participant. One semi-structured interview was held with forty-six of the sub-sample participants based on an interview schedule with a set of ten questions (Appendix A). Stanley (2010) and Greene and Hill (2005) gave participants a choice to be interviewed alone or with a friend; borrowing from that protocol, the interviews were done alone or with groups of two to five participants. The option to be interviewed alone was up to the participant. The groupings of children were selected by the researcher and approved by the participants before the interview.

Go-Along Interviews

A second interview was conducted as a “go-along” interview. The creative method was described by Carpiano (2009) as “interviewing a participant while receiving a tour of their neighborhood or other local contexts. In this regard, the researcher was “walked through” people’s lived experiences of the neighborhood” (p. 264). Kusenbach (2003) argued that this type of interview allowed the researcher into complex and subtle meanings of a place in a participant’s everyday experience, and Trell and Van Hoven (2010) argued that creative interviewing strategies allowed for small nuances of a place and enabled the child participant to have a more active role in the research. Cele (2006) found that a walk with children in a familiar place allowed her to experience the place and the small details with the children. Based on these claims, walking narratives were done only with the Key Actors in the study and were held with only one student at a time. Participants were given a Flip video
camera and asked to hold it as they walked through the habitat giving the researcher a tour of their usual activity in the space. The Flip video camera had a viewing window that framed what was being filmed without having to look through a lens and was an appropriate tool for this type of data because the child could move through the space, viewing the space normally, and still hold the camera. The participants were asked to hold the camera in the direction they were facing and up away from the ground.

Walking narratives were fifteen to forty-five minutes in length depending on each participant; the researcher followed the participant holding the camera without direction on where to go, what to look at, or where to stop. The go-along interviews typically started with the question, “Where should we go first?” This freedom allowed for exploration of the habitat. The walking narratives were employed with the smallest group of participants in the study as the last phase of the data collection.

Photographs

During go-along interviews and some group interviews in the habitat, participants were asked to photograph three scenes in the habitat; the directions were to first photograph the participant’s favorite place and the next two photographs were taken of whatever caught the participant’s attention on that particular day. In some cases, the photographs were used in the interviews to elicit dialogue from the participants about the habitat and to give the students a stronger voice in the research where the subject must interpret the photo for the portraitist (Harper, 1994). Rudkin and Davis (2007) used photographs in a similar way with youth in an urban area.
based on Wang and Burris’s (1994) concept of “photovoice,” when the camera gave participants an opportunity to frame their unique perspectives in the place (as cited in Rudkin & Davis, 2007). Photographs were also taken during key moments of children’s interactions in the habitat. Sometimes in place of video, the researcher framed the photos; this use of photographs was especially useful for analysis during go-along interviews when the children holding the video were photographed by the researcher to provide a wider context in the habitat’s setting.

**Drawings and writing**

Three types of drawings and writing were collected as data: 1) independent observations in science notebooks, 2) memory maps, and 3) event maps. Every student at Carson Elementary kept a science notebook as a place for recording science investigations, research, and studies in the classroom and habitat. During Wonder Days, all students had the choice of recording observations by writing and drawing in their science notebook. The drawings were analyzed for patterns and used in some interviews in a similar way as the photos. Drawings were scanned electronically from participants after interviews when a child referred to his or her science notebook. The drawings in the notebook were not solicited. The second form of drawing data was a memory map of the habitat. In the science classroom, every student was asked to draw the habitat from memory including all of the features they could recall. Students were asked to place a star on the map indicating where something memorable happened, and a smiley face on their favorite place in the habitat. On the back of the
map, the students were asked to describe their memorable story, their favorite place, and three adjectives to describe the habitat. Maps were analyzed for patterns and the stories, favorite places, and adjectives were recorded and placed into a spreadsheet for coding analysis. The third form of drawing data was an event map. Based on nature writer Hannah Hinchman’s (1997) work, an event map is a series of sketches in a place of the events that occur in a set time (approximately ten minutes). Students were given a base map of the habitat that included major features as point-of-reference, then the students recorded drawings and words of what ‘events’ took place as they walk around or sit in one place. Memories of events were also included. All students in each fourth, fifth, and sixth grade classroom were asked to do this activity during science specials class, except in the cases of severe weather. In those three classes (Mrs. Murray’s fourth grade, Mrs. Cruz’s fourth grade, and Mrs. Foster’s sixth grade), the classroom teacher agreed to do the event maps during class time. In all cases, the science teacher and the classroom teachers followed the same directions (Appendix C). No data was collected from Mrs. Cruz’s class due to a special event in the school that limited their time in science class. Participant observations were also conducted during Mrs. Foster’s and Mrs. Murray’s classes event mapping activity in the habitat; event mapping was not observed in science classes. The drawings in students’ science notebooks and the event maps were used for discussions in interviews, in some cases, and analyzed for emergent patterns in the data.
Artifacts

The faculty and parents at Carson Elementary amassed a collection of photographs and videos relevant to the habitat and its use over six years. These artifacts were consulted to validate or contest the themes that emerged from the data and to add hues of past student experiences to the final portrait. The video and photographs taken over the years featured students with a parent or guardian signed media release. When the video footage or photographs were reviewed, the past students' names and images were changed for confidentiality. All of the data described above was collected from October, 2010 to May, 2011 (Table 3).

Data Collection Procedures

Trustworthiness was gained from a variety of components in the research design that created resonance. Lawrence-Lightfoot and Davis (1997) explained resonance as “referential adequacy through the construction of a credible story with logical coherence careful not to impose a facile consistency or a simplistic logic that will misrepresent the complex reality we are documenting” (p. 246). The organization of the data and record keeping were also critical to achieving resonance. In the following section, the protocol and procedures are described that managed the massive amount of data collected in a way that maintained resonance of the portrait.

An Impressionistic Record was kept electronically. At the end of each data collection activity, reflections, questions, and observations were recorded. The integrity of the Impressionistic Record came from the daily entries and ruminations.
In addition, a field journal was maintained in a specialized notebook that, when used with a Livescribe pen (Livescribe, Inc.), created audio recordings in tandem with the writing on the page. This valuable tool allowed the researcher to write impressions.

Table 3. *Chronological Data Collection by Participant Group*

<table>
<thead>
<tr>
<th>Month</th>
<th>Data collection/Research activity</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>October, 10</td>
<td>Consent/Assent forms</td>
<td>Sample</td>
</tr>
<tr>
<td><strong>Ongoing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November, 2010 –</td>
<td>Participant observations in habitat with and without video</td>
<td>Sample</td>
</tr>
<tr>
<td>May, 2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interviews</td>
<td>Sub-sample</td>
</tr>
<tr>
<td></td>
<td>Drawings in science notebooks</td>
<td>Sample</td>
</tr>
<tr>
<td></td>
<td>Archival data</td>
<td></td>
</tr>
<tr>
<td>November, 2010</td>
<td>Drawing: Memory map</td>
<td>Sample</td>
</tr>
<tr>
<td>January, 2011</td>
<td>Go-along interviews</td>
<td>Key Actors</td>
</tr>
<tr>
<td></td>
<td>Drawing: Event map</td>
<td>Sub-sample</td>
</tr>
<tr>
<td>February, 2011</td>
<td>Go-along interviews</td>
<td>Key Actors</td>
</tr>
<tr>
<td>March, 2011</td>
<td>Go-along interviews</td>
<td>Key Actors</td>
</tr>
<tr>
<td>April, 2011</td>
<td>Drawing: Event map</td>
<td>Key Actors</td>
</tr>
<tr>
<td></td>
<td>Go-along interviews</td>
<td>Key Actors</td>
</tr>
<tr>
<td>May, 2011</td>
<td>Go-along interviews</td>
<td>Key Actors</td>
</tr>
<tr>
<td></td>
<td>Member check</td>
<td>Sub-sample</td>
</tr>
<tr>
<td>August, 2011</td>
<td>Photo display in school hallway</td>
<td></td>
</tr>
</tbody>
</table>

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during each observation and record notes and voices during interviews, impromptu interactions between students with permission to be recorded, and the researcher’s daily reflections. The data was stored on a personal laptop computer where the information could be read electronically, sorted, and coded. The field notes were reviewed and incorporated into the Impressionistic Record at the end of each day throughout the study.

Participant observations occurred during regular classroom time and in science specials when teachers other than the researcher took students into the habitat. Teachers would notify the researcher when they planned to go out and the researcher would observe, or in two classrooms, the teacher had regularly scheduled times in the habitat and invited the researcher to observe then every week. In fourth grade, a teacher took her students out every Wednesday morning for nature journaling time and in sixth grade, a teacher took her students into the habitat for observation time where some used a notebook and some did not. These types of participant observations were conducted twenty-four times over the study period. In science specials, every participating grade level had intermittent “Wonder Days.” Participant observations were conducted during these forty-five minute periods eighteen times in the study period. Daily records of observations were maintained in the field notebook and “include[d] explicit reference to participants, interactions, routines, rituals, temporal elements, interpretations and social organization” (Denzin, 1989 as cited in Adler & Adler, 1994, p. 380). The researcher kept the Livescribe pen and specialized
notebook on hand in order to capture conversations and impromptu dialogue with and
between participants. The researcher also employed digital video recording of
observations in the habitat. These recordings were transcribed and coded.

Drawings in science notebooks, memory maps, and event maps completed
during class time or in science specials were collected for analysis. The teachers were
given a script on how to draw an event map, then either the science specials teacher
or the classroom teacher led the event mapping process with each class. All but one
class participated in the event maps. Drawings in the student’s science notebooks
were photographed and stored digitally. The photographs, drawings, and maps
became part of the Impressionistic Record and in some cases, guided the interviews
with individual students.

Interviews took place during the students’ lunch period. Each participant in
the sub-sample was interviewed once over the six-month period and each Key Actor
participated in a go-along interview during the study period. Students were given an
invitation to interview with a group of participants from the same class. Every
member of the group was familiar with one another and all participants agreed to the
group before the interview took place. When the weather allowed, the interviews
were conducted in the habitat and the participants were asked to take three
photographs. In some instances, when time allowed, the participants did a short
narrated video about their favorite places. This video was in addition to the go-along
interviews. Fifteen of the thirty students participated in a walking narrative. All of the
interviews and interview video were transcribed and coded. In addition, a contact summary sheet (Miles & Huberman, 1994) was used after each interview and became part of the Impressionistic Record. These summary forms captured the major themes of the interview.

After the interviews and walking narratives were completed, two weeks of participant observations were conducted with each class. Part of this design was due to the change from winter to spring, specifically to observe students’ experiences in a different season. The other reason for another block of participant observation was so the researcher could hone in on the Key Actors for an entire class period and compare the behaviors, activities, and actions to the interviews and walking narratives. Participant observations were done in whole class activities while video and photographic data were recorded.

Twice during the study, the researcher met with an expert on Carson, a teacher in his thirty-second year in the school district and twelfth year at Carson. A case analysis form was used with each meeting (Miles & Huberman, 1994) as a way of guiding the meeting to summarize the case, ask for feedback, and record advised next steps. This form was also used during phone calls with the researcher’s dissertation committee chair and committee members. These records of colleague and expert meetings became part of the Impressionistic Record. Another source of feedback was a doctoral writing group that met once per month from January through May. The design and intent of this group of doctoral students and candidates was to provide
feedback on written drafts of the dissertation and act as a sounding board for challenges met in field research. A case analysis meeting form was implemented when the researcher had a need for the group’s feedback. In all three expert groups, student confidentiality was honored by the use of participant pseudonyms.

Reciprocity

There is a spirit of reciprocity in qualitative research. Childress (2000) reflected on the difficult decision of what to give back to the students who gave so much time to his study and lamented that every qualitative researcher tries to find a way to give back the intangible gifts of participant’s time and energy. Depending on the age of the participants movie tickets, iTunes gift cards, or pizza parties are all appropriate ways of thanking participants (Freeman & Mathison, 2009). In this case, it was necessary to thank the participants as well as the entire school for permitting the research project, for allowing the researcher to relieve her duties as the science specials teacher in order to conduct the research, and a community wide openness and flexibility for the study. The findings revealed that there was little known about the history of the habitat in the current student body of Carson. As a way reciprocating the generosity of spirit shown by the school, a time line using framed photographs was given to the school for display in the main hallway. Lastly, a picture of the habitat for each student was included in a thank you card from the researcher at the end of the study.
Data Analysis

Data analysis and interpretation began on the first day that data was collected to illuminate the experiences of the students. “Researchers’ day-to-day process of listening for emergent themes functions as sort of on-site hypothesis finding and testing” (Lawrence-Lightfoot & Davis, 1997, p. 217). The daily work was writing in the field notebook, transcribing, reflecting in the Impressionistic Record, and preparing for the next day, as an iterative process working towards a coherent final image that had resonance with its readers. Data analysis was complex; Lawrence-Lightfoot and Davis (1997) described construction of a portrait like weaving a tapestry, which happens through a tedious, systematic search for patterns. To build the overarching story, the structure and form of the conjoined narrative, and the clear and consistent voice, a protocol of qualitative analytic processes had to occur. Identification of themes (conception) was conducted using five steps. This section will describe the ongoing steps of data analysis according to Lawrence-Lightfoot and Davis (1997) in portraiture.

The first three steps of analysis related specifically to the transcribed interview data, Impressionistic Record, photographs, and video transcriptions where the researcher: (a) listened for repetitive refrains; (b) listened for resonant metaphors; and (c) listened for cultural rituals by employing pattern coding, coding for repetitive refrains and memoing (Miles & Huberman, 1994). Lawrence-Lightfoot and Davis also recommended “voice-centered analysis” (Gilligan, Brown, & Rogers, 1989 as
cited on p. 191), a protocol instructing the researcher to read each interview transcript four times, each time with a different literal voice in order to call attention to subtleties that may go unheard in one reading. This specific analytical strategy was done twice for the go-along interview transcriptions.

Metaphors and rituals were identified through the pattern coding and through the iterative process of reading and re-reading stories in a constant comparison (Lawrence-Lightfoot & Davis, 1997). Once the themes began to form, the portraitist could identify what Lawrence-Lightfoot and Davis referred to as “resonant metaphors...not only expressive of the central themes and values of human experience, they are also generative. They embody values and perspectives and they give them shape and meaning” (Lawrence-Lightfoot & Davis, 1997, p. 198). Miles and Huberman (1994) explained metaphors as a useful tool to help researchers and actors make sense of experiences; metaphors are pattern-making devices that allow us to take a theme and map it onto a concrete concept (p. 252). Miles and Huberman (1994) advised to look for implicit meanings, to wait until there was a substantial body of data on which to draw from, to move from the obvious to the undercurrents of the data, to interact with participants and colleagues and play with metaphors that embrace the themes, and to know when the metaphor is no longer useful when making metaphors (p. 252). Resonant metaphors aided the researcher in constructing the aesthetic whole and became identifiable half-way through the study, after which,
the metaphors (i.e., The Lost Boys) were confirmed as appropriate ways to define the children’s experiences.

The fourth step of the analysis involved seeking convergence from the variety of data sources through the process called triangulation (Lawrence-Lightfoot & Davis, 1997, p. 204). In this step, the field notebook, Impressionistic Record, drawings, event maps, and photographs were compared and tested for the themes that emerged from the interview and participant observation data. The visual media became a way to both add to and test out the themes. Lawrence-Lightfoot and Davis (1997) cautioned that in triangulation, sometimes the themes do not emerge and there are discordant data. This dissonance felt unsettling, but was very valuable to the study. Stanley (2010) found the discordant data to be the most enlightening as a teacher forming a portrait of her home school because it challenged her assumptions and gave her another perspective to view the stories from. The “deviant voice” (Lawrence-Lightfoot and Davis, 1997) made the portrait more well-rounded and added texture to the final narrative.

The fifth and final step of analysis was convergence through the theme construction (Lawrence-Lightfoot & Davis, 1997, p. 193). The themes were kept simple to leave room for small details that may otherwise have been ruled out (Lawrence-Lightfoot & Davis, 1997). Establishing tentative themes of children’s experiences early on in the data collection helped find the small intricacies as data continued to be collected and helped the researcher to hone in on pertinent stories and
comments by the students. This helped build the metaphors. To complement resonant metaphors, Lawrence –Lightfoot and Davis (1997) also recognized the constant comparative method of Glaser and Straus (as cited in Lawrence-Lightfoot and Davis, p. 189) as a way to focus the patterns that emerged; this art of investigating the data for themes and patterns happened through daily written reflections in the Impressionistic Record. Once five themes were firmly established after a final review and coding process at the end of the study, relevant dimensions that supported each theme were outlined including a dimension of dissonance, or deviant voice. The relevant dimensions were filled in by stories and experiences in the data that provided evidence for the theme. Next, for each theme, a series of “If...Then...” statements were created and tested by the data in the respective dimensions of the narrative (Miles and Huberman, 1994). After multiple tests of the “If...Then...” statements, the qualifying stories filled in the dimensions of the themes and the themes became the coherent final narrative called the aesthetic whole. For example, a statement that was tested in this way was if classes spent more time in the habitat, then the students’ attention was directed to smaller details of the habitat. Using that statement, the evidence was gathered to test if the statement was true or false. In this example, the statement was supported by the evidence and became a resonant aspect of the theme titled Critical Thinking and Curiosity. In portraiture, the data analysis is called illumination, where many parts assemble a portrait that “resounds with authenticity” (Lawrence-Lightfoot & Davis, 1997, p. 247).
Trustworthiness and Dependability

The qualitative rationale for determining the strength of an investigation is composed of trustworthiness and dependability. Lawrence-Lightfoot and Davis referred to trustworthiness as (1997) resonance: “the standard of authenticity”, the ‘click of recognition’ that one feels in reading the narrative - a ‘yes, of course’ response instead of a ‘yes, but’ response. (p. 247). Trustworthiness refers to the “truth value” of the research (Eisenhart & Howe, 1992) determined by triangulation, member checks, colleague exchange, research stance, prolonged engagement in the field, and thick description (Creswell, 2007). Dependability was the consistency of the study and was determined by triangulation, peer examination, and an audit trail of data collection and analysis (Creswell, 2007).

The trustworthiness of this study was built into elements of the research design and implemented through the integrity of the data collection. Below are the specific pieces that strengthened the study coupled with each element of trustworthiness:

Triangulation—the data sources were intentionally chosen to complement one another and offer insight from a variety of the child’s perspectives (Miles & Huberman, 1994).

Rich, thick description—the narrative nature of portraiture created rich, deep, context oriented and strong text (VanManen, 1990) and description with a “sensual-aesthetic dimension” (Danaher & Briod, 2005).
Researcher bias clarification—portraiture intuitively allowed for the clarification of the bias of the researcher in a dual role, which created a deeper understanding of the setting, and the ability to include researcher voice as part of the narrative.

Statement of discrepant information—it is tempting to turn away data discordant from the emerging themes (Miles & Huberman, 1994), but portraiture embraced the “deviant voice” (Lawrence-Lightfoot & Davis, 1997) to highlight the themes, not negate them.

Member check—study participants reviewed the transcripts from their interviews; and a colleague at Carson Elementary assisted the researcher by reading transcripts, the Impressionistic Record, and the final narrative to check for resonance.

Prolonged fieldwork—the data collection was conducted from October, 2010 through May, 2011 creating prolonged exposure as portraitist in the setting (Creswell, 2007).

Another factor of trustworthiness and dependability was the quality of the relationships between the researcher and the actors in the story. The rapport and trust in relationships was built through: (a) the search for goodness as opposed to pathology; (b) through empathetic regard for the students; and (c) by developing clear boundaries as researcher and teacher (Lawrence-Lightfoot & Davis, 1997, p. 141).
Limitations

There are inherent risks that limit the final story when a researcher functions in a dual role. The research was benefited and limited by the previous relationship that the participants had with the researcher as a teacher. This prior relationship influenced how the student participants related to the researcher because of the primary way the students knew the adult in the role of authority. Freeman and Mathison (2009) discussed the ideal role of the researcher in children’s constructivist research as a friend, or in the “least-adult role, that is, a role that aligns the researcher more (in language and behavior) with children than with adults” (Mendell, 1991 as cited on p. 60). Even though the researcher gave up her classroom position in the school, this role was not fully realized because the teacher maintained a position in the school and therefore, her role as authority. The role as teacher-as-researcher was not the ideal role, but served the study and students better than remaining in a classroom position. The researcher then minimized the power differences between adult and child in a school setting (Freeman & Mathison, 2009; Greene & Hill, 2005) by lessening the power difference between adult and child. This was done by being present in the habitat to interact with children, but not in a leadership role of authority; the concept was a there/not there type of approach to participant observations. Lessening the power difference was also achieved by giving children the choice to participate in the study, providing the student participants with choices and responsibilities within the research design, and collaborating with students on the
final outcome of the study through member checks. The research design of the study
purposely included student-directed activities including the photographs, videos, and
drawings providing many ways and opportunities for children to share their
experiences based on their diverse personalities, interests, and styles of
communicating (Freeman & Mathison, 2009, p. 64).

The interviews assisted the researcher in a deeper understanding of the
children’s experiences that were observed in the habitat, but the additional data
sources that were not dependent on student’s direct response to the portraitist aided in
eliminating the researcher’s bias as a teacher and supported the students in a
relationship with the researcher that could not be in the least-adult role. The
researcher must be reflexive throughout the data collection and analysis so that she is
aware of the bias she brings to the study (Freeman & Mathison, 2009). Danaher and
Briod (2005) recognized that a researcher must state her bias outright, a key
component of the bias clarification to build trustworthiness of the study. Reflexivity is
innate to portraiture through voice and the explicit personal context; the portraitist
was assumed to be in every story that was told and had the ability to identify herself
on the periphery of the story through a continuum of being directly in the dialogue. In
addition, the portraitist was given an opportunity to set her relevant biography in the
personal context of the portrait. These aspects of portraiture did not insure that the
bias of the researcher did not influence the results, but explicitly stated the bias
instead of bracketing the researcher completely out of the results.
Finally, an issue in the discussion of recognized limits of researching children’s experiences was the problem of being an adult wanting in to a child’s world. Freeman and Mathison (2009) are cited here at length to clearly set out the limits of this dimension:

“Participant observation studies have the advantage of working within children’s everyday spaces. They have the disadvantage of being imbued with their own notions of power and authority, inclusion and exclusion, and child and adult roles and responsibilities… Wanting to understand and emphasize how children negotiate and interpret experience requires an approach that assumes the researcher’s ability to experience those cultural interactions as a child would; adult perspectives are suspended in an effort to experience the child’s world as a child” (p. 55).

Freeman and Mathison (2009) go on to state that access to the world of a child calls for observation and time. A researcher faces the challenge of being removed from childhood but can work to re-enter this world through rapport with the students and long-term research design.

**Significance of the Study**

The United States has a fresh momentum to reconnect children to nature, exemplified by the political involvement of the First Lady Michelle Obama’s Let’s Move campaign and the recent passage of the Colorado Kids Outdoors legislation. In this movement, green schoolyards are becoming more common as part of the mission
to reconnect kids to nature (Blair, 2009; Hutchinson, 2004; Louv, 2005). Although the literature supporting the benefits of nature is growing, there are few phenomenological studies of children's experiences in natural settings and specifically natural settings in schools. This study provided a micro scale perspective from one schoolyard and the experiences of the fourth, fifth, and sixth grade children within it; this was an opportunity to drill down from the rhetoric and see, through the experiences of these children, how their experiences painted the daily perceptions in a natural setting. Understanding children's experiences in natural schoolyards contributes to a scholarly understanding of child development in nature (P. Kahn, 1999), how children construct meaning of places and how place meaning develops (Heft, 2001), and develops influence of policy and programs for children's wellness in the natural world that is the focus of the current political attention (Freeman & Mathison, 2009).

In an educational era that seeks to find what is wrong with education, the study of children's experiences in green schoolyards allowed a pivot from the pathology of schooling, or what schooling is doing wrong, to the goodness that exists in public schools (Lawrence-Lightfoot & Davis, 1997). Schools have the opportunity to break down barriers to children's time in the natural world by offering interactions with nature during the school day. In this study, a well-established green schoolyard became the subject of children's experiences so that schools, scholars, and educators can gain insight into what children do, feel, and think about while they are immersed
in the natural world during. This understanding has the opportunity to inform other
green schoolyard projects in their design and incorporation as part of the school day.

Summary

Based on the concept that children need nature and the theoretical framework
from ecological psychology, portraiture was a well-suited methodology to understand
students’ experiences in a green schoolyard. This study was based on the anticipatory
framework that schools can provide necessary interactions in nature for children.
Participants from Carson Elementary School’s fourth, fifth, and sixth grade
classrooms were invited to participate in observations, a sub-sample of students was
invited to interviews and to contribute drawings and event maps, and a smaller
selection of Key Actors were invited to go-along interviews, in addition to initial
interviews and observations. Artifacts of the school’s history informed the historical
context of the portrait and created a way for the researcher to check emergent themes.
Analysis occurred through the rigorous search for themes and constant comparisons
between stories with a special attention to discordant data. The final portrait, or
aesthetic whole, was a reflection of the life-world of children in Carson Elementary’s
schoolyard habitat. The next chapter will prime the canvas for the portrait by
describing the physical, cultural, and historical context of the study and the
autobiographical voice of the portraitist who was also a teacher in the school.
CHAPTER IV

CONTEXT

The portrait itself was built by the experiences of the actors, or participants, in the habitat as told by the resonant themes found in the multiple sources of data. Although the findings shaped the completed portrait of the habitat, it was the physical setting and the history of the school that made Carson’s habitat such a rich topic of inquiry, along with the personal context of the researcher that primed the canvas. The setting was the main subject of the portrait. The purpose of this chapter is to set the context of the study from the “outside in” (Lawrence-Lightfoot & Davis, 1997) beginning with the larger physical setting that included the town and ecology of the area narrowing down to the habitat on the school’s property. Then, this chapter will set the historical primer which was the way that the habitat came into form and function through the institutional culture and history. Finally, the personal context of the researcher will be established to articulate the autobiographical backdrop of the portraitist.

Internal Context

Carsonville was a historic town established in the 1800’s for its mining resources and was named for the impressive and unique geologic formation where the town began; this formation was called Carson Rock often referred to as the Rock. The
town’s main street stretched south from the Rock’s large sloping hill that buried a prehistoric rainforest covered by arid shrubs, ponderosa pine trees, grasses and wildflowers. Carson Rock was named for the massive solid formation firmly planted on top of the large sloping hill; the Rock was created by ancient marshes, volcanic super-heated ash, and major flooding events. Carson Rock’s profile was similar to an ant hill with a square rock planted firmly on top. Hiking trails up the sloping hill cut through the scruffy, tall vegetation up to the base of the Rock. There was a steep side with a switchback trail where a teenage trail crew maintained spots of stairs made of wood and rock or hikers could choose a meandering side of the hill with one wide maintenance road that also served as a trail. At the top of the hill, where the scrub oak met the very large, bare rock formation, an old handrail marked where a trail used to take people to the very top of the Rock’s formation; a formal trail to the top no longer existed. Getting to the top of the Rock was a bragging right among local children due to the actual climbing necessary to get up the steep vertical sides. At the Rock’s highest point, the town proudly flew an American flag that sat next to a thirty-foot tall metal star ceremonially lit up to initiate every Christmas season. The Rock offered both a place where ravens and cliff-nesting raptors nestled into the rock’s hallowed out shelters and a fantastic view of one of the state’s majestic 14,000 foot peaks. This stunning vista to the south was only interrupted by the town’s rectangular grid of streets running parallel to the train tracks on either side and the highway. Main street kept the historical character of the town in its buildings inhabited by modern
shopping as well as local merchants that reflected the rural nature of the area including a feed store. The fairgrounds on the south side were visible by the metal green roofs that looked like a hub to the vast expanses of ranch land to the south and southwest.

Looking north from Carson Rock the vistas were interrupted by suburban development and large strip malls. The suburban sprawl marched toward the Rock through old cattle ranching lands. Across the highway, large homes with fenced backyards lined new asphalt streets with the Rocky Mountains as the dramatic backdrop. Large retail chains lined the highway frontage road and the main roads winding up above the two-lane road that paralleled the highway. The northern development marked by a large outlet mall became four-story townhomes and multi-million dollar houses before giving way to the working ranches again as the roads led north out of town. Between the retail development and Carson Rock was one of the oldest neighborhoods in Carsonville, the high school, and Carson Elementary School.

From the highway’s frontage road, a perpendicular street climbed a hill and ran alongside the edge of Carson Rock. Large cotton wood trees lined the sidewalk with patches of scrub oak and grasses. On the other side of the road were one-story townhomes, stacked condominiums, apartments, and modest single-family homes. The type of housing changed significantly in the one-mile stretch of road from the bottom of the hill up towards the school. The townhomes had beige siding, metal framed windows, garages set back off of the street, and piles of large pink rhyolite
rock stacked along the parking lot edges and sidewalks. Moving upward, the condominiums were in large buildings set in different angles from the street; they were made of red brick with small patios facing Carson Rock, green manicured grass patches, and signs reminding residents to pick up after their dogs. The family homes toward the top of the hill were lined up along the street. Each home was in a different state of update and repair; while a sprinkling of homes had fresh paint and green grass, an equal assortment of homes had fences blown down, holes in the exterior siding, and overgrown yards. The condition of the neighborhood represented the toll of the economy on Carsonville; many homes sat vacant in foreclosure as families in dire financial situations lost their homes. At the top of the hill, only one mile from the frontage road and the vast assortment of residences, newer and much larger homes with more modern architecture lined the road. Larger yards and green grass topped the hill surrounding the school. A general rule in Carsonville was those with more money built higher on the hills. To reinforce this point, beyond the school and immediate neighborhood to the east, brand new homes double and triple in size lined the top of the ridge that served as Carsonville’s eastern most boundary.

*Carson Elementary*

Between the modest homes and the larger homes, Carson Elementary School was perched on the hill. The front entrance of the school faced the parking lot and a large mowed field with a breathtaking view of Carson Rock and Rocky Mountains (Figure 4). The physical architecture of Carson Elementary was a two-level
rectangular plane with an L-shaped building with dark metal-framed windows and grey-framed metal doors, constructed entirely of red brick. Carson Elementary School was twenty-seven years old and architecturally bland. The parking lot was long and narrow, with two mobile classroom buildings along its sidewalk. Large houses on a the hill above the school above the parking lot loomed over the temporary classrooms. Personal touches of the teachers were visible in the small windows high

Figure 4. Carson Elementary’s school grounds and habitat.
on the walls. The science classroom resided in the mobile closest to the school’s front door with a long new metal ramp that reverberated with the children’s footsteps when they entered the room. The parking lot introduced the school’s character. Parents dropped off their children in front of these mobiles and were greeted by four or five teachers opening car doors and saying good morning. The school secretary, in the building for its entire twenty seven years, had her own parking space close to the building marked with her giant first name’s initial in a bright pink box. In front of the handicap spaces, a large circle full of river rock surrounded the base of the flag pole; scattered throughout the rock were bright splashes of colorfully painted stones decorated as an art project two years ago.

On the west side of the school just beyond the parking lot was an uninterrupted view of the Rocky Mountains across a large mowed grass field abutted by the neighborhood houses which sat just below the field, their rooftops visible over the grass. The playground consisted of standard steel and bolts playground equipment resting in wood mulch and was surrounded by homogenous concrete and blacktop. This was the area where Carson’s children had recess and gathered to line up before school. On the north end of that playground, a native shrub wall rising nine feet in height running the short length of the field established the boundary of the schoolyard and marked a significant drainage system leading to the main stream in town. This scrub oak wall wrapped around the north side of the school’s property and back
behind the building where it's appearance and ecology was the same, but its purpose
and significance to Carson Elementary shifted.

The Habitat

The natural history of Carsonville was as rich as its cultural history. The area
varied in elevations within a few hundred feet or another, which created a biologically
diverse range of riparian, short grass prairie, and montane ecosystems. Most prevalent
in the immediate area of the school was a montane shrubland community of Gambel
oak (*Quercus gambelii*), mountain mahogany (*Cercocarpus montanus*), choke cherry
(*Prunus virginiana*), and ponderosa pine (*Pinus ponderosa*). The Gambel oak, or
scrub oak as the students referred to it, grew in large dense patches and mature stands
five to nine feet in height. Scrub oak was a deciduous shrub easily identified by its
long lobed leaves that were thick and leathery. The bark of the scrub oak was rough
and covered in scab like grey and brown bark; there was often an orange fungus in the
small crevices of the bark that added a splash of color to the stands. The branches of
the scrub oak were tangled and stiff. Continuous clusters of scrub oak formed great
stands of woods with open grassy meadows, but these woods were not composed of
trees that grew straight up out of the ground. The scrub oak woods were mired and
tricky; the woods were very difficult to maneuver through because of the infinite
overlaps of the hard branches and trunks.
The schoolyard habitat was not visible from the front of the school or the playground. It sat like hidden treasure between the school and the continuance of the scrub oak wall and drainage (Figure 5). It was not a garden in the traditional sense of food crops, but a natural landscape designed, built, and planted by the students and community. From the blacktop and playground, a concrete path wrapped around the school building passing the primary classroom windows. Halfway to the back of the building, the concrete path stopped and a trail began; it led to a bright colorful sign that read WELCOME in a mosaic of many oddly shaped tiles, each one made by a sixth grade student two years ago. The only man-made fixtures were the welcome sign and a chain link fence surrounding an electrical box as a relic to the temporary classrooms that sat between the habitat and the playground for three years. During that time, the school’s student population was double what it was during the study. The suburban development around town increased the number of school-age children and put heavy demands on school buildings. In 2010, a new school in those neighborhoods was finished and opened, which relieved the pressure on Carson whose student population went from 850 to 500. The temporary mobile buildings were removed and the land that held the mobile classrooms became a vacant space surrounded by flimsy orange plastic fencing until the school district could reclaim the area. The orange fencing remained as a symbol of caution to the children and eventually was replaced by a two foot tall wooden plank and wire fence, still temporary until someone claimed the area. It was unknown if the metal cage and
Figure 5. A map of Carson Elementary’s habitat with photographs (clockwise starting from lower left corner): (1) the trail built by sixth grade students on Legacy Day leads from the science classroom to the habitat; (2) the trail through the habitat from the library; (3) the pond dock, cattails, and up the hill toward the school building; (4) the trail to the picnic table from the rock steps; (5) down the hill in the drainage; (6) a view from on top of the hill above the library; (7) the habitat through the library windows.
The habitat was a space open to the community; there were no fences (except the short-term caution fence) or walls, no symbols of exclusion to the surrounding community. Students entered the habitat from the playground or the library, the one room in the building with dramatic windows overlooking the natural area. The library was significant to the habitat’s history as it was an addition to the building in the year 2003. The construction of the library disrupted the natural area behind the school. As a result, a fourth grade teacher and his class decided to abate the damage of the construction by building the habitat. As students entered the habitat from the library they descended fourteen concrete stairs and met the trail made from crushed local rock called rhyolite. The homogenous brick building bordered the habitat on one side and the trail followed parallel to the wall. The butterfly garden was approximately eighty feet in length and six feet wide and grew between the trail and the school wall. In the summer and fall, it was the habitat’s most colorful feature alive with honeybees, beetles, garter snakes, praying mantis, and various other insects and spiders. As the constructed trail wound around the perimeter of the habitat, there were three towering ponderosa pine trees in a line parallel to the trail interspersed with grasses, alfalfa, large rocks for sitting, and a microcosmos of critters and insects. In the summer, that area was alive with grasshoppers that popped with every footstep. The centerpiece, though, was not the flowers nor the insects, but the water. At the north end of the habitat approximately fifteen paces from the trail, was a small
(roughly 120 square feet) but substantial pond shrouded by cattails and willows and covered with duckweed, a small three-leafed aquatic plant that rested on the water’s surface and sent fine tendril roots into the water.

The pond in the habitat was at the lowest point; the habitat was shaped like a one-sided bowl with the landscape rising as you walked toward the library. The pond was originally part of this area where the water naturally settled, but a pipe drained the water into the shrubs and down into the drainage connecting Carson’s land to the main stream in town. To re-create the pond for the habitat, this drain pipe was manually plugged and the water naturally collected again; the area rapidly transformed into a rich riparian site that eventually became home to leopard frogs that were considered a species of concern by the state wildlife agency because of their diminishing habitat. An eight foot by eight foot dock constructed of recycled plastic planks jutted out over the pond’s edge giving children access to the center of the pond. Nine large flat rocks created three risers connected to the dock and created a seating area for classes; this amphitheater was referred to as the “rock steps” and was the area where most classes both began and finished as whole groups.

The trail of crushed rhyolite wrapped around the rock steps and the pond and led to a picnic table constructed of concrete. This was a favorite perch of both students and small wildlife because the concrete picnic table looked out over the drainage area that cut below the shrubs and through an undeveloped corridor. The corridor below was officially outside of school boundaries but lacked official
structures that marked where the natural area began and the school property ended. The seasonal stream created a small v-shaped valley through the bunch grasses in an open meadow and clusters of scrub oak. There was a parting of the scrub oak that led down to this small drainage; students at Carson came to call this simply “down the hill.” Down the hill was a continuation of the rich montane shrubland habitat with wide open spaces as well as clusters of more nine-foot tall scrub oak. The scrub oak and drainage corridor provided rich resources for the local mammals, birds, invertebrates, and reptiles. Black bear scat was sometimes found down the hill, mule deer and their tracks were often spotted in the habitat next to the pond, and a bobcat was seen several times by both the students and the librarian out of the large library windows. Twice since the habitat was created as a formal classroom at Carson, students were called inside when a mountain lion sighting triggered a series of cautionary phone calls to the principal. Common birds included ravens and crows, scrub jays, chickadees, and spotted towhees, and migrants using the pond and shelter offered by the habitat as a stop over on their journey.

From the picnic table another view was available to the students; the habitat climbed up a large hill also bounded by the tall scrub oak toward the back of the school. This continuous wooded area between the habitat and drainage served as the habitat’s eastern barrier and the typical limit for younger children. As this natural penetrable border, known as “the woods,” lined the habitat, small ponderosa pine trees at various stages were scattered up the hill. This area, known as “up the hill,”
climbed significantly and wrapped around the back side of the library, where the level of the ground eventually met the windows near the library's ceiling. The school building was built into this hillside. As the land continued to wrap around the school, the windows to the technology and art classrooms were at ground level, then upon reaching the parking lot, the ground was again level with the floor of the building. This path led back to the mobile science classroom and parking lot after passing a large, green dumpster usually left open because the black plastic lids were just large flaps and difficult to close in the wind.

**Inside the Building**

Although the context of the study was the outside of the school building, the interior of the school provided insight into the school's culture. The library’s north wall was floor to ceiling windows overlooking the habitat which nestled into the crook of the brick building’s L-shape. From the seats at the moveable round tables in the library, the front doors of the school were visible down an entry way with a lofty ceiling and skylights bringing sunlight into the front hallways. Birds made out of thick copper sheets hung from the ceiling of the entryway; they moved and swayed with the breeze each time the door opened and the air moved down the hall into the library. The birds were a collaborative project between the art and science classes and the product of a three-month study of migration. In this hallway, the art teacher featured work next to a bulletin board decorated by the parent community group with decorative flowers and plants, fabrics, and a bobcat - the school’s mascot. The
hallway provided maroon benches for families or students to gather. One morning, a mom snuggled up next to her young daughter reading a book to her on the bench. It was a tender moment to witness amidst a busy hallway with children streaming in and parents saying goodbye to preschool children at the classroom door. House plants lined the front hallway, too, and were tediously cared for by the principal’s secretary who spent fifteen to twenty minutes tending to them each morning after the children dispersed from the hallways and disappeared into the classrooms. The front hallway was an inviting place with direct line to the library and habitat.

The whole school was inviting, despite the white cinderblock concrete walls. Many teachers painted the walls of their classrooms in rich colors and some of that color found its ways into the hallways. The school as a whole could be broken down into smaller areas by grade level. Upstairs, intermediate classrooms were grouped in three’s around a central break-out area. The break-out area was the center of the space, a hub of a three-armed arrangement, each arm being a classroom. Each classroom had a window that looked into the break-out area and the break-out area housed two picnic-style tables with benches, a shared computer printer, and decorations that suited the grade-level team. There were photographs of students, maps, student work, or bulletin boards announcing information to families covering the walls. The break-out areas gave students a place to step out of the classroom in a way where they were not considered “unattended” by school rules. It was a place where dramas occurred, were retold, hashed out, or laughed about later. It was also a
place where students received support from special services faculty or parent volunteers. The break-out areas were symbolic of the community that was foundational to the culture of the school. It gave a physical space for kids, teachers, parents, and any mixture of those groups, to come together for a variety of reasons. The break-out areas were a product of the physical building’s redesign, the same project that added on the library and then, eventually, led to the incorporation of the habitat.

**Historical Context**

In 2004, Carson’s building was remodeled and a library was added on the east side of the school building. During the construction, the grass and shrub area behind the school was damaged. One fourth grade student from 2005 called the damage “a wasteland” indicating that the students were concerned about the impact of the construction. A fourth grade teacher at the time, Skip Granger, wanted to create a space for students created by students. He described his vision as simple, “I just wanted to create a place to go sit and read.” He laughed, “Really deep.” He made his vision of the habitat sound simple, but after talking with him at length about the evolution of the space in the relaxed setting of his backyard in downtown Denver, it was obvious that he wanted more for the students than an outdoor reading area.

Mr. Granger’s manner was warm and charismatic. His reputation at Carson Elementary was one of kindness, humor, and an unmatched love of his students. He was constantly modest about his work as a national literacy expert on motivating boys
to read and always minimized his reputation in the school district after his thirty-two years of teaching there. It did not surprise me to hear him also minimize his vision of the habitat because his purpose and intention was clear: his students. Mr. Granger described the students in his classroom in his good humored way as “the rejects of American schools...like 25 of them who weren’t fitting in, who didn’t belong, with abysmal reading and writing scores who didn’t fit.” Mr. Granger was drawn to just these students because he related to them from his own childhood. In his presentations in professional development to the school faculty, and even in his workshops on literacy offered to teachers around the state and country, he was not bashful about his experience as a student as one of misery, failure, and confusion. He was drawn to the group of students who were the most unstable at Carson Elementary.

When the habitat was beginning, Carson Elementary had more than 800 students because of the rapid growth of the suburban developments surrounding Carsonville. The school managed those numbers by using a year-round calendar on a tracking system; 800 students were split up into four tracks, each track with its own calendar. Every nine weeks one of the tracks would “track-off” for three weeks while the group of students and their teachers who were off, rotated back into the building. This schedule entailed unique cultural traditions such as teachers moving classrooms every rotation, an extended calendar through the summer, and classes of students who moved through each grade level together instead of being rearranged every year. A
and B tracks had the most traditional calendars; they began school in August and ended the year in May. C and D tracks had the most untraditional calendars ending the school year in June, two weeks before the next school year started in July. D track had a distinct culture from the rest of the school. Mr. Granger described the teachers that were attracted to this schedule and the students as “more divergent, the wilder, the more focused and centered in the ‘what me worry’ kind of teachers. So we developed a personality around D track which then drew people to it...you know last in, first out and you got more divergent thinking on D track, too.”

According to Mr. Granger, D track was filled last as it was the most undesirable calendar; D track was the only track without more than two weeks off in the summer. He described it in his good humored way, “D was like the scourge because there is no shared time with traditional, you know? Nobody wanted D track...D track was where all the numb nuts were because it was all of the last people in the building so it was the less stable families. Because the people who had been there were more stable and more involved wanted the A and B track, and C was a distant third.” What Mr. Granger would not acknowledge was that his reputation for compassionate teaching also drew families into his classroom and D track. Stable families who knew Mr. Granger through their older children or word of mouth demanded Mr. Granger’s classroom for their children. The result was a diverse group of students with a wide range of academic abilities. In that culture, Mr. Granger had a vision for a project where his students could experience success and purpose. With
the construction of the library and the damage to the natural area behind the school, Mr. Granger saw a place for students to get away from a busy, crowded school to find solitude that represented his passion for literacy. A parent of one of his students, and his former teaching partner, Lynn Foster, knew of a National Wildlife Federation guide for creating a wildlife habitat as a learning lab; her vision represented her passion for science.

Mrs. Foster, who was a parent in Mr. Granger’s room and a district level science educator at the time, attended a National Wildlife Federation Schoolyard Habitat training. At this training, participants were given a blueprint for students to plan, select, design, and build a natural area that met the major habitat needs of local wildlife. Mr. Granger recalled, “And she came back, handed me the curriculum guide, and I said okay. And we started on Monday. She gave it to me on Friday and I said we’re doing it. I think that was fall and we got busy in the spring.” He admitted that Carson’s Principal Gabriella Cannon was skeptical; “I don’t think she thought the kids would really go through with it when we okayed it with her because they were so fragmented and so crazy, they were all the reject kind of kids.” Mrs. Cannon approved the project and the students began a year-long process of research, design, buy-in, and implementation.

The class began by researching the local environment and wildlife finding out the components of any habitat. From their research, they worked in teams to design a natural space that would meet the habitat needs of the local wildlife. They constructed
models of their designs and then presented them to each classroom in the school in order to find out what other Carson students wanted in the space. The end of the student’s process was to combine their ideas to create a plan for the schoolyard habitat. When presenting the process to a variety of audiences after the fact, Mr. Granger described a process where the students’ dreams surpassed the adults’ expectations; the students in the fourth grade class had a large vision of a space with a pond, a dock, an amphitheater, and picnic tables that was teeming with wildlife. The adults expected an area with a garden and some trees, yet simultaneously let the students dream big. From the beginning, Mr. Granger’s vision for the habitat was a place of solitude and beauty while the students, as a result of their inquiry, saw a place where students could take school outside. He explained a transformation in the students from misfits to “suddenly they were like the Monkey-wrench Gang. They were engaged in their planning and they were excited and it was their space and they created it. It was the empowerment where they knew they could do it.” The energy expanded from one classroom into the community.

It was obvious that Mr. Granger had told the story many times of the first work day to put in the trail and some of the boulders. On a Saturday in March, he woke up to six inches of snow on the ground. Mr. Granger laughed when he described pulling into the school and finding more than 100 volunteers in winter coats ready to begin the work. That day the students of one classroom saw the beginning of their vision with support from students, parents, and teachers from all of the classrooms.
and tracks. Later that spring, Mr. Granger’s fourth grade students planted ponderosa pine trees and native shrubs and another work day for the community completed planting more than sixty perennials in the butterfly garden. The work in the habitat continued with the help and financial support of the community, but the National Wildlife Federation could not certify the habitat with a plaque honoring the students’ work until there was a water source. During the following year, the teachers plugged a drain pipe at the lowest depression and over the year, the water collected instead of draining into the stream bed below. Later, two separate Eagle Scout projects installed an amphitheater constructed of tiered slabs of rock, known as the “rock steps,” and a concrete patio next to the stairs leading out of the library. The physical space had been transformed into the design imagined by the students and the habitat became a central component of the culture of Carson Elementary.

Carson’s Culture

The habitat in Carson’s schoolyard was carried out on a premise of forgiveness instead of permission. Mr. Granger admitted that the secluded nature of the area afforded the work was done under the radar of the school district, who at the time, may or may not have allowed the hardscaping with the trail and boulders, nor the pond. This was a reflection of the divergent culture of the school based on what the Mrs. Cannon and her teachers saw as opportunities for their students. The school’s culture maintained a balance of academic rigor and richness of experience. Carson Elementary had a twenty year tradition of taking sixth grade students to Rocky
Mountain National Park for a week long overnight camping experience; the fourth and fifth grade students had a shorter tradition of their own three day mountain trip. The second grade students had a tradition of learning local history through walking tours of the town. The school’s culture also valued play. One example was illustrated by Mr. Granger’s description of Friday kickball games: “It was a time when we were just playing another classroom...and the excitement and the teachers, we would sit out there on lawn chairs and we would have kids as coaches and umpires and we just sat there and enjoyed the day and enjoyed the kids, you know for forty-five minutes every Friday.” Never witnessing this playfulness, I asked Mr. Granger when that ended. “Oh my God, with standards. And I don’t think we’re better off because our test scores have not gone up...and it could be that the whole focus of schools have changed.”

The use of the habitat was to recreate that sense of play and to support students’ academic endeavors. The culture of the habitat was more like play in nature and less like a nature education center where the ultimate goal was land preservation. The children were not made to stay on the one trail that covered half of the habitat’s perimeter nor were they told not to touch. The children were told to touch, to explore, to walk anywhere in the habitat. Mr. Granger’s convictions were that children needed the freedom to choose their path through the space. He planted every year because he wanted the children to experience planting, but also because the students would unintentionally step on a sapling or perennial in their explorations. The general rule
was the old cliche of first, do no harm; children were encouraged to investigate what interested them. The dock was another place where touching was encouraged. When I started working with Carson, I established a routine of laying on the dock to look into the water; when children stood at the dock’s edge and got excited, they were more likely to fall into the water. The belly-on-the-dock rule also afforded a close-up view of the water and the ability to reach into the pond.

Throughout the creation of the habitat on the outside of the school, the inside of the school was also transforming. Gabriella Cannon often described the habitat as the change that could be seen, while the changes not as easily observed were shifts in the school’s identity to become the school of science and inquiry. The professional development for the school’s faculty began to focus on science notebooks; teachers began to play with the concept of inquiry as a way for students to guide the lessons in science with the goal of applying the same techniques to other areas such as math and writing. Educators from non-profit organizations were invited to bring supplemental programs to students and teachers during the school day and families participated in science family nights. The school district’s interest in the school’s identity was minimal, at the time. But internally, the energy around the school’s identity escalated at the same time as the habitat and the convergence of those two events created a culture centered around students. The habitat became a symbol of the school’s identity.
Over five years after the creation of the habitat, teachers and students worked to maintain the space. Teacher work days were scheduled after school in the spring and teachers gained interest in weeding and cutting back perennials in the butterfly garden. Every year, Mr. Granger ordered a truck load of mulch and trees from the local agricultural cooperative extension and his students would plant and mulch; some of the young saplings thrived and some did not. At the end of the 2009-2010 school year, the sixth grade class initiated a Legacy Day, a day for the students to give back to the school and to leave a positive mark as they moved on to middle school. The first legacy day focused on the habitat and the students came on a Saturday with their parents and friends to plant flowers, weed, and mulch. The students also designed and painted a mural on a small concrete wall near the blacktop on the playground.

The first legacy day marked the end of an era for Carson as the school split and returned to a traditional year-round calendar without tracks. The reason for the downsize was the opening of a new school in the more affluent neighborhood that fed into Carson until the construction was complete. The teaching staff was reduced by almost half, the student body went from 850 students to 500, and the school was no longer inhabited throughout the summer. There was a grieving process for many children and teachers because of the closeness in Carson’s community. It was the first test of many for Carson’s collective strength.
Political Climate

Carson School District had a state-wide reputation for good schools; the suburban developments that grew rapidly in the district attracted young families because of the public school system. Political strain caused major shifts in the school district and during the two years before this study was conducted, the district suffered multi-million dollar budget cuts, collapsing of departments at the district level, the resignation of the superintendent, and a new school board with a high value on private education. This climate had direct impacts on the schools, including Carson Elementary.

The political climate in the school district grew uneasy at the time that Carson was becoming recognized for the work in science and inquiry, and for the work in the habitat. A new school board was elected in 2009. Shortly thereafter, the standing superintendent resigned with two weeks notice and the new school board had the ability to hire a new superintendent. The person that they chose was a woman with an eighteen month tenure in an Arizona school district. The new superintendent valued school identity and the new school board valued school vouchers to pay for private education. What transpired during the year of this study was a direct result of two new governing entities in the school district with priorities very new to the school district. Within that process, Carson Elementary became the model school of choice, as defined by the superintendent because of its established identity as the school of science and inquiry. A documentary was filmed with the leadership team in the
habitat, Mrs. Cannon spoke about the evolution of the school, students were brought out into the habitat and interviewed, and students were interviewed in their classrooms about science and inquiry. The end product was a four minute video; the video was shown at every superintendent and district event. Soon after the video began to show around the district, the leadership team received emails and interest about the school. The dissonance was that Carson Elementary was not in the spotlight until the new superintendent placed it there, right alongside a school board approved school voucher system that would pay for five hundred children to attend private schools. Oddly enough, the superintendent’s public praise of Carson came after she had only been inside the school twice with little interaction with the teachers, students, or administrators. The character of Mrs. Cannon was not to attract attention. The video brought attention to the school through the superintendent for reasons different than how the school’s identity evolved.

On the first day back for teachers during the 2010-2011 school year, Gabriella Cannon announced her resignation to the staff citing many other reasons than those related to district politics. She resigned her twelve year career as the principal of Carson Elementary and twenty-seven year career in the school district. Carson Elementary began a grieving process. Mrs. Cannon was not only loved by the teachers in the school, but respected for her ability to cut through district politics to do what was best for her students. She was a strong, caring administrator who knew each child in the school by name. There was little doubt that without her ability to
maneuver through the school district, a habitat would not have been a reality. Mrs. Cannon resigned after twelve years in the school and left in December, two months after the documentary video was filmed and widely shown. An interim principal named Marcia Finley was brought in to finish out the school year. Mrs. Finley was a petite woman who came to the staff with a high recommendation from Gabriella Cannon, an important recommendation to a staff that felt uncertain about the future. Mrs. Finley was a retired principal of a primary school in the school district and came to Carson with an understanding of her transitionary role. Mrs. Finley claimed to understand the habitat’s place in the school. After six weeks in the interim position, she described it as a “beacon of hope” and something that “lifts you up.” The hiring process began for a new, permanent principal in January. The staff grew to like Mrs. Finley, and a transition to a new principal was another painful process. In addition, the staff was losing Mr. Granger who was retiring after thirty-two years in the district. Mr. Granger was perceived as the caretaker of the habitat. Without him and Cannon, the teachers wondered what would happen to the school and to the science and inquiry identity. The main concerns from the faculty were numerous, including if the new principal would value the habitat.

The superintendent had placed Carson in the district’s spotlight through the widespread use of the documentary featuring the school’s identity and consequently the initial search failed to generate a candidate that the superintendent was happy with. The second principal hiring process appointed Olivia Smith. Mrs. Smith was an
assistant principal at another school in the district. She spent several days at Carson from April until the end of the year and worked with the leadership team to build an understanding of Carson’s rich journey to the superintendent’s spotlight. In the months between the hiring of a new principal and the end of the school year, six other faculty resigned or retired. Under new leadership, the future of Carson Elementary’s science initiative that focused so heavily on the habitat was uncertain, but the teachers that remained carried the resilient spirit of Carson Elementary and were a faculty of people who loved to work with children. It was a faculty that brought me into the school six years prior to the study.

**Personal Context**

My familiarity of Carson and its community began as the habitat was taking physical shape. After building the unique space for the school, the teachers were unsure of how it would work for instructional purposes in the school day; some wanted a place to read and some wanted a place for science investigations. At the time, I was working for a small non-profit organization whose mission was to connect children to nature. A tax-based foundation approved a grant for this organization to work with Carson’s teachers and students in the habitat; the program began with funding for three intermediate classrooms and Carson’s administrators chose one fourth, fifth, and sixth grade classroom respectively. Since Mr. Granger’s students were responsible for the habitat being at Carson, Mrs. Cannon chose D track to work with the program I brought to the school. The grant program included nine blocks of
time for each class in addition to three professional development opportunities for Carson’s teachers after school. During each lesson, my role was to take students into the habitat with their teachers or connect the habitat to lessons in the classroom. I worked with Lynn Foster, the district science specialist at the time who was also the parent that helped create the habitat, to connect the academic demands of the district and state to the creative nature of the lessons outside. My work with Carson as an outside educator lasted for three years even though the grant only lasted for one additional year. After the grant funding was cut, the parent community group who managed a small budget within the school’s larger finances put their monetary resources toward the programs. The non-profit organization continued programs with Carson after I left the organization and carried on a strong relationship that brought another teacher into the school named Kara Schneider.

One year after I left the work with Carson, the principal created a position on Carson’s faculty to teach science as a specials. A common concept in elementary schools, specials was an opportunity for schools to both provide art, music, physical education, and computers for the students while giving planning time to the classroom teachers. When the school self-identified as the School of Science and Inquiry, Cannon added science as an additional specials class for the entire school. Because of my previous work with Carson’s students and teachers, I was offered the position. My role in the school was not to relieve any of the science lessons in the classroom but to additionally enhance science for the students for forty-five minutes a
This purpose gave me the freedom to take the students into the habitat and we went outside as long as the weather was not dangerous. The role of a specials teacher also provided me with the opportunity to work with every student at Carson, a rare opportunity for a teacher in a large school. Two years later, this rapport allowed me to investigate the children’s experiences in the habitat while my previous work as a naturalist gave me a lens for observing them.

My training before and after my education as a teacher was as a geographer and a naturalist; my work as a naturalist was focused on native plants and birds, but included understanding ecological communities through still observation and research. My passion early in my career included observing natural settings with young children. My work with Carson’s students drew directly on those experiences and was primarily outside in the habitat. In a similar position at her school, Stanley (2010) referred to herself as a “naturalist teacher;” that term was also appropriate in my position at Carson. My other responsibility was to train Carson’s faculty in science content related to the habitat, science pedagogy related to being outside, and to create social systems in the habitat that made teachers more comfortable with taking students outside for lessons. Carson was a very traditional school with teachers trained in formal classroom learning. There was a perception for the majority of the faculty that taking students outside would not equate with learning, although there was a willingness on the part of more than half of the teachers. Through the vision of Mrs. Cannon, the professional development role that I played grew into a full-time
position the following year. A cadre of eleven teachers worked intensively in science instruction that included how to incorporate the habitat as an outdoor classroom. My third year in the school was also the period of time that I conducted the study; to manage both roles, I worked part-time with teachers in science instruction and part-time as a researcher without any instructional responsibilities. When I left my part-time science specials position in October to begin data collection, a woman named Erin Hudson was hired. Her background was not science nor as a naturalist, but her personality and style suited the needs of the position.

Summary

A portrait was comprised of the canvas comprised of the physical, historical, and personal context. Although the portrait itself was formed by the experiences of the students’ encounters with the natural setting, the primer on the canvas must establish where the study took place in both space and time. In addition, Lawrence-Lightfoot and Davis (1997) shared the autobiographical context of the researcher and stated: “...portraitists alert the reader to the fact that contiguous with the literal journey to the physical location is the researcher’s personal journey in gaining familiarity to the site” (p. 67). With the context of the setting, culture, and portraitist set, the next chapter will define the five emergent themes that resonated from the children’s experiences in the schoolyard habitat and relevant dimensions that were present in each of the children’s encounters.
CHAPTER V

FINDINGS

The findings of the portrait revealed themes and dimensions of the schoolyard habitat. The themes and dimensions were illuminated by the experiences of the fourth, fifth, and sixth grade students who agreed to be participants in the study. In total, one hundred six children consented to participate and their actions and drawings were observed. The findings reflected deeper observations and interview conversations with fifty six of those children, in addition to their drawings and photographs. Their stories and phrases revealed five themes of experience: (1) critical thinking and curiosity; (2) ownership and identity; (3) peace and calm; (4) respite and respect; and (5) adventure and imagination. Although distinctive from one another, each theme was woven together by findings that washed through every experience creating overlaps in a recursive nature between dimensions. The resonant qualities present in all five themes were self-confidence, distinction, wonder, familiarity, respect, positive social interactions between students, and relationships between the children and the adults. The ways that children knew, acted, and felt were reported in the findings as embodied experiences; each experience contained all three facets of the children’s cognitive, emotional, and physical selves. The interactions between the children and the habitat were distinguished into two categories based on Reed’s (1996a) concept of interaction fields: (1) promoted interaction and (2) free

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interaction. Promoted interactions were experiences with a focus, usually given by the teacher, before going into the habitat. Free interactions included experiences where an adult did not direct a focus, but the children attended to information in the environment independently. With those common foundations, the themes are presented here without value assigned to their order, beginning with the way children were inspired to question and wonder about the information in their surroundings.

**Critical Thinking and Curiosity**

Intermediate students at Carson Elementary experienced inquiry and wonder in the habitat. Students made discoveries and questioned what they found, then used reasoning and critical thinking skills to come to conclusions. Children used problem solving skills including recording their thinking in a science notebook or nature journal, so they could hang onto their thinking and come back to it at a later time. Students had a depth of knowledge of how the habitat’s ecosystem functioned. As children observed the habitat more frequently, they attended to the finer details of the habitat as if to zoom in and out in their attention. Once they attended to the smaller details, their depth of knowledge and critical thinking expanded and they were able to make connections between the habitat’s infinite ecological information. Participants revealed moments of wonder and awe in recalling memories in the habitat or made spontaneous exclamations as they directly experienced the habitat in go-along interviews and participant observations. The habitat also provided a place for building relationships through the investigative exchanges.
Questioning, Reasoning, and Critical Thought

The habitat’s native montane shrubland ecological community was full of possibilities for student inquiry. A common observation was a student enthusiastically calling to another child to share a discovery. Another common observation was a child taking an object over to a teacher, or pulling on Mrs. Hudson’s shirt sleeve to “come and see” what was found. The information attended to was as diverse as the children. The children expanded their understanding of the habitat’s systems by first observing, then attending to the details, then deeply exploring the information.

Among the many parts of the habitat that captured students’ attention, three examples illuminated this process including the pond, insect galls, and animal tracks.

The pond

The heart of the habitat was the pond. The children were drawn to the water in every season. In the winter, the icy cover of the pond afforded play and problem solving. In the spring, the pond came to life with green cattails growing up through the dried reeds of the previous season, chorus frogs stopped and started with unpredictable timing, water skippers returned to the surface, and the level of the water rose and receded depending on the recent weather. The children loved the pond and their questions and reasoning around the events related to the water were rich in scientific content, process, and awe. The specific examples illuminating critical thinking and curiosity related to the pond were ice, frogs, and searching for critters in the pond’s mud.
**Ice.** In every observation of every class in every season, a group of students walked to the pond dock and laid down, heads dangling over the edge, hands up near their shoulders, palms down or one hand on the dock, the other in the water. Questions emerged naturally, effervescently, from the heads bobbing down over the water. In winter, the children were attuned to the ice: the thickness, the density, the bubbles trapped inside. David broke out a chunk of ice and brought it to me up on the hill, asking me how the air bubbles got into this four inch by five inch block of ice. I posed the question back to him asking, “Well, what do you think?” whereby he slowly explained that air pockets formed in the ice as the water froze. He knew the explanation and came to me for affirmation. A group of sixth grade boys spent thirty minutes trying to figure out how to break the ice and where the surface’s weakest point was; they started with small materials like sticks and finally moved to a small boulder before being stopped by Mrs. Foster who spotted one of the boys hoisting the large rock over his head with two hands ready to slam it down on the ice. The boys were not alone; on the first Wonder Days with Mrs. Hudson in November, every class had a group of children, both boys and girls, who were intent on finding a way to break the ice.

**Frogs.** As the ice melted, the children’s attention turned to the level of the water and the frogs. Near the end of April, Mrs. Murray’s fourth grade class overlapped Mrs. Foster’s sixth grade class outside in the habitat to draw their spring event maps. I observed from up on the hillside. The fourth graders were at work on
their maps when I began the observation; they moved slowly and steadily in silence orbiting the pond. The rhythm was steady, pause-look-write-step. Rachel, to the typical beat of her own drummer, worked her way up the hill picking up loose sticks with her open notebook clutched between her right arm and her chest. She tightly grasped the sticks in her left hand humming quietly to herself. The sixth grade students entered from the playground and filled in the rock steps in perfect silence. They sat down for the first chorus frog croak of the afternoon. When the familiar sound carried through the air, almost every child paused and looked at the pond. Chorus frog croaks were described as a finger nail running down the teeth of a comb. Sometimes they lasted a few seconds, sometimes they lasted a few minutes. The first croak was over as quickly as it began, and the students turned back to their drawings.

The frogs captivated the students’ attention. A first grade class with the technology teacher entered the habitat from the library, breaking the silence. The teacher’s voice carried as she explained she wanted a class picture of them for their class project. The older students glanced over at the commotion that accompanies young children being arranged on a staircase, but most appeared impervious to the noise. Mrs. Murray signaled to her students with one raised hand and they lined up obediently. Rachel was the last in line and they walked inside on the path to the playground. The chorus frogs started croaking again and began a stream of vocalizations that gave them their name. As soon as the frogs commenced, every sixth grade child stopped to write and the first grade children changed their voices to a
hush. The sixth grade students were drawn closer to the pond. Still in silence, they stood close to the cattails and tried to find the perfectly camouflaged amphibians the size of a silver dollar. A group of eight students lined up and each one jumped from the bank of the pond onto a rock hiding in the cattails with Tim’s assistance, peering over and under the cattails following the sound of the frogs. It was obvious when a child picked out the frog; their expressions were nearly identical. Their eyebrows went up, their eyes grew large, and their mouths formed into a perfect O. Each participant in the study recorded their location on the event map when the frogs started. In every interview, one or more of the participants talked about the frogs. In their stories, a chorus frog or leopard frog was involved.

_Pond dipping._ Pond dipping was another habitat activity full of inquiry and wonder. On a spring day, Mrs. Cruz’s fourth grade students walked into the habitat from the science mobile, around the back of the school. One in five students carried a black nylon bag that contained a blue net, an identification key to aquatic macro-invertebrates, and a cup. The promoted activity was called pond dipping; the objective was to use the net to scoop up the slimiest, blackest mud from the bottom of the pond, lay the net on the ground or dock, and gently prod around with a finger or a stick to see what life the mud contained. Michelle looked confident. In an interview, she declared that her favorite story from the habitat was on back-to-school-night in August when nets were provided for families to explore the pond together. Michelle, her older brother Travis, her mom and her baby sister were the only family that came
outside, so they had the habitat to themselves. That night we found a dragonfly
nymph, its body two inches in length, as it writhed around in response to being out of
the water making it easy to find in the inky black mud. When the dragonfly nymph
began to move, it looked like the creature from the black lagoon. I pulled it out using
my thumb and finger as tweezers and placed it in a cup of clear pond water. Michelle
watched intently at the nymph peddled around in the small container.

As Michelle sat for two minutes of silence with her class ten months later, her
attention was on the dock anticipating when she could get the spot she coveted. When
Mrs. Hudson said go, Michelle and three other girls in her group sprang to the front
corner of the dock and Michelle took over directing the group on the places to dip the
net. Typically reserved, Michelle confidently took command of the group. On the
other edge of the dock, Devon, Lilly, and two other girls sat hanging over the edge.
Devon had the net and reached into the bottom of the pond, the water climbing up
nearly to the armpit of her stylish shirt. With the first load of black, stinky, silky mud
in their net, the questions started. The children asked each other for help with the
identification chart, how many legs the critter had, who had the net, if it was a
damselfly or a dragonfly. In the background, another group huddled over the concrete
picnic table after grabbing a load of pond muck in their blue net from the far side of
the pond. Michelle surrendered her net to her teammates and bounded around the
pond to check in with three other groups and see what her classmates were finding.
Mrs. Hudson circulated and touched base with each group, but they barely knew she
was there. The students were immersed in the pond muck, hands covered in a thin coating of black silt, fingers spread and arms out so their hands did not touch their clothes. None of the students in the class were observed wandering; each fourth grade child was leaning over a net or fishing around in the water for their group. Their attention was fiercely directed at the pond.

The specific examples of the pond as a source of inquiry illuminated the activity around the pond. Students with familiarity of the habitat still found surprises because of the pond. Delaney, an intellectual child who methodically documented everything and was a very logical student, stood on the hill overlooking the pond and explained that her biggest surprises in the habitat were related to the pond: the great variation in the water level and the discovery of leopard frogs two years ago. The detail in the children’s drawings was primarily found in their drawings of the pond. The maps of children’s activity during observations concentrated around the pond. The most popular place in the habitat was the dock. The overwhelming repetition of stories, memories, and value related to the pond emerged immediately from the data indicating the importance of the pond literally and symbolically to the students. Not only was the pond the source of diversity in life in the habitat, it was also the lifeblood of the habitat in the minds and hearts of the children. Especially with the discovery of leopard frogs, children felt a sense of caring for the wildlife. Yet, children also attended to small and significant details of the habitat’s ecosystem that generated curiosity apart from the water. Another source of inquiry was insect galls.
Galls

On the branches of the scrub oak (*Quercus gambelii*) and the stems of the rabbitbrush (*Ericameria nauseosa*), insects laid eggs in the tissue of the plants’ buds or stems. As a larvae secreted chemicals from its body, the stem or bud mutated and formed bulbous encasements on the plant. For the scrub oak, the galls were woody bubbles that turned black and scaly and formed in clusters at the end of the branches. For the rabbitbrush, a large perennial in the aster family, the galls appeared on the stems as dense cotton balls the size of marbles. The galls captured the regard of the students and three girls illustrated the depth of questioning and wonder when they tried to figure out what the galls were. Three girls exemplified the critical thinking and curiosity that accompanied the galls: Alizea, Chelsea, and Audrey.

Alizea. Alizea was in Mrs. Hart’s fifth grade class and it was her first year at Carson Elementary. Her previous school was not far away, north just beyond the outlet mall surrounded by horse property and train tracks. The first time Alizea met with me for an interview, she was joined by Erica, another new student to Carson who came from the same nearby school. Alizea described herself as someone interested in animals and insects, which her mom thought was gross and an interest usually for boys; Alizea reported a strong sense of belonging at Carson because investigating bugs was part of the culture of her classmates and the habitat. The girls explained their past experiences with hunting for ladybugs, picking up ants, and questions about spider mites. The interview was in the habitat on a warm December day and the girls
sat at the concrete picnic table. I asked the girls to tell me their favorite story from the
habitat. Alizea recalled finding the galls on the rabbitbrush, quoted at length below to
illustrate the progression of her story to questioning and wonder:

Alizea: One of my best stories was when me and [my friend] we were pulling
out those knapweeds and we kept on getting hurt. Then as we came down
here, I noticed those little white things and I had never seen a cotton bush
before. I thought it was very interesting so I picked it up, and it was a little
hard.
K: Do you think that’s a cotton bush?
Alizea: I think so. It has a cotton on it.
K: So, that’s not a cotton bush.
Alizea: (slowly whispers...) What is it?
K: I can’t wait for you to find out! [T]he white “cotton” is actually a whole
other deal. It’s actually something that is living on the rabbit brush. It’s not a
plant.
Alizea: Oh my gosh. (whispers) Oh my gosh. (hushed) Can we go look at
that?
K: Yes! Let’s go look. [all three of us go to the rabbit brush plant next to the
table and crouch down]
Alizea: That’s what I thought was cotton….That is so scary and I picked it off
and squished one.
K: What do you think is in there?
Alizea: It’s so soft. I think they are probably plants or something because they
are like sticking on tight....[making little sounds ah ah ah ah]
Erica: Wait, there is green right here.
K: That’s where they attach to the plant....
Alizea: Is this maybe an insect?
Erica: Cotton came off of mine and it’s still green.
Alizea: What is this here?
K: The white is from the insect and the brown is from the plant.
Alizea: So the insect...(long pause)
K: What stage of life do you think the insect is in right now?
Alizea: I think it’s in the producing stage?
K: Do you think its an egg or larva or adult?
Alizea: I think it’s an egg.
Erica: Yeah.
K: Think about how warm it is in there.
Erica: It has like little brown spikes.
Alizea: It's so warm in here.
K: Let's take those in, I'll give you a vial to put them in and you can see what happens.
Erica: The other ones are still the same. [referring to the galls taken in earlier in the year]
K: Well, remember sometimes we don't see a lot of insects this time of year. Why?
Alizea: Because they are under the ground.
K: Would they survive right now?
Alizea: And some of them will travel to other places to mate and like put their babies in a safe spot for their eggs.
K: Yeah. So this is another adaptation, another way of surviving...
Alizea: What if we stayed out here all night and then we seen them lay the eggs?

The girls' conversation drifted as they carried the galls back to the picnic table. Then Alizea decided to split open the gall she was holding. She hesitated and looked to me for permission to pull open the gall and I nodded encouraging her to continue. When she opened the gall and found a small, clear grub writhing around, the girls exploded into a rapid conversation, bantering back and forth with questions and observations.

Erica and Alizea ended with a conversation questioning the ethics of removing the galls from the plant, feeling remorse for pulling the gall open because they knew that the insect inside would not survive.

Chelsea. Chelsea, a quiet fifth grade girl from the same class as Alizea and Erica, also found that opening a gall satisfied questions she had about the cotton-like structures for two years. During her go-along interview in mid-April, Chelsea led me to the same rabbitbrush near the picnic table that engaged Alizea five months before.
Her line of questioning was similar to Alizea’s and full of sensory descriptions. Chelsea pried the gall from the plant’s stem, commenting on how tightly stuck it was, then described the colors. The larvae had developed into a small black pupa inside the gall since December; Chelsea sat perfectly still holding the gall a few inches from her face, her eyes locked on the pupa. Her voice was calm, her breath even, and the volume of her voice was low. She asked what it would turn into, why the gall was fuzzy, when the insect would emerge, why it was there at all. “I always thought they were just blossoms,” she said in disbelief, then put the gall’s two halves back over the insect and tucked the gall under the plant.

**Audrey.** The third child to take a special, long-term attention to the galls was Audrey. In Mr. Granger’s sixth grade class, she was a self-directed, confident young woman with her brown hair pulled straight back into a ponytail and most of the time, in a purple hooded sweatshirt with cartoon-like skulls. Audrey was a unique sixth grade girl with a powerful sense of herself. In fifth grade, the galls on the scrub oak captivated her and her classmate, and in science class they researched the galls, made a poster containing the information they found and photographs, and presented the information to other classes in the school. Her friend moved to a new school this year, but Audrey’s passion and excitement for the galls carried on and she taught other students in her class about them. On a cold day in January, Audrey led Remmy over to the exact branch on the scrub oak that Audrey originally selected last year. Later in
a conversation with Audrey, she explained that she always started her time in the habitat at the galls up on the hill to make sure they did not change.

The two girls felt the woody galls, pushed them, squeezed them, and Audrey drew a picture in her science notebook, documenting any subtle shifts that she noticed. As the two girls probed the branches, Ginger noticed their attention and joined them, hearing Audrey’s well rehearsed explanation on the wasps that formed the galls. The girls had a short discussion and moved to the rabbitbrush. As Audrey walked by me, she asked if they could dissect a cotton-like gall. Like Alizea and Chelsea, the students were always respectful of what they pulled off of plants and most students asked first. The girls sat at the concrete picnic table and opened Audrey’s notebook, treating it like a sterile field for the dissection. These girls were much more methodical than Alizea and Chelsea had been. It was January, one month after Alizea’s discovery of a moving larvae. Audrey opened up the gall by using her thumbnail to pry it apart, then set it down to draw what she observed. Then, she gently picked it up again and smelled the gall. “Smell this,” she commanded Remmy as Ginger observed over her shoulder, “I think it might be hand bac, I just put hand sanitizer on.” Remmy sniffed the gall perched between Audrey’s finger and thumb. “Whoa! That smells like watermelon,” Remmy exclaimed. “It smells good.” Audrey paused, still unsure of what was in the gall. “It can’t be a watermelon seed. They don’t grow like that. They grow from a little black thing to like a green ball or something.” The three girls stared into the gall. Audrey shrugged and closed the two...
halves back together, in the same way Chelsea did when she was done. They asked to
take it inside to see what happened and I agreed to get another small plastic vial out
of the science room for their investigation.

The galls were present in every season and consistent each year. Audrey’s
questions were about why the oak galls did not change in two years. She was afforded
the opportunities to observe them over multiple years and form questions about the
details of a small cluster of balls the size of marbles. Alizea and Chelsea’s ongoing
observations were afforded by the same concept of time and multiple visits to the
rabbitbrush. Chelsea wondered about the rabbitbrush galls for two years while Alizea
was able to satisfy her curiosity immediately. Alizea also revisited the galls with me
during her go-along interview with the same hushed responses of “Oh my” and
drawn-out whispered “Wow.” Another common, simple feature of the habitat that
consistently grabbed the attention of children in every class in every season, were the
tracks left by wildlife.

Tracks

The drainage lined with tall stands of scrub oak, grasses, flowers, and fruit-
bearing shrubs was an excellent corridor for wildlife moving through the human
development to large parcels of undeveloped ranch land and open space around
Carsonville. The drainage provided the equivalent to a wildlife super-highway; the
habitat was a perfect stopover for many animals with the pond’s large water source. It
was common for students to find evidence in the form of scat and tracks of the large
mammals native to the area, including black bears, mule deer, coyotes, foxes, raccoons, and bobcats. The tracks provided Carson’s students with opportunities to document the wildlife in the area without ever seeing the animals themselves. The tracks also provided situations for the students to critically think through the animal’s actions and what it was doing as the animal left the tracks using a wider understanding of that particular animal’s habits. A tradition was to use a finger to circle a good track or series of tracks in the snow when a child found them so that other children would not step on the track, losing it forever. On every snowy day that children were outside, I found circles around tracks on the ice in the pond and scattered everywhere else the students walked that day. There was a great unspoken respect for a track that was circled evidenced by the children’s foot prints that consistently went around the circle marking the tracks instead of through it. Students were observed attending to tracks in Mrs. Foster’s class on a snowy day, with Gus during a go-along interview after a snow storm, and with Mrs. Murray’s class during nature journaling.

*Mrs. Foster’s class.* During the first week of February, Mrs. Foster’s class stayed committed to their weekly Monday morning time in the habitat in spite of the eight inches of snowfall the night before. In the classroom, Fred called out over the
conversation that their morning would be an adventure into the “unchartered glory of the fresh fallen snow.” The sixth grade class made their own fresh tracks through the snow that blanketed the entire habitat contrasted by a teal blue sky and bright shimmer of sun. As the students entered the habitat from the playground, their footsteps creaked and groaned as the dry snow rubbed together under their feet and the sound carried out the way that sound does in the insulation of snow covered fields. The snow kept the students voices hushed, yet they whispered and giggled as their feet sunk down to the path. The three tiers of the rock steps were smoothed into one level by the snow, and the first students to the steps slipped and dropped when they found the ledge of the first level. They laughed quietly, making eye contact while one girl helped another back up to the top step by extending her hand. Once the students all filed out, they filled in the space at the top of the rock steps and were asked by Mrs. Foster to be still for their two minutes of silence. Their feet in the snow began to do a “kick-flick;” a boy’s feet kicking out and flicking the snow off of his shoes was a motion mimicked by the rest of the group. Their heads were still, their feet were not. It appeared like an unconscious movement. Step-kick-flick....step-kick-flick. Mrs. Foster noticed and asked only one boy to stop and hold still. Easier said than done. He stopped for a few moments, then his feet started the movement again. It appeared that the children must kick, stomp, and flick. I was taken by this unrest. I would call it natural inclination. At one point, I looked down and saw myself engaged in the same motion as the snow gathered on the toe of my boots. The exact movement
was observed during Mrs. Murray’s nature journaling two weeks before. The students walked and flicked, kicking the snow off the tip of their shoes. It was intuitive movement afforded by deep, light snow. Jimmy came around the back of the group and slipped in the ice under the snow. He teetered and tottered trying to find his balance, then stopped without falling and laughed silently.

As the students began to settle in, they noticed that fresh tracks popped out to their awareness. They pointed to various places around the space. Mrs. Foster asked Connor to do a demonstration and walk across the untouched snow in front of the group, from one side of the steps to the other toward the pine tree. He took eight long strides and the group indicated the place Connor should halt by shouting, “Stop!” Mrs. Foster asked who could explain what they noticed in the tracks. The students began putting Connor’s actions back together based on the direction the toes of his shoes were going, the length between each print, and the tread left by the bottom of his shoes. Using that example, the students were instructed to find tracks, try to determine the direction of the animal that left the tracks, and what the animal was doing. The children were told they could go anywhere in the habitat and they fanned out in the usual pattern around both sides of the pond. They kept the silent reverie in the snow, moving cautiously around the frozen pond looking at the fresh wildlife tracks, being very careful not to step on them. David and two girls stayed on the rock steps to investigate the animal tracks that cut through the snow in front of their feet. All three crouched down, turning their heads but not taking their eyes off the tracks as
they spoke to one another. The child in the middle of the group used her arm to explain the direction and path the animal took. After four minutes, they agreed that it was a rabbit based on the shape and size of the tracks and the location based on their knowledge that a rabbit lived under the pond’s dock. There was not a teacher guiding or facilitating their conversation. Across the habitat, Delaney and Beth walked carefully alongside tracks leading up the hill. Back at the dock, Alanna and David pushed fresh track-less snow toward the pond, bobbing their heads up and down with each step. At the edge, they noticed small tracks on the ice and without hesitation, David laid down on his belly in the deep snow on the dock to investigate. In a moment Alanna and two other students joined him on the dock and had a quick conversation about what animals they remember being in the cattails. They stood up after two minutes of laying in the snow and smiled, brushing the wet ice from their stomachs.

*Gus.* Gus was also comfortable laying on the dock in the snow. On a different day in January, I walked outside with him for a go-along interview. As soon as we walked outside, a rabbit darted from underneath the dock into the scrub oak; the rabbit was exactly where Gus told me it would be on our way out from the library. He glided to the dock and laid down in thirteen inches of fresh snow on his stomach hanging his head completely over the edge to see underneath. “Oh, that looks like a mouse,” he declared looking under the dock. “Why?” I asked. Gus reported that he found tiny tracks with evidence of a tail dragging behind. In thirty minutes, we
wandered through the habitat and down the hill finding large and small tracks. Gus reasoned out loud through each set of tracks he found, sometimes coming to a conclusion and sometimes admitting he did not know the animal that left the tracks behind. Later in April, Gus walked to the places where the tracks had been still wondering aloud about the animal that left them. He remembered where the tracks had been even when the snow was melted and the grasses were turning green.

_Mrs. Murray's class._ In Mrs. Murray's classroom, the students sat on the floor after thirty minutes of nature journaling time in the habitat. Outside, the January morning snow was fresh. The students entered the habitat from the playground. In a bright pink snow coat with her hood over her head, Marissa stopped at a track near the trail with a furrowed brow telling everyone to walk around her, concerned that the other children would spoil her evidence. Now, back inside, the children faced Mrs. Murray in her orange swivel chair next to the flip chart. As usual, it was as calm in the classroom as it was in the habitat. The children maintained the tone from the outside to the inside. “I was unsure of what we would see today. I kind of thought, oh, it’s not going to be like summer or fall, but it was quite interesting to see what we could draw out there. What was the first thing you noticed today?” Mrs. Murray asked the children, leaning forward with her elbows on her knees holding her nature journal in one hand. One boy answered quickly, “The tracks.” Mrs. Murray agreed, then asked the students to consider what kind of tracks they were. A debate broke out in the group of students and Mrs. Murray held up her hand. The students ignored her.
She waited patiently while the respectful arguments quieted down. She glanced at me, smiling, then continued to tell the students how unfamiliar she was with tracks and described her drawings. “Something I noticed, I thought it can’t be this or it can’t be that, I was thinking, and I could be totally wrong, but I thought they looked like this...” and she began to duplicate her sketches on the board next to her chair. The conversation carried on and the students stared into their own nature journals looking at their sketches of the tracks they observed. Steven and a boy next to him debated with quiet enthusiasm with their fingers pointing to writing in their open notebooks. They paused when Mrs. Murray asked them to and listened to Rachel describe her tracks. Several side conversations bubbled up around the room. The class never arrived at an agreement about the tracks that Mrs. Murray observed and drew on the board. They did not need to. Each child had a reason for her or his prediction based on their knowledge of the animals. Not one child opted out of the problem solving process.

The spring mud was also good for animal tracks, especially evident in the event maps drawn by the students. Children’s maps included written statements about the tracks at the location the tracks were found including:

- “Looking for deer tracks around a pine tree ever since I found one once.”
- “I remember the deer track so cool it was on Wonder Day.”
- “Found a deer leg.”
- “Just found a track - most likely [sic.] deer - somewhat fresh!”
• “Saw deer tracks in pond.”

• “Found a large deer print, it was getting a drink” next to “I found a fox or coyote’s print in the mud! The animal was getting a drink.”

The tracks provided intrinsic opportunities for questioning, reasoning, and problem solving.

A group of sixth grade boys understood the value of the habitat for academic learning. Damien, an inquisitive boy in Mr. Granger’s sixth grade class, explained his opportunities in an interview with Archer and Frank. He said, “I like the habitat also because you’re learning so much but it seems like you’re just having fun. Yet, you’re learning a lot.” He also reported an understanding of the habitat that was based on free exploration. I asked him what would happen if their movement and exploration was as limited as the classroom when they were outside. He looked down shaking his head, “This conversation would be so different...like, it would be so totally different.”

**Detailed and Deep**

The general feeling of the students in the habitat was a need for balance between teacher promoted interactions and free interactions. Based on Reed’s (1996a) fields of interaction, the students wanted the freedom to choose their direction in the habitat but also wanted support from the teachers to give the students a focus. The findings indicated that the students with more class time in the habitat were more comfortable with free exploration; when the students were more comfortable freely choosing the information to attend to, their attention to small, intricate details was
higher. When the students had a refined sense of the details in the habitat, their understandings of the place were richer and had more depth. The illumination of these findings coalesced from the fifth grade event maps, the actions of the children during observations, and through the stories that they told.

Event maps provided a baseline drawing of the major features of the habitat and the students were asked to draw what they observed that day or a memory of something that happened in the habitat (Appendix C). There were no restrictions on the amount of time that had passed since the event drawn on the map took place. Because of time constraints, some classrooms did the event maps with Mrs. Hudson in science class and other students did the activities with their homeroom teacher. In fifth grade, an interesting contrast emerged in the drawings. More of Mrs. Hart’s students recorded the details of the habitat, while more of Mrs. Shaw’s students recorded their own movements in the space. Both classes had opportunities in science class to explore in the habitat, but Mrs. Hart’s class went into the habitat more frequently over the year than Mrs. Shaw’s class. Mrs. Hart did not go outside as often as the previous year, though, something her students consistently reported. The children knew the frequency because they looped from fourth to fifth grade with Mrs. Hart as their teacher. Both classes did their maps with Mrs. Hudson in science class; she set up the directions inside the classroom and the students went outside to do the mapping. Both classes did their event maps in March. The table below helped compare the statements made by the students on their maps (Table 4). Mrs. Hart’s
students not only included details in what they recorded, but they also were attuned with shifts, changes, and loose parts of the habitat and included questions. Several students from Mrs. Shaw’s class included details, but the overwhelming pattern was that Mrs. Shaw’s students recorded the detail of their movements and Mrs. Hart’s students recorded the details of what they moved through.

Other comparisons of children’s experiences based on how much time students spent in the habitat naturally distilled from the data. Mrs. Foster’s sixth grade and Mrs. Murray’s fourth grade had weekly time set aside for the habitat. Mrs. Murray’s Wednesday mornings at ten o’clock were committed to nature journaling; Mrs. Foster’s Monday mornings at nine o’clock were reserved for exploration based on the Earth science unit the students were investigating at the time. Mrs. Murray’s nature journaling encouraged free interaction when the children chose what they wanted to sketch and write about, while Mrs. Foster promoted a focus for the students. Conversely, Mr. Norris’s sixth grade students only went out into the habitat twice during class time and Mrs. Frederick’s students did not go into the habitat during classroom time at all. For the children with recurrent, consistent time in the habitat, their record in a notebook was detailed, used correct names of local plants, birds, and wildlife, and the tone during
Table 4  
*Event Map Response Comparisons Between Two Fifth Grade Classes*

<table>
<thead>
<tr>
<th>Mrs. Hart’s Class</th>
<th>Mrs. Shaw’s Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>The leaves on the shrub oak are orange, hard, and curly. The leaves are about to</td>
<td>Looked at memorial.</td>
</tr>
<tr>
<td>fall to the ground. There are black, little balls on the trees.</td>
<td>Sit on table.</td>
</tr>
<tr>
<td></td>
<td>Stood on table.</td>
</tr>
<tr>
<td>The pond is like a swamp, before it was like a clean lake (smaller).</td>
<td>Looking at dry edge of water; Put head over dock.</td>
</tr>
<tr>
<td>There are pine cones growing on a pine tree! I knew it was spring!</td>
<td>Hunted for grasshoppers.</td>
</tr>
<tr>
<td>I think a vole lives here. I found a burrow.</td>
<td>Hole.</td>
</tr>
<tr>
<td>The burrow is covered with leaves.</td>
<td></td>
</tr>
<tr>
<td>Saw an interesting plant. Featherlike leaves?</td>
<td>Standing in a cove with a rock.</td>
</tr>
<tr>
<td>Acorns gone.</td>
<td></td>
</tr>
<tr>
<td>I stopped by a small tree and saw dangley [sic] things on it. What are they called?</td>
<td>Looking at dead flowers on tree</td>
</tr>
</tbody>
</table>

their habitat experiences in science class was calmer. In the classes without consistent
time in the habitat outside of science class, the students did not show the same
familiarity. Mrs. Frederick’s Fourth grader Jenna, in her go-along video, struggled to
see past the major features like the large pine tree, the welcome sign, and the pond,
while Mrs. Murray’s fourth grade student Eddie paused to draw a wood chip stuck in
the ice on the surface of the pond. The scale of the students’ attention was, for the
most part, different based on the consistency with which they had the opportunity to
go into the habitat during the study period.
Carson Elementary’s students had experiences of critical thinking and curiosity in the habitat. The children posed questions naturally, without being directed to one particular plant, animal, track, or gall. The freedom of interaction balanced with promoted frames of attention from the teachers, provided a place where children could think critically and attend to the finer details of a natural environment, therefore finding a deeper level of knowledge about the habitat’s ecological systems. The students gained confidence as they gained knowledge about the habitat and the familiarity with the place allowed them the opportunities to notice changes between seasons and multiple years. The students questioned, reasoned, and solved problems and they were awed by what they were able to explore. As the children constantly interacted with the habitat and expanded their knowledge through their actions, they felt a deeper sense of ownership and attachment to the place. These attitudes contributed to the identity children claimed in the habitat, relevant to the next emergent theme from the findings.

**Ownership and Identity**

The evidence indicated that Carson’s community valued the habitat. The school publications in print brochures, websites, and family communications featured the habitat as a central component of the school’s identity. The parents supported the science teacher’s salary with parent organization delegated funds within the school budget. The funds were intended to provide children with extra opportunities to spend class time in the habitat in science specials. The school district also found value for
the habitat. The district administrators brought guests to the school infrequently for five years, then featured Carson's leadership team and students in a documentary that was used to promote schools of choice by highlighting an elementary school with a strong sense of identity and purpose. Even the teachers who did not regularly take their students into the habitat spoke about the area with great pride with the children, parents, and other teachers. Every layer of Carson's nested systems valued the habitat which reinforced the sense of ownership and identity that Carson's students associated with the place.

The findings indicated a second theme of ownership and identity in children's experiences. The resonant dimensions supporting this theme are understanding the unique situation of a school habitat, getting access to nature, feeling similar emotions as in special places and with special people, safety, stewardship and legacy. Children valued the habitat because they knew it was unique for a school setting and because many of the students did not have another place to go to access nature with the same quality of time and exploration. The children felt a strong connection to the habitat because they associated their feelings in the habitat with the feelings of other special places and family. Students at Carson also felt safe in the habitat. Carson's students felt a sense of place evidenced by their stories and favorite places and their sense of loyalty to the habitat. Carson's students experienced respect in the habitat for the place and for each other. Lastly, students at Carson felt an intense need to give back and take care of the habitat. The findings indicated that their connections to the place
were linked to the actions of planting a tree, cleaning up trash, and spreading mulch. The sixth grade students at Carson planned and executed an entire work day to leave a legacy of service behind before moving on to middle school, which included the creation of two murals. The first relevant dimension of ownership and identity explored in the findings was how the children understood the unique opportunities offered to them by the habitat.

_I've Never Been to a School with a Habitat_

Children at Carson Elementary did not need to be told that a schoolyard habitat was unique. All of the children who had ever attended another elementary school explicitly stated that Carson Elementary was special because of the habitat. Most of these students compared Carson’s habitat to the landscape around their previous schools. Many students reported feeling not only lucky to have the place, but that Carson was a better school because of the habitat. Sitting at the picnic table in the sunshine, Renne remembered how she felt starting at Carson Elementary in sixth grade, “When I first came here and I thought about the habitat I thought it was going to be small and we didn't have very much to do. And now I come here and take the tour of the school and my mouth dropped.” I asked if that was her first impression. She replied, “Yes, because when I heard about the habitat, I had never been to school with the habitat before. And then seeing this just kind of shocked me.” My next question to Renne was if the habitat made her feel excited to come to Carson for sixth grade; she responded, “Yes. Yes it did. This is like,” she paused, “the habitat is one of
the things I am happy about going to the school because it's kind of unique. And there's not very many places that actually have stuff like this. It is kind of, I like being part of something that is unique.” Connor sat next to Renne staring at the table nodding in agreement.

Another term used often by many students was “special;” not only was the school distinct but the children themselves felt special because of the habitat. Rocky, a fifth grade boy who struggled to make emotional connections to other people, felt special when he was outside in the habitat. Being in the habitat made him happy. Every child interviewed reported feeling happy, free, or excited. Logan was a fifth grade boy often observed bounding through the habitat unable to sit still for long; I asked him to describe the feelings he got in the habitat. “It feels great to be there because you’re surrounded by natural...natural nature. It’s not like reading out of a textbook and it’s actually getting to see what actually happens,” he replied rapidly.

“Logan,” I asked, “how would a character in a story describe it?” Logan got quiet for a second and looked out of the library windows into the habitat; in a dramatic moment, he replied, “I would describe it like...Every time he goes out into the habitat he feels he has some special need in the habitat.” The unique essence of the naturalized part of the school was not lost on the children; based on the interviews, go-along interviews, drawings, and interactions between children, it is reasonable to say that the students were emotionally established in the habitat.
Access to Nature

When I asked Michael Z. to tell me about his favorite time in the habitat, he told me about being in the habitat for the first time in his slow, thoughtful way, “It was pretty exciting... cool... it was probably the first place I’d ever been straight out in the wild.” Michael was not new to Colorado; he lived in a north metropolitan suburb of Denver until the previous year. Michael’s family spent time hiking at Carson Rock, when he was allowed to run ahead on the trail. But, to Michael, the habitat was not just a garden or a plot of land connected to a school; when Michael was in the habitat, he was in the wilderness. Michael’s time in the wild was valuable to him. On nature journaling days, Michael always started up the hill near the pine trees alone. His dark eyebrows and pale face furrowed over his blue eyes as he made the same movements back and forth, stopping to investigate and record what he noticed each day. His movements in the habitat matched his personality: slow, thoughtful, careful, and purposeful. Outside, he was typically on his own and in the classroom when the class shared their thoughts from the day with Mrs. Murray, Michael listened more than he spoke. Michael Z. was not the only student who expressed the sensation of wilderness.

The children without access to natural settings outside of the habitat were equal in number of study participants to the children in the study with access to nature. For sixth grade boys Jake and Tim, the peaceful and calm “nature-y” places were described as hard for kids to find on their own. Yet, the relaxed and easy
expressions of children in the habitat were observed equally throughout all of the participants. Eddie and Tony were two of the boys who reported that they did not have access to another natural setting to explore. To observe Eddie and Tony, it would be easy to assume the boys spent countless hours in natural settings, yet both boys reported the habitat was the only place they had to explore nature. In the Impressionistic Record, my reflection of a February nature journaling activity recalled the intuitive activity of the boys:

Tony - I watched him as he watched intensely the ground around him. His gaze was down on the ground as his pencil moved, observing the shadows on the wood chips and the wood chips in the sun. Later, when I asked him why he chose that spot, he referred to seeing wood chips with ‘designs.’ In the video, his head looks down, turns right, looks down, turns right...rhythmically from his book to the wood chips...entrenched. He stood once and looked behind him. I wasn't sure why. He told me the wooden pole that made a shadow was behind him. He was looking back at it, placing the source of the long dark shadow.

Eddie - the leader in the scrub oak. We all walked to the top of the hill to look for mountain mahogany, a plant that is part of the montane shrubland community of plants. At the top of the hill, Eddie immediately stepped into the scrub oak, his red sweatshirt the only thing keeping him visible through the branches. As a teacher, I would have asked him to come out immediately...what a spoil that would have been to the entire class’s experience because as Eddie hedged in, one by one the other students started to join him. First Tony, then Isabella (who had been wandering away from the group toward the top of the hill). Rachel, Nancy, and Tony picked up trash and found large bags in the middle of the mt. mahogany bushes, then noticed that the kids are inching toward Eddie in the woods.

Eddie, Tony, and Isabella came out and went in like a fish in a coral reef...testing the boundaries to see when the teacher would take notice and approve, or more likely from the look on their faces watching her intently, ask them to come out. When she didn’t, I gave the video camera to Isabella and
asked her to record the walk through the thicket. Soon, the entire class was on the path through the woods with Eddie and Isabella leading the way. I was in the middle of the pack, 5-8 kids ahead of me (aside from Isabella and Eddie, I can't see the rest of them, only an occasional sweatshirt).

The children were fifty feet from the school building when they entered the woods, yet their reactions around me made me feel like I was an explorer in new territory millions of miles from civilization, much less the school. I heard things like, "this is so cool!" and "I've never been here!" and "Look! Look how beautiful this is!" Eddie yelled out, standing in meadow clearing of scrub oak.

The two boys did not hesitate as they moved from quiet observation with the nature journals, to the physical expansion as they explored the woods. They were not only comfortable in the natural setting, they interacted with the habitat in a familiar way.

Chelsea’s familiarity with the habitat was unique because she shared it with her brother and mother more than her classmates or teachers. Chelsea’s younger brother was in third grade and had a special curiosity about insects, reptiles, amphibians, and other local small critters. Chelsea credited her own understanding of pollination to the explanation by her brother one afternoon in the habitat after school. Fostered by their mother, the two children were given countless opportunities to explore the habitat before, after, and outside of school. Chelsea was similar in personality to Tony; she was deliberate and slow in every action and thoughtful before every response. After the go-along interview with her in April, the following was reported in the Impressionistic Record:

We moved onto the plum next to the pond that was flowering with small white flowers. After standing for a minute, I noticed a huge bumble bee with a bright
orange stripe across its abdomen and large black wings, hearing its loud hum before seeing it. Then, Chelsea noticed hundreds of honey bees, one on each blossom. Again, we stood and watched quietly. What I wanted was for Chelsea to verbalize her experience, but then I realized that we were naturalizing. Chelsea was intuitively stopping, standing, crouching, looking, waiting....a rhythm of observant routine that she was very comfortable with. She did not need to verbalize because her movements told me enough. I relaxed and we watched.

Next, we moved to the butterfly garden, watching for color and looking for plants with fuzz (like the white cotton-like galls), and then arrived at the far end of the pond. This was Chelsea’s favorite spot. We stopped, looked, listened. She spotted a spider and told me about finding frogs. I asked her what kind. “Leopard frogs!” she confirmed. She was exact.

Chelsea knew every detail of the habitat including what to expect in other seasons showing a sophisticated temporal understanding in addition to her spatial knowledge of the habitat. Unlike Eddie and Tony, the evidence suggested that she had a parent who created access to nature for her children. Chelsea explained that the habitat gave her a feeling of excitement that she did not really feel anywhere else. Chelsea and her brother could have gone anywhere to explore and they typically chose the habitat.

Connections to Special Places and Family

Children did not always explicitly say how they felt in the habitat, but verbally connected the feeling to other experiences. Participants recounted feelings of familiarity related to home and family. Carson’s students came from a diverse background of experiences and comfort levels outdoors, where the definition of outdoors ranged from time outside in the neighborhood to family outings to the Rocky Mountains. Beth noticed feeling the same emotions in the habitat as she did
when she went to Rocky Mountain National Park with her family. Zack explained that he felt the same way in the habitat as when he was helping his grandfather walk through nearby wilderness areas looking for deer and elk antlers for the chandeliers they built together. David gave me a tour of his forts in the woods and we tucked our bodies between the trunks of scrub oak. He explained the sensation of being in the woods like being in the mountain forests. Jake connected the feeling of the habitat to when he is hunting with his father, Tim connected the feeling to being in the forests of his family camping in the mountains, and Connor described a camping trip when I asked him how the habitat made him feel. Travis, Delaney, and Ava described the habitat as feeling like their backyards. Alice connected her desire to plant flowers in the habitat to planting flowers with her mom; Lilly talked about her grandmother’s love of wildlife when she discussed her feelings about the rabbit that she observed near the pond in the habitat. The experiences in nature out of the habitat influenced the experiences with nature in the habitat. The warm emotions connected with positive experiences were common in children’s explanations of how the habitat made them feel when they explored natural settings in contexts away from school. The children did not label their feelings, instead they explained experiences and people that exemplified the sensations. For the children at Carson without experiences in nature, the habitat provided new, equally emotional opportunities to connect with nature.
The sentiment related to home and comfort in the habitat was directly connected to the children’s sensation of safety. Sophie, Beth, Ava, and Connor illuminated the children’s expressions of feeling safe in the habitat. Sophie was a petite fifth grade girl with blond hair and a voice that sounded younger than her ten years. Sophie was insistent about her passion for the habitat. When I interviewed her with her best friend Ella, along with Michael A. on an unseasonably warm afternoon in January, she was frequently distracted from the conversation by an occasional rustling in the cattail reeds or bird call in the scrub oak as we sat at the concrete picnic table. Only a few minutes into the interview, I had to remind all three children to let one another finish speaking as they rapidly shared their stories and questions. To describe the habitat, Sophie began, “I would say it is a beautiful place and when you come back here you will be surrounded by many beautiful things and you will just feel safe.” Sophie described herself as an “outdoors kind of girl” but she also described herself as someone who felt scared very easily and as someone who sought safety with the people around her. She did not feel scared in the habitat, nor did she act frightened by the usual suspects when observing bees, wasps, and snakes. “I only don’t feel safe here if there is a cougar,” Sophie commented. During a later conversation, I asked her if she had ever encountered a cougar and she said no, but she knew they could live in the areas because it was their natural habitat. Instead of being afraid, Sophie was aware of how the natural system functioned and where she
could move and explore and still feel safe. Sophie was safe in the habitat because it was a familiar place that she understood, associated with teachers and friends that she loved.

People also made Beth feel safe. Beth, Delaney, and Jimmy had lunch with me in the habitat on the afternoon in January after Mrs. Hudson first let the class explore the woods in science class. That morning, I noticed that Beth had her notebook open for the entire time the students were outside and I asked her to share what she had written. Beth was a meticulous writer; her passion was poetry and she reported that she often used the habitat as inspiration. She sketched, but most of her written record was in narrative form. On that particular day, she wrote:

“On the previous page I did not mention the fact that we went down into the open space during our extra wonder time with Mrs. Foster. Then, we got down to the ditch/river (is it man made or not?) we turned right. As we traveled up or down river we spread out... As I continued down river, I came upon a group of dead or hibernating (?) cattails. I wondered if this was the end of the river or not but a groove of scrub oak was preventing me to see. I could’ve gone through it but that would have been disrespectful.”

Aside from her insistent record of inquiry, Beth was reluctant to go into the woods. I asked Beth about the scrub oak and she quietly replied, “I like having a teacher down there because it is rough for me and I like being able to go and do something different. But I think that the whole class should probably be together in this area or have two teachers.” Jimmy and Delaney added that there was a necessary awareness that children needed to be down the hill or in the woods. I asked them what they
perceived as the greatest danger. Jimmy said getting injured by animal attack or getting cut by the scrub oak, Delaney answered that another person or animal could hurt a student, and Beth was concerned about children poking sticks into holes that animals would live in. Beth’s feelings about safety were deeply related to her desire for the habitat to be a respectful place. A later title in her notebook read, “The habitat: A place of nature and humanity.”

Both Sophie and Beth reported feeling safe in other natural settings under certain conditions usually related to the people with them. Ava’s feeling of safety contrasted her feelings at home in the woods behind her house, less than a mile from Carson Elementary. Ava’s favorite places in the habitat were the butterfly garden and the pond dock; she was drawn to the variety of colors in the flowers and the changes in the pond depending on the season, and even the day. When Ava came into the science room to meet with me, she sat in a metal folding chair that dwarfed her small, dark frame. I sat across the table facing her. She started explaining her favorite places in the habitat before I could get the recording started and sat still with her head tipped down and her large brown eyes looking up. She described the woods behind her house and I asked if she explored in the woods at home after she went into the scrub oak during a recent Wonder Day in March. She nodded, then explained that the woods at her house were dangerous because there were rocks and people on a nearby trail. She used the words “scary” and “dangerous” to describe the woods behind her home, but “pretty cool” and “awesome” to describe the woods at school. The woods
behind her house were perceived as too dangerous to explore even though it was the same ecosystem surrounding the habitat because in the habitat, she was with adults and peers that she trusted while at home she was anxious about people she did not know. I asked her what the most dangerous part of the woods was, to which she replied, “You could probably have an earthquake happen and the trees would fall over.”

The sensation of fear that children felt in the habitat, both improbable like Ava’s and based on their understanding of the ecosystem, were most often stated by the students, but rarely observed. David was concerned about children getting lost, but he explored new trails through the woods every chance he had during class. Other children reported a fear of wildlife, most usually wasps, but very few students were observed being bothered by the insects. During a warm fall day, Mrs. Foster’s class sat on the rock steps for two minutes of silence for the first time after wasps moved into a hollowed out burrow under the ledge created by one of the top rock steps. As the wasps became sensitive to the group of children sitting near the entrance to the hive, they began to swarm Connor who had the unfortunate opportunity to sit closest to the hive’s opening. The students, in their careful silence, noticed the wasps gathering around Connor’s head, but stayed seated. Noticing the rapidly growing number of wasps, I asked the students to calmly stand up and move in slow motion to the top of the steps. No one panicked and as soon as Connor was a safe distance from the wasps, he took his first breath in minutes and danced around, shaking his arms
around his head. Later, when I asked Connor about the incident during a go-along interview, he laughed and told me that it made him appreciate bees and wasps even more. As he joked about the wasps, he stood filming the blooming spring plum shrub covered with bees. He was not deterred by them and was also not afraid. In a similar reversal of fear, Chelsea also reported in a go-along video that seeing a garter snake made her less fearful of snakes. It was undetermined how much of the perceived fears in the habitat were related to previous experiences or cultural stigmas. The evidence suggested that children's experiences with the things that they feared in the habitat alleviated, to some degree, the anxiety the children felt around that fear. The opportunity to see a snake or a swarm of wasps created stories for those children, an essential component of the children's sense of place.

**Sense of Place**

A sense of place reverberated throughout the study as a relevant dimension of the theme of ownership and identity. The children were connected to the habitat by their own stories and memories created through free and promoted interactions with the nature and each other that imbibed the habitat with meaning. In the reflection on this dimension that emerged in the Impressionistic Record, I found a metaphor for how I came to understand sense of place and used it as my lens for observations in the study:

My father has a map of the world hanging in his basement. He laminated it and pressed it onto foam board so that he could place a push-pin at every
location that the people in our family have visited. My push pins are yellow, his are blue. My father travels throughout the Middle East for work as a survey engineer; the locations he has visited are more than the push pins. The push pins are symbols of meaningful experiences found through smells, tastes, people, and physical movement in a culture where he is a guest. When I view the map, the blue pins are symbols of locations that my father has traveled. My yellow pins are imbued with smells of southern African cities, friends, food, and textures; these stories permeate the symbols of the yellow pins. In both colored push-pins there is meaning, deeply for the person who placed it there. Even in the case of a small town in Mexico, the yellow and blue pins lean away from each other sharing a hole in the map, but the meaning, the experiences were vastly unique because my father and I are not the same person and did not share the same stories.

My home with my husband and daughter is a physical structure infiltrated by the same sense of place. The space is filled with meaning; my family inhabits every crevice of the home as our stories occur. We have ownership literally, of the place, but also we feel a strong sense of belonging here. We plant and tend the garden every year, we replaced the broken door knobs, we chose the color, we manipulated the structure to fit our needs and tastes. We giggled watching the dogs play in this room, we shared countless meals at the table, we sat on the stairs to share sad news. We made it ours.

Using the metaphor of stories pinning people to a physical place with meaning, the evidence implied that Carson’s students were anchored to the habitat in the way my travels are pinned to a map; the children were held by their own individual stories as well as their shared experiences.

Children’s belonging to the habitat was created through memories, stories, and favorite niches after several months or multiple years at the school. The habitat gave children a sense of the school’s identity as the school of science and inquiry, and gave some of the students a sense of self-identity. Alanna recalled being in Kindergarten when Mr. Granger’s fourth grade class was designing the habitat, “I remember a day
before the fourth and sixth graders came in our classroom and asked what we wanted in the habitat. Then the whole class stands up and goes, ‘A pond!’” When she was in fourth grade with Mr. Granger as her teacher, she knew that taking care of the habitat would be part of her responsibility in his class. Alanna and Elizabeth explained the feelings associated with caring for the habitat that included spreading mulch out around the plants and trees in the spring two years ago. Elizabeth described that the girls, not the boys, did the bulk of the work and she felt tough by proving to her male classmates that girls could handle getting dirty and hard work. As Elizabeth, Alanna, and Travis spoke, we were standing at the top of the rock steps in the habitat on a clear day after a fresh snowfall. Elizabeth looked around at each place she delivered mulch like she could see the memories despite the blanket of snow. I asked her if she ever got dirty or enjoyed digging around before that work day. She smiled, showing her braces, and replied, “I didn’t before. Before I came here. I didn’t like any of that.” It echoed an earlier comment made by Alanna, “I remember the first time I came here and I remember how I felt and I have many memories here. I feel like there’s a piece of me in the habitat. That sounds really mushy, but I feel like that.”

Whether or not the children had attuned to the finer details of the habitat and despite how often they were provided opportunities to be in the habitat during the school day, many of the students had rich, detailed personal stories of the habitat. Most of the children’s memories were connected to wildlife sightings of snakes, deer, and most of all, leopard frog sightings in previous years; as evidence in the curiosity
and critical thinking theme indicated, the more frequently a child was in the habitat, the more detailed her/his observations were. The leopard frogs were considered a species of concern by the state wildlife agency; when the students first found them in the pond, the frogs became a symbol of how Carson Elementary helped wildlife by providing a healthy, aquatic habitat. Children’s stories varied from someone falling in the pond and getting their shoe wet, to observing two wasps attacking newborn rodents under a pile of cut grass next to the pond. Ella, a fifth grader, laughed as she recounted the time when I bit into an acorn to crack it open revealing a small, milky grub inside. Archer, a sixth grader, recalled being able to see and hear the habitat through his second grade windows. Last year, fifth grade teacher Alice Dekan brought her students down the hill for nature journaling every Friday morning. The children were allowed, even encouraged, to spread out and record the plants and evidence of animals that they found. Mrs. Dekan was a tough, loving teacher and the children loved her back. They were familiar with the area and knew they were trusted to explore, and also knew the consequences for breaking that trust were non-negotiable. The students from Mrs. Dekan’s class were in sixth grade this year and reported vivid memories of their time down the hill. Gus walked me over to a place near a patch of scrub oak and explained the old, dried stem as where he and Peter found a mason bee last year. Alanna and Elizabeth wandered along the stream bed looking for small fairy houses they built, knowing the exact placement of each one. The children’s memories were tied to the explorations down the hill, precisely to a moment of finding one
insect and remembering it by its common name. The mystery of the hill pulled on their sense of adventure and the infinite possibilities sparked their curiosity. Every story contained emotion and enthusiasm for the memory as they were shared in interviews, on paper, or during informal conversations during observations. Every story also held a deep familiarity that provided evidence to the richness of the particular experience that came from time during the school day; someone provided opportunities for the children to get outside. The findings did not indicate who had consistent access to the habitat in previous years. More evidence supporting the theme of ownership in the children’s experiences illuminated shades of a fiercely protective sense for the habitat. The sense of guardianship for the living and non-living felt by most participants emerged as acts of stewardship in the habitat.

Stewardship

The students became stewards of the habitat when they were asked and without being directed by their teachers. Children championed the habitat by picking up trash almost unconsciously as they walked through the place and forming a clean-up club that met after school once a week. Stewardship was meaningful to children and the students participated in Legacy Day, a sixth grade day to give back that took place in the habitat on Earth Day.

Random acts of clean-up. Carsonville had two types of wind: no wind or gale force winds. The dumpster was next to the cafeteria at the top of the hill from the habitat; the staff in the cafeteria had a difficult time opening the large plastic flaps
that hinged down over the top of the dumpster, so they left the dumpster open. The wind would swirl inside of the dumpster and anything loose was tossed into the air barreling toward the scrub oak where it landed, tangled in the branches, eventually making its way to the leaves on the ground. When Mrs. Murray walked with her fourth grade class to the top of the hill for nature journaling, the children spread out into the woods. Tony came out of the branches twice with large pieces of plastic and paper in both hands, then put it in a bag that Rachel found tangled in a tree. She explored the scrub oak with the bag hanging on her arm. Her movements mimicked a chicken, stopping every five steps to bend down and gather food wrappers, loose paper, and pieces of plastic like soda caps then standing straight up and moving on.

On another occasion, Alanna and Faye from Mrs. Foster’s sixth grade class gathered on the pond’s dock. Alanna stood looking into the pond, hands tucked in the sleeves of her bright pink hooded sweatshirt, the sky blue but the air so cold that I could see her breath. She heard another child say that a two-foot tall statue of a turtle with a rabbit on its head holding a sun dial was in the pond. Faye, sitting next to Alanna, jumped up as Alanna cried, “What?” Faye stood close while two other students gathered behind them. “Why is it in the pond?” Alanna looked at me, speaking in a high loud voice. For the next five minutes, the group of girls, shocked that anyone would do such a thing, worked to find the lightest person to walk on the frozen pond to extract the sun dial statue. As they worked, they discussed their feelings of disbelief that any individual would throw anything into the pond,
including the pencils that they found upon closer inspection, under the ice. The respect for the habitat was clearly contested by the trash in the woods and objects in the pond, though it was difficult to find the moments of disrespect in participant observations.

*Clean and Respect Earth (CARE).* The children’s regard for the habitat culminated into a group of five children that came together to do trash clean-ups after school once per week for the last five weeks of school. From Mrs. Murray’s fourth grade class, Isabella and Rachel approached me during lunch in March and asked if I would be the adult outside with them while they picked up trash. It was the day before the student’s grueling standardized testing began, so we agreed to meet in two weeks to find a time that would work for them and for their teacher. Two weeks later, Mrs. Hudson took Mrs. Foster’s sixth grade students out for a Wonder Day during science class. She let the students explore in the scrub oak and they began to pick up trash. The energy to untangle the trash from the leaves increased. Mrs. Hudson reported that the forty minute period turned into a major clean-up effort. Afterwards, Fred, a tall, blonde, eager boy who spoke very quickly, went inside and told Mrs. Foster how concerned he was that there was still so much trash left. She encouraged him to talk to me about finding a time to go out.

I gathered Isabella, Rachel, and Fred together during the fourth grade lunch period. We met in the fourth grade break out area, I asked the children how they wanted to coordinate cleaning up trash. We met for twenty minutes and discussed the
logistics of starting a clean-up project every week. They wanted t-shirts and busses to transport families; more within the scope of the project were tools like gloves and trash bags. They assigned themselves tasks for recruiting teachers and students and we planned to meet the Tuesday after spring break to finalize the details. They decided to take small sections of the woods each week, starting with an area that Fred observed with a lot of trash down the hill. I asked each child why they wanted to spend time outside of school picking up trash. All three children explained that they were motivated by television’s depiction of dramatic bird deaths from plastic bags or rings, the Disney Channel’s recent campaign telling stories about children who did community projects, the recent Gulf Coast oil spill and feeling powerless, and philosophies about the human race. When I asked where the trash came from, they all agreed that in general, trash came from lazy people in cars throwing litter out the window. The children’s motivations were interesting. The habitat gave the children a way to take an action that was manageable and made a difference with larger, looming issues on their mind. They picked up trash for thirty minutes after school every Wednesday for the last four weeks of the school year. Only three other children joined their efforts and Rachel never came to a clean-up because her parent could not arrange transportation home for the girl. The students decided to call themselves C.A.R.E., an acronym for Clean and Respect Earth.

*Giving Back.* Children’s stories and memories were closely connected to acts of stewardship like those of the CARE group, except even the smaller actions were
powerful. Alanna and Elizabeth were not the only students that reported feeling a strong sense of their identity related to the habitat. Most frequently, this sense of belonging and ownership was related to an opportunity the children had to give back to the habitat through some sort of work project. In some instances, this involved planting one tree or pulling one weed. In other situations that children recalled, it was related to more involved projects like what Elizabeth and Alanna described. The event maps illuminated the theme of giving back more than any other data source. Twenty-one children out of the sub-group of participants (n=56) labeled a specific place on their maps related to work that was done. Seven children knew the exact location of a weed that had been pulled at the beginning of the year, or even in the past three years, during fall weeding days in science class. On the map near the picnic tables by the library, a fourth grade girl wrote, “My first time weeding. All was give me the chills [sic].” Another sixth grade girl labeled the same place with, “Put weeds in trash bags.” Even the most seemingly mundane details from the word events stayed with the students.

In addition to where invasive plants were taken out, the event maps also included where plants were put into the ground. The findings indicated a deep emotional connection that children felt as a result of putting a plant or tree into the habitat. Marissa wrote, “When I was in first grade right after I moved I helped replant the Butterfly garden.” 5th grader Cassidy even remembered where the tree was that her sister planted three years ago, casually marking her event map with, “Looked at
sisters tree.” Another fourth grade child wrote, “As I look up the hill, I remember the tree that I planted.” Next to the location of the tree, the child wrote, “Most of all I remember that I love habitats and always will.”

Two years ago, the planting and moving of mulch was an opportunity for Mr. Granger’s students as he coordinated and usually paid for materials for both projects. Last year, the entire sixth grade started the tradition of a day to leave a legacy with the school and the first Legacy Day was held on a Saturday morning. Children with transportation came and planted, mulched, weeded, and painted a mural on the concrete backstop on the playground. Out of five classrooms, only thirty students were able to come. As the study findings began to emerge that indicated the powerful impact of planting on the students, I shared them with Mr. Granger and the rest of the sixth grade team. As a result, the sixth grade teachers decided to make Legacy Day on a school day so that every sixth grade child could participate, and planned a time during that day for every Carson student to come out and plant a shrub or tree. The date was scheduled, appropriately, on Earth Day.

Legacy day. There was a buzz in the sixth grade rooms the morning of Legacy Day. Students filed into classrooms in shorts and t-shirts carrying materials requested by the teachers: five gallon buckets, gloves, small garden shovels, and water. In Mrs. Foster’s room, Bryan jumped over desks like a track and field event. Mrs. Foster noticed the flurry of activity from the break out area, and marched in to remind the students of her behavior expectations. The choreography of the day was loose; none
of the teachers had any experience with so many children doing work in the habitat at once. The general timeline was to have the students go to specials, have a morning meeting to set up the jobs and expectations, then to pull other classes in the school outside for brief times in the afternoon with the sixth graders acting as team leaders. The feeling with the sixth grade team was uncertainty and a “here we go” kind of approach. The students surpassed any and all expectations for a successful day.

After specials, the three sixth grade classes filled up Mr. Granger and Mrs. Stafford’s room. The set-up for the day was critical to the day’s success. The classroom was shaped like an outstretched trapezoid; the narrowest side of the parallel walls had windows above the habitat and the longest side was cabinets, a window to the break out area, and the door. The two angled sides were made of several panels that moved apart and connected to the other two sixth grade rooms on either side. The students entered through the moveable walls; Mrs. Foster’s students sat on the floor nearest their side and Mr. Norris’s students filled in the floor between desks on the opposite side. Mr. Granger stood at the overhead projector and screen on the window side of the room, watching each child as they settled in. Peter sat up on the cabinets opposite Mr. Granger with a video camera running. A group of students, including Gus and Remmy, went out to meet a class of morning Kindergartners to plant lilac bushes. Mrs. Stafford went with them. I stood next to Peter to observe.

Mr. Granger began the meeting with a firm, flat tone that indicated to the students his fun-loving nature was at bay. His posture and tone meant he was serious.
He began, “I appreciate you coming in the way you did. We have a really cool day. We’ve never done this before and we don’t know how long this is going to take. You can imagine that if you are Mr. Norris or Mrs. Foster how nerve-wracking that is because they don’t know what to plan for. So, I want you to turn to your teacher and say thank you.” Mr. Norris and Mrs. Foster smiled uncertainly and nodded their heads as the children said thank you in a sing-song like chorus. Both Mr. Norris and Mrs. Foster were operating in full trust of Mr. Granger’s experience with work days and students, the usual style for the sixth grade team. Mr. Granger continued, “I want to do this quickly so I need you to be totally focused and ready to go. I want to start with the purpose of today. After that, don’t ask any questions. We’ve never done this and you get to prove that Legacy Day can happen this way.” He continued as the students sat still and silent. Mr. Granger was known for his strong relationships with students. He spoke about a legacy, and a girl raised her hand and said, “It’s like leaving a part of yourself here.” Mr. Granger responded with awe at the statement shared by the girl and shared with the students that he felt emotional about the day because he was retiring; he wanted to leave part of himself with the school. He then moved on to expectations. The day was run on the rules from the students’ week long outdoor camp: three strikes and the students were out, using a menacing tool called “The List.” If a child’s name was placed on the list by any adult three times, the student was sent home. This was a strict and well understood policy, and proved a very effective management strategy. The rigidity of this policy was softened by Mr.
Granger’s open and honest style. “And I’ll be outside with the finest teammates I
could ask for,” he then said softly to the students, “I am going to be outside with some
of the most beautiful people I know in my life.”

The students were given choices of work to do while Mr. Granger drew the
location of each job on a map projected on the screen. The projects were weeding,
mulching, planting, and creating a crusher fine rock trail with Mr. Norris from the
science classroom to the habitat. Mr. Norris explained it as grueling work that would
demand the students be flexible, because he was not sure how it was going to work.
He would call students to the rock steps mid-morning to start that project. I also spoke
to the students and explained how other classes would come out to plant throughout
the day. Each class would have students in groups of three, the sixth graders would
make the fourth person in the group. The jobs for small groups were a digger, a
planter, a mulcher, and a person to water. Using a white board, I drew the process
step-by-step after which the students applauded my “art work.” I also explained to the
students that my role was as researcher, not as teacher for the day. The students asked
questions about the groups, the jobs, and the day. Children raised their hands and
volunteered for jobs based on the descriptions. They showed incredible resilience to
the ambiguity surrounding the day, even within the work that needed to be done. After
a forty-five minute meeting, the students lined up back in their respective classrooms
and went outside, ready to start.
The students spread out through the habitat based on the work they wanted to do. The voices in the habitat were calm and the students got right to work. Mr. Granger steadily moved from location to location interacting with the students in the various jobs. His boundless energy as a teacher served him well for the day. He did not stop moving until the students were excused. After twenty minutes, Mr. Granger called the students over to the rock steps and laid out the jobs again. In the background, the Kindergartners yelled out a cheer after they finished planting the lilacs along the trail from the playground and Mr. Granger told the sixth graders why they were cheering. “Just you wait! Just wait until you plant with the kids. They are so excited.” A large group of sixth grade students volunteered to help Mr. Norris on building the trail and the group dispersed.

The day was flawless. The sixth grade students moved in a respectful cadence. The teachers’ voices announcing what needed to be done were the loudest voices in the space. Mrs. Foster called for children to move weeds, Mr. Norris was heard talking about grading a trail to keep the water from washing it out, Mr. Granger was seemingly everywhere at once. Mrs. Stafford recorded the activity with her large, digital camera, pacing from one end of the activity to the next. Tim explained that he was on the wheelbarrow crew; he leaned back against the handles of a large blue wheelbarrow with a white baseball cap askew over his aviator style sun glasses. He was calm and cool, waiting for someone needing mulch so he could fill the wheelbarrow and deliver the goods. Frank moved slowly around the weeding project.
by the scrub oak, cautiously picking up weeds one stem at a time. He paused next to me and asked, “Mrs. Keena, if I see a snake, can I watch it?” Jake and three other boys tied orange flagging ribbon onto the rose bushes so that later in the morning the children who were weeding would know not to pull the marked plants. Archer stood in the background with a video camera filming. I stopped frequently to survey the scene, constantly navigating with the small stories unfolding and the larger picture. The tone of the habitat was the same at every scale; the students faces were happy and determined as they accomplished their work.

Children from other classes came into the habitat with abundant energy. The sixth graders who were interested in working with a group of younger children were called to the rock steps and Mr. Granger or Mrs. Stafford talked to the classes and introduced the jobs for each group. The sixth graders that helped knew the type of plant and location for the group. After the first group of fifth grade students, the classes seamlessly planted the trees or shrubs amidst all of the other ongoing work. There was never a shortage of sixth graders wanting to help and the number of sixth graders helping was never overwhelming to the younger students. At its busiest, the number of students in the habitat included seventy-five fourth grade children, forty Kindergarten children, and eighty sixth grade children. Elizabeth worked with fourth graders Marissa, Rachel, and Courtney and the girls skipped up the hill together. Mrs. Murray watched the activity in astonishment and said, “Isn’t this amazing?” Mrs. Hart laughed as her students made water dams below the cherry saplings and asked
how to follow up with watering the trees. Both women commented on the steady scent of the plum blossoms as the breeze picked up. Before the sixth grader’s usual lunch time, Mr. Granger called everyone to the rock steps to congratulate them on a successful morning. While the students were at lunch, the teachers met in the sixth grade break out area. The team agreed to let the students stay outside as long as they worked, giving children the option to stay in and read if they were tired. No one elected to stay in.

There was directed action and non-directed (perceptual) action in the habitat. The day was full of physical movement and directed attention on physical characteristics of the landscape including a connection of body and earth. This was evident through the digging, hauling, pulling, planting, watering, mulching, sitting, running, raking, pushing, and general maneuvering of the environment with hills, hard clays, slippery slopes, tangled branches of the scrub oak, and the dump-truck sized heap of mulch. There was also perceptual awareness of the hardness of the soil and texture of the clays in between children’s fingers to untangle dirt clods, the wind gusting through picking up sand and mulch and hitting faces, the itchy sensation on ankles and under gloves from the dried out grasses and knapweed, the feel of drinking water after working to haul wheel barrows up and down a steep slope or carrying large rocks up a hill to form a barrier to the maintenance crew’s mowers. The teachers did not have to direct the focus of the students to the larvae under the damp leaves, the spiders under the rocks, or the “ants with red eyes” near the boulders. The
teachers also did not specifically direct the attention of the students to the texture of the soil that was softer under the harder crust on top. These were not “outcomes” of student learning, nor benchmarks of the day, but every child in the habitat had an embodied perception of time with friends, a sense of worth and care, and physical fatigue by the end of the day. All of this perceptual learning was made possible by being in the place.

After the Legacy Day, I walked outside with Gus and asked him to show me about their work in the habitat on Earth Day reflected in the Impressionistic Record:

We walked up to the trail that he helped build. At first, he pointed out the trail as though it was no big deal, but as he talked about how they worked to dig out a level path and how his classmates moved rocks by hand up a hill, the pride of what they accomplished comes through his words and his smile. He looked around, eyes wide with a big grin as it settled in on him the amount of work that was done.

We walked back into the main habitat and he told me that he protected the golden banner (yellow flowers) where the mulch had covered them up. I asked the students to be mindful of them because the early spring flowers were in a direct path of the wheelbarrows and next to the area where 5th grade planted cherry trees, but I did not directly ask Gus to uncover them from piles of mulch. He described his efforts to lightly pull mulch from the flowers.

Gus was proud of their work but enjoyed the Kindergarten students more than any other aspect of the day. He took me to the plant and told me that the young children treated him like a gardener, “I felt like a teacher teaching them how to plant.” They
planted a lilac seedling that would grow to eight feet in height if it survived. I asked if he would come back to visit it, “If I still live around here,” he replied.

Delaney also took me on a tour of the habitat after the work on Legacy Day and led me up the hill to the back corner of the library where the path of the science classroom wrapped around the side of the building and began down the hill to the habitat. Her work was to move football sized rocks buried in the path to the steep hill above it. Every student in sixth grade heard Mr. Granger recount the story of his first fourth grade class planting three hundred saplings up on the hill and the district maintenance crew mowing them down the following week. No one was sure whose idea it was, but someone on Legacy Day saw the rocks being uncovered in the path and had the idea to create a long rock wall up the hill above the school to block the maintenance crew’s mowers. “So you hand carried the rocks to the wheelbarrow, then pushed the wheelbarrow up there,” I asked her, pointing to the steep hill. “Yeah,” she laughed, shaking her head. “Was it hard,” I asked again. “Yeah,” she said, “and I know it paid off.” I asked what other jobs she did that day and she told me about helping the third grade and Kindergarten students. “Chaotic,” she replied when I asked her what that was like, “There was a lot of people and there was in some cases, limited buckets and it was just chaotic and there was a lot of people out.” She looked happy as she described the scene. “Do you think it was good for the kids who came out to plant?” “Yeah,” she said, “It was good.”
Murals. The legacy of the sixth grade included two permanent additions to the habitat; two murals on the library steps, the design of which were voted on by the sixth grade classes and sketched out on the concrete by a parent/artist of a sixth grade student. The murals were intended to be done during Legacy Day, but with the anticipated activity, the mural painting was scheduled for the following week. The child who designed the mural was able to stay out and paint all day, the rest of the sixth graders worked on the painting for a shift, then rotated with other students. The first design was by Beth; it was a scene around a bobcat, the school’s mascot, including a sun, children planting trees, pine trees, and flowers. Beth’s painting was along a concrete wall of the stairs leading into the library that faced the picnic tables and patio below the library windows. The second design was by a boy who drew the school’s mascot. The giant head of the bobcat was painted in sections on the rise of each stair leading into the library. The mural was not visible walking down the stairs, but once in the habitat, when a visitor was facing the stairs, the mural was completely visible. Beth painted slowly and stepped back every hour or so to watch her design become the mural on the concrete wall. A steady rotation of students from Beth’s class came into the habitat, put on an old shirt as a smock, then found the color that matched the area assigned to them by the parent. The parent was patient with the students as they bantered and gossiped while they worked. Beth was quiet most of the day, smiling steadily and listening to the comments of classes entering the habitat for class while they worked. In the later weeks, students stopped dead in their tracks
when they saw the mural. When Mr. Norris’s class entered the habitat in their usual stream to the rock steps, it appeared that they were drawn to the painting. They moved quietly to the stairs closer to the murals, stilled for a few moments, then walked to the pond to begin their class. It was a lovely moment of recognition.

Three classes did not get to plant during Legacy Day because they ran out of time. To reconcile the students’ disappointment, Mr. Granger spent an additional day planting with the classes who could not participate during Legacy Day and students from his class to lead the small groups. It was too difficult to coordinate again between three sixth-grade classes. The day was overcast but warm, an unusually sticky May day in Colorado. In the background of the mural painting, the chorus frogs croaked and Mr. Granger worked with a small group of sixth grade students from his class to finish planting seedlings above the library. Tyler, Gus, Frank, Peter, Archer, Remmy, and Audrey worked with Mr. Granger, digging holes along the wall above the library next to the new path built during Legacy Day. The students carried buckets of mulch from down the hill and around the corner of the school near the playground and waited for another second grade class to clamor out breaking the stillness. The activity was less chaotic with fewer classes, but the children’s enthusiasm was consistent from Legacy Day. The sixth graders maintained a sense of grace and patience working with the younger children, and the younger children exhibited a mutual respect for the work. The clamor did not last long as the sixth grade children expertly assigned the young children jobs and moved fluidly to put the
thin seedings into the ground. Gus, Archer, and Frank meandered back and forth from a miniature shelter they built in science class at the edge of the scrub oak. The pace was calm and peaceful, the third strong theme that emerged in the study.

**Peace and Calm**

The intention of the habitat from the first thought in Skip Granger’s mind was for children at Carson to have a calm and peaceful place to read. Although his vision expanded to an outdoor classroom, peace and calm were instilled as resonant refrains throughout the children’s experiences. When the children were asked to describe the habitat, they consistently used the exact phrases “peaceful” or “calm.” The essence of solitude was found in observations of students in the habitat, specifically illuminated during two minutes of silence observed on the rock steps facing the dock at the beginning of most classes, and during a weekly fourth-grade nature journaling time.

**Calm Like a Museum**

When describing the feeling of the habitat, students did not refer to any one activity in particular. Their descriptions were general; the feeling of serenity that they referred to repeatedly was related to the place as a whole, or simply the idea of being in the habitat, not engaged in any one activity. The students explained the feeling of peace whether they were sitting in the habitat for an interview or in the science classroom. It was an all pervasive sensation that the children had related to the place. In the student interviews, more than half of the children used the terms peaceful or calm to describe the habitat. When the participants were asked to use three adjectives
to describe the habitat in the first event map activity, the same frequency of the terms was found.

Participants illuminated the essence of peaceful and calm when they were observed in the habitat and interviewed. Steven was a tall, thin fourth grade boy with reddish brown hair, freckles, and a shy smile. He rarely spoke out in a group. Instead, he watched students' faces and listened to their reactions. His movements in the habitat were quick when he was in science class and still when he did nature journaling with Mrs. Murray. Steven touched and moved the parts of the habitat that he was curious about. He was very comfortable sitting in the tall grasses on the ground, laying on his stomach on the dock, or kneeling into a squat with his long legs folded beneath his body supporting his weight, knees to his chin. He was not disturbed by spiders or insects, nor was he concerned with muck from the pond or dirt on his jeans. Steven looked like he belonged outside. He was constantly interacting with the habitat through his senses. When I asked Steven how the habitat made him feel, he quietly explained that he got the same peaceful and calm feeling as being in a museum. I asked if that was a good feeling to which he smiled and nodded evenly, “Yeah.” Ginger was a slender sixth grade girl with dark long hair and bright blue eyes. In the interview in the school’s library looking out into the habitat on a cold snowy day, she explained that the habitat was a place that made her feel relaxed, “like I can do anything I want to.” Sophie, a petite blonde child in fifth grade, described the feeling of peace from being surrounded by nature. And Jonathan, a lanky fourth grade
boy with large brown eyes, short uneven brown hair, and a high voice sat in a tree in
the woods, leaned on the trunk of the scrub oak in his fort and used an odd analogy of
cigarettes to describe the feeling of serenity. “I would describe it like fun and
interesting and calm....a natural calm kind of like cigarettes, except those are not
natural. I know one thing about cigarettes. Well, two. They make you cough and they
are bad for you. This [habitat] is very healthy.”

This overall description of peace was sharply contrasted by a fierce
resentment of classes or classmates that were loud or disruptive in the habitat. The
children valued the sense of calm in the habitat; the students’ sentiments about
maintaining the peace were directly related to the theme the students called “messing
around.” June’s advice to other teachers was to maintain the sense of peace by not
allowing students to yell across the habitat. But even when children who sought more
activity were louder, students looking for a sense of solitude found it by moving into
the quieter spaces. In sixth grade, a group of girls interested in finding out what a
milkweed pod was stayed up in the butterfly garden while the rest of the class went
down the hill. The voices of the children down the hill could be heard in the garden,
but there was a stillness around the dormant plants that maintained the sense of quiet.
The habitat was so varied in structure and form that children could find tranquility or
active adventure in the same time and space, while they could separate from one
another enough to find what they were seeking that particular day, in any season. The
diversity of affordances offered by the habitat helped children find what they needed
to satisfy a given mood. The most dependable ritual in the habitat with the essence of peace and calm was called two minutes of silence.

Two Minutes of Silence

Two minutes of silence was a routine established to allow students to settle in. My first job as a naturalist was as a teacher working summers in a river canyon. The founder of the then 53-year old organization used to say that the reason we did our work with students was to teach them to see. He meant that children needed help opening up to the infinite possibilities for attention in nature. During the first year as the science teacher, I established a routine called two minutes of silence to allow the natural activity in the habitat to resume after the students walked outside. Two minutes started as an arbitrary amount of time: short enough for the students to tolerate it and long enough for the students to find a palpable stillness. The routine was used consistently in science specials class for the past three years, but was not adopted by every classroom that went into the habitat for other lessons during the day. The short time period for everyone to be still was valued by the students. Connor explained it as, “the first place we usually

Photograph 2: Tony’s nature journal entry that he proclaimed was his best drawing.
go every day...so we can see.” Two minutes of silence was intended to welcome
attention from all of the senses.

On a cool day in January, Mr. Granger’s sixth grade class sat for two minutes;
they settled in physically making adjustments, before quieting down. The first sounds
were of kids on the playground, then of the students scratching at the rock steps, a
cough. Sometimes, during the silence, I used a signal to point out the wildlife. Birds,
especially when they were not making noise, were more difficult for the students to
discern in the tangled branches of the bare scrub oak. The hand signal, a simple
pointed finger at the end of my straight arm, was used to call their attention to what I
observed. In the field notes, I recorded a powerful example of this motion:

A scrub jay starts moving at the bottom of the scrub oak across the pond
inside the closest branches. I point silently. Three students squint into the
shrubs and point, then four then five. The large bird hops from branch to
branch working its way from the ground to the tip top of the shrub and stays.
Then most of the students are pointing silently. Audrey nudges Remmy and
points out the bird.

The domino effect of the silent signal was most useful for sounds and movement in
the habitat during the silent two minute ritual. The students promoted an interaction
between their classmates and the movement based on one simple signal. Rocky
attended to the bird calls, “the noises that birds make,” during two minutes of silence,
then immediately described the feeling as relaxing. Jake could not contain himself
during a two minute observation and enthusiastically “I hear a crow,” bubbled out in
loud words. For the most part, the students allowed themselves the quiet. Over time, the quiet became comfortable.

In January, the weather turned unusually warm and a layer of snow melted in patches around the habitat. The rock steps were clear enough for the sixth grade students to sit for the two minutes of silence ritual and they dutifully settled in. Some of the students found small pebbles from the trail on the rock steps and moved them around with small sticks or their fingers, while other students looked into the dried cattail reeds. Beth sat at the back of the rock steps, near a lone alder tree with bare branches except for the small brown cones forming at the tips of its limbs. She was always quieted by the time, but on that particular day and one day later in the year, she turned her face toward the sun, smiling, eyes closed. Her body did not move. Her notebook was open in her lap. Her eyes stayed closed for the entirety of the time and when the teacher said “Ok,” meaning, “you can move around now,” Beth moved at a slower pace. She opened her eyes, blinked twice in the direct sunlight, and sat still for a few more moments. Later, Beth recalled that feeling of peacefulness and explained that it stayed with her when she was back inside the school.

There were three tempos after the two minutes of silence: the first was an immediate movement up, like popcorn, where the students bodies went from sitting to standing movement in an instant. Most often, the next movement would be to the dock laying on their bellies with their heads hanging over the edge, peering into the water. The second pace was slower, like a stretch, to stand up, where the students
would look around scanning the habitat for a place to begin. The third pace was like Beth, like waking up, where the students sat for a few moments or a few minutes. In this pace, the students either opened their notebooks and began to write, or remained still with their eyes on the habitat but not necessarily focused on any one point. The students were afforded the time for their own pace.

Students appreciated two minutes of silence evidenced in the interviews with the students, event maps, and observations. Connor reported, “Whenever it’s quiet like this, it feels very...you want to spend all of your time out here.” Chelsea explained that she felt excited in the habitat and she started feeling that way during the two minutes, “Once I am there.” Mia described the starting point in her event map as “soothing and relaxing, duckweeds moving through the water.” Jake labeled the same rock steps with “quiet and peaceful,” and Allison labeled the rock steps with “I feel calm.” Ten students labeled the rock steps with “Two minutes of silence” on their event maps. Even the students who wanted to jump into the habitat without a pause sat quietly, sometimes painfully, but respected the ritual and other students’ desire to be still.

The most profound appreciation of the two minute routine was reported by Tyler during an interview with Peter in the science mobile. The conversation turned to video games and computers. Peter, confidently leaning back in the metal folding chair, shared with us that he enjoyed the multi-dimensional parts of nature. As he talked about the texture of the habitat, Tyler listened attentively. I asked if the boys
felt pressured to spend time with electronic media like their peers that they discussed earlier in the interview. Peter replied, “A lot of kids do.” Tyler thought for a moment and said, “I kind of do, but I realized just a while ago that a lot of things are electronic. Cars. Everything. And I kind of like it when I can get away from that sometimes.” I asked Tyler when he realized that and he responded, “I think it was when we were doing two minutes of silence out on the rocks and I started to realize that this is a really beautiful place to be right now.” Tyler was present in the moment, still enough to hear his own thoughts.

The reverse affect was observed when classes entered the habitat without pausing at the rock steps. In May, Mrs. Frederick’s fourth grade class earned an extra science class with Mrs. Hudson. The children, who did not go into the habitat during their regular classroom time, were exhilarated to be outside on the warm day. When the class came out, they came out loud and raucous, running and yelling. Six children ran straight into the woods and the rest of the class dispersed spread around the habitat. Mrs. Hudson was visibly rattled by the students’ actions. She called them to the pond dock and pulled them to the rock steps. Jenna was breathing heavily when she sat down. The flurry of activity lasted four minutes and had them all, the students and the teacher, unnerved. Mrs. Hudson sat on the edge of the dock facing the children, still moving and squirming as one boy’s leg ground a pebble into the rock by shaking it back and forth. She used a low, steady voice and sternly reminded them of two minutes of silence routine. The students finally grew still and I noticed that
Jenna’s breathing returned to normal. After one minute of the children’s stillness, the frogs started croaking. They were much calmer as they got up and restarted their activity for the day. The two minutes had an embodied effect; the children’s bodies relaxed with their thinking and attention to what surrounded them. I observed another class that did not adhere to the two minute routine, but their time was still and silent nonetheless. Mrs. Murray had her own routines for nature journaling that had the same pacifying effect on the children and the general essence of the habitat. It was reverent.

_Nature Journaling with Mrs. Murray_

Mrs. Meg Murray’s fourth grade class had a weekly ritual of nature journaling with her class in the habitat. Mrs. Murray, a veteran traditional teacher and wife of a Lutheran Pastor, was a delightful woman with short hair and dark thin glasses, a variety of stylish shoes, and a contagious laugh. Her students knew her as strict and loving and later remembered her for her singing and dancing while writing on the chalk board. Her calm composure was infectious in the culture of her classroom and that sense of mutual respect translated directly to the students’ experiences in the habitat. Most Wednesday mornings, Mrs. Murray would gather her students on the floor in front of a tall metal rolling easel with a flip chart paper tablet, and they would discuss the skills for sketching like a scientist. Like she did with the tracks, Mrs. Murray spoke in her gentle voice about observing, drawing accurately, and labeling the drawings. She thought through the troubles that she ran into the week before, like
trying to draw something that was moving, or seeing a pile of branches and assuming it was a beaver dam, and she worked through it for the students to be part of her thought process and problem solving. The students hung on her every word. They wanted to be a part of the observations that she described out of her own nature journal.

Mrs. Murray’s class did not practice two minutes of silence on the rock steps; instead, they walked out through the playground on the path and when they entered the habitat. They did not require the two minutes of silence because their time in the habitat was thirty minutes of reverence. The routine was to write the date at the top of the page and record the weather, then spend the entire time in one place observing silently and independently. In that time, the task was to draw with great detail and label the drawings as a scientist in the field would do. Then, back inside, Mrs. Murray asked the students to write a paragraph about their drawing and to reflect on that Wednesday morning in the habitat. The students found great attention for the finite details of the habitat throughout every season.

In September, Tony and Eddie each observed leaves laying on the ground and attended to every detail of the leaves for thirty minutes. Each boy drew a different leaf in his nature journal and labeled where part of the edge was missing, musing about the cause for the imperfection as an insect bite making the leaf look like a “pig face.” Their attention during nature journaling was similar, as they always stayed close to each other, but the independence of the boys’ attention was also obvious.
Eddie wrote the exact date as “Wensday [sic] September 29 2010” while Tony labeled his page “Wensday something.” Tony drew an alder tree leaf with such accuracy that I knew what it was before he told me where he was sitting (as he did not identify the tree by its name). He wrote, “Cold day breeze lightly blowing and clouds over head may rain, I thought.” Tony was probably absent the day after the nature journaling in September because his reflection was two weeks later, on “Wensday October 13, 2001” and said: “Once I was settled I found a leaf it was quite ragaty, and it was light green. It was enjoying because other leaf kept over laping the one I was drawing. Another thing I drew was a purple things that hung from thee tree branches. The one that was hard to draw was a little flower it was the size of a dime and was light white. Well thats all for today.” Tony’s attention to small details in his drawing helped him to recall not only the leaf, but the feeling of being annoyed by the other leaf blowing over it while he was drawing. He could recall this emotion more than a week after drawing the leaf. Eddie’s attention to small details was similar to Tony’s. He wrote: “A Wensday afternoon slity brezzy sunny out in the habitat. Im herying [sic] a dog barking at a house nearby. it stoped. I seen a leaf bitein out of.” In Eddie’s reflection the next day he wrote:

“A day ago a hafe bitein off of leaf and it was a Humunges leaf it looked like a pig face. I tuched once and it was over the leaf trombling to the ground a copl miniets after that I seen a woodchip mistrily it was beryed under a rock it looked as if it was a tent laded on its side. A little bit after that I seen teh 3
When I interviewed the two boys together in January, three months later, each boy still recalled exactly where he was sitting and how each leaf caught their attention. Tony told me that his day and drawing was his favorite; he said, “because I was really focused and it turned out really good. I like the leaf I was drawing...because it was like, it had a little, it had different kinds of bites like edges and smooth bites from bugs and stuff. It was on the trees that [Eddie] was talking about, it’s like the rock he was talking about, when you go on the trails it’s on the tree right above that.” The boys found details that were uniquely interesting to them and those details became a vivid memory. When I observed Tony and Eddie later in the year, they had the same focused attention that began to help them form questions about what they observed.

Tony and Eddie were not unique in their fixed attention to sensory detail in the habitat during the quiet nature journaling time. Mrs. Murray had a classroom of diverse students, personalities and academic capabilities, but every single student was settled and comfortable during the nature journaling time. In contrast to the feeling of serene comfort with Mrs. Murray, in January a substitute teacher accompanied the students out for the nature journaling time. Her set up in the classroom was different, and it was clear from her watchful observation of the students that she was nervous about having them outside. The teacher’s anxiety translated to the children as nervous energy. Steven especially could not get settled nor find the sense of relief he usually
pulled from the habitat. The students wanted the sense of peace and calm in the habitat; they depended on it to find the fourth emergent theme of respite and respect.

**Respite and Respect**

The sense of serenity that Carson's intermediate students identified with the habitat gave them a sense of respite in the place. The participants in the study reported feelings of relief from social and academic pressures when they went outside into the habitat during the school day. There was also an essence of respect in the habitat; the findings indicated that in the habitat children held a regard for the plants and animals, but also for one another. While students reported in interviews that other children were "messing around," or doing something they were not supposed to be doing, only several instances illuminated that dissonant aspect of disrespect. Similar to the theme of ownership, the children held the habitat and one another in high regard when they were outside. The resonant dimensions in the evidence supporting the theme of respite and respect were solace in social situations, "zooming out" from academic pressures, relationships, and the freedom to move and play.

**Solace**

On a brisk cloudy day in January, three sixth grade students from Mr. Norris's class sat on the concrete picnic table overlooking the drainage. June was a petite girl with almost white blonde hair, lightly curled and cropped at her shoulders. She wore thin wire frame glasses; her navy blue hooded sweatshirt over a Twilight t-shirt and bulky boots contrasted her skinny black jeans. She had sharp features and a light
complexion. June came to Carson in sixth grade from Wisconsin when her father’s job changed. Sappire was broader physically than June; she had shoulder-length brown hair and thin gold framed glasses. She wore a peach hooded sweatshirt zipped up to the top and jeans that gathered above her black skateboard sneakers. Sappire had a small, kind smile. With the longest tenure at Carson, Sappire came to the school in second grade. The third student was named Raymond, but he preferred to be called Boss. Boss was a tall, overweight boy with short dark hair that curled at the ends. He wore baggy athletic pants and a blue long sleeve t-shirt with white athletic shoes.

Boss started at Carson in fourth grade. Because of his weight, Boss was the frequent target of bullying and had learned to protect himself with sarcasm and by insulting other students. Boss learned to sabotage relationships before he could be hurt by other children long before he came to Carson. June was a girl that appeared to move between social groups easily; she described herself as a someone who worries a lot.

Out of the three students, Boss and Sappire were the closest friends and watched out for each other in a difficult social dynamic that existed in their classroom. They were in class together since fourth grade and established protection for one another and support for each other. Walking out to the habitat through the library, the Building Resource Teacher Mrs. Grant, pulled me aside to tell me how glad she was that Sappire and Boss had each other because they had unconditional kindness in their friendship. She had witnessed this during her observations in Mr. Norris’s room. During the interview, Sappire corrected Boss’s grammar and when the
conversation turned to painful teasing by other students, Sappire stood behind Boss and put her hand on his shoulder. By the end of the year, though, Boss had harmed his relationship with Sappire by insulting her in front of other students and when they left sixth grade, they were not talking to each other. On the day in January when we sat down to talk about the habitat, all three children were kind to each other; there was a great sense of respect throughout the conversation.

The three students revealed an aspect of the habitat that offered them relief from social pressures. Five minutes into the interview, Sappire described a place away from the boys in her class that teased her; “It makes me feel like I’m somewhere I can be, and not be angry at other people like the boys in my class, because those boys infuriate me.” Boss looked down at his hands in his lap and repeated, “Infuriate.” Sappire continued, “Sometimes those boys will say mean things to me...And I don’t like that at all. So I like to come out here and I go somewhere where no one is like up on the hill.” Although the three students did not name the children that they were seeking relief from, they did consistently refer to “the boys” in their conversation. Sappire reflected that the habitat was peaceful aside from boys screaming. Later in the interview, the children asked me how they were selected to be interviewed. June encouraged me not to interview the boys, “because they are so loud and stuff.” The habitat was their place to escape, but they also felt that not everyone in the class felt the same sense of solace. In that case, the feeling of relief dissipated and the children felt more frustration with their peers. The loudness confounded what really bothered
the children, revealed later in the interview when they opened up into an emotional
dialogue about feeling bullied by “the boys.” The children were not comfortable
sharing the details of the conversation in the study, only that all three were the target
of hurtful names and painful teasing. In the conversation, Sappire stood up speaking
louder as she spoke and Boss leaned over his knees sobbing. June was still with her
hands in her lap.

During the interview, Sappire asked several times if they could go up the hill
and “pop” a cattail when we finished our conversation. Earlier in the year, the
students discovered that the tightly packed seeds on the cattail, forming what children
commonly referred to as hot dogs, exploded with a slight amount of squeezing
pressure. The tiny seeds at the end of whispy light parachutes were sent out in a burst
as they were carried up into the air in even the slightest breeze. The three children
giggled and relaxed after our difficult conversation about bullying and feeling sad as
they walked to the top of the hill with cattails in hand. When they stopped, June
grabbed onto the cattail head and without hesitation, pulled out a handful of seeds.
The seeds exploded into a cloud. Boss and Sappire laughed like children and followed
June’s lead and in an instant, the three children were swarmed with a cloud that
swirled around them before either falling in a clump to the ground or being lifted off
into the air. It was like watching them go from holding their breath to breathing again;
they revealed the painful social intricacies of sixth grade and then became young
again playing with the loose parts in the habitat.
The relief children expressed in the habitat was related to social troubles as well as academic pressures. In March, after a week of intensive standardized testing, Mr. Norris’s sixth grade went into the habitat for the first time all year during class time. The frigid twenty degree temperatures did not keep five boys, including Boss, from laying belly-down on the dock to poke at the pond’s icy cover. What started as a general investigation into what children could find that was smaller than a penny, to promote their attention to smaller details, became a let down from the pressure around the state standardized test. Most of the students moved in clusters or pairs as they chatted. Over the twenty minutes, the activity level amplified as students found movement in the cold; the students’ movement was unceasing. Two girls discovered the icy cover on the dock’s surface and scissored their legs back and forth rapidly while their upper bodies remained still. After they slid through the ice, they pushed more snow onto the dock with their feet, then packed down the snow sliding in rapid, brisk movements. Soon, two boys joined them and the dock became full of rampant sliding, scissoring activity. When Mr. Norris saw the movement he asked the children to get off of the dock unless they were going to lay on their bellies. They stopped, uncertainly, and walked onto the rock steps. Three times they eased themselves back onto the dock and were asked to leave again.

In Mrs. Murray’s fourth grade, the same sense of relief was offered to children from the pressures associated with academics. Marissa, Steven, and Michael Z. sat
with me in the science classroom around the long rectangular table seated in metal folding chairs. Marissa sat across from the two boys. In their conversation, the children revealed a deep fondness for the habitat. I asked the children how they felt after spending time in the habitat and they reported a sense of relief from what they perceived as immense pressures associated with school. Marissa immediately responded to my question, “I feel at peace and, because just being outside calms me down. Except when people are talking and are not supposed to be, that makes me mad. But, I feel calm and I feel relaxed because it’s like you don’t have to worry about upcoming tests, you don’t have to worry about problems you are having. You just be outside enjoying the time you have out there.” I considered this and asked Marissa if she thought the time was about checking out or checking in with herself. “It’s zooming out. It doesn’t feel like you’re at school anymore.” Steven related the feeling of the habitat to the feeling he got from a museum, “It makes you calm, like nothing can bother you.” Taking all of this in, Michael rubbed his face and hair with his eyes squinted closed. “It feels like it is the only time I can be alone and at peace without anything to bother me. I just forget everything and relax and just think happy thoughts and rest for awhile and all that...When I am inside and all that, it’s like all the work is hitting me and I have a lot to worry about. Well I have to do this at home, dang I forgot my homework so I need a good grade. So when I go out it just goes away immediately.” As Michael talked, he relaxed. I was taken by his word choice and said, “Wow! Immediately?” Marissa jumped in, “And sometimes when you go
inside after you relax, the work just jumps and hits you right in the face.” Steven then added, “I wish we had a five minute break before we had to do that.” Overall, the children reported feeling that once they were in the habitat, it was more an adjustment to go back inside. There was such a relief afforded by the experiences in the habitat, free or promoted, that the children had to gear up to go back to school work or back into the complex social milieu.

Respect, Relationships, and Confidence

Along with the sense of relief, there was also an attitude of respect and confidence when students were observed in the habitat. The respect was shown towards the intricate living system and between students. Carson Elementary served high achieving students, average students, and students with severe personal and learning issues. Gabriella Cannon believed in children and was known to welcome any child to the school regardless of their history or label by previous schools. In one instance, a boy was kicked out of two schools before trying an online school, then the family requested Carson; this child’s history of expulsion was prior to fourth grade. The culture of Carson was unconditional acceptance. This culture was generous but not without disputes among the teachers and parents. As evidenced by Boss, Sappire, and June, the children’s issues percolated into interpersonal problems in classrooms, on the playground, and between students and teachers, especially in fifth and sixth grades. The student population defied the stereotype of a white, middle class, suburban school because of a small percentage of extreme behavioral issues. But the
overwhelming evidence indicated that the habitat was different. The children had regard for the place itself as well as for one another.

The astonishing resonance throughout the analysis was one of respect and cooperation in the habitat. What stood out as a dimension of respect was not in what I observed but what I did not observe. During observations of participants in the habitat, children drifted where they wanted and needed to go. The analogy of drifting emerged through observations; as I watched children move physically and in their attention from one point in the habitat to another in a seamless transition, it reminded me of a glider drifting through a space without sudden movements or changes in direction. Sometimes, the child’s drift was toward another group of students in a social gathering where the conversation was sometimes not related to the habitat at all. Conversations were plans for the weekend, something funny that happened in class, or for a group of girls in Mrs. Foster’s class, an opportunity to giggle and flirt with Tim. Other times, a child’s drift was to a group looking into the pond on the dock or to a group that explored the woods up the hill. And other instances of a child’s social drift was to the teacher outside with them, asking questions, needing the teacher’s attention and affection. As children moved around in the habitat, I did not observe any instances of arguments, exclusions from social cliques, nor harsh words to one another. Even Boss and Sappire, who revealed intense emotional conflicts with other children in Mr. Norris’s class, drifted in and out of every social group when they
were working in the habitat. The interactions between students illuminated a sense of social acceptance, contrary to the social confrontations that occurred inside.

Messing Around

The dissonant dimension of student respect for one another was repeatedly referred to as “messing around.” Sometimes used in science education as a positive term, the children consistently used this phrase to describe a negative action or feeling in the habitat. This term was used by boys and girls and all participant grade levels independent of the others. Tyler explained the general feeling of children in the habitat was to treat it as they wanted to be treated. He explained, “I think our school is very cool in that way and we can all respect the habitat and it’s not always a time to mess around.” I asked him if he thought everyone at Carson respected the habitat; “I would say not everybody, but most people,” he replied. Every student interviewed reported feeling a deep sense of care, yet another prevalent refrain was “messing around.” As I spoke to more students, the ambiguous term became harder to pin down to one definition, it was more of a sense or feeling that other students were not following the basic rules or were doing something that would harm one another or the plants and animals. The term was brought up by children in every grade level in the study. Audrey, Ginger, and Remmy’s description of messing around was always connected to the boys in their class. Ginger explained, “There are two types of messing around. One is behavior in the habitat, messing around and stuff, but there is also physical...Physically hurting it. Hurting the habitat.” Audrey and Remmy agreed
with Ginger's definition. I continued, "So if you're not hurting anything, is messing around okay?" Remmy answered quickly, "It's like playing." Audrey chimed in, "There are two types of playing, there's playing nice to each other and then there's roughhousing." Remmy rebounded, "Yeah, if you like shake the trees to get snow on you." Audrey concluded, "If it's dangerous to somebody else." Without having to ask for an example, Remmy finished her thought, "Yeah, cause I saw the boys and it would shake the tree really hard just to get snow on the other boys." The girls explained the purpose of the habitat was for learning science, not for play. Boss, June, and Sappire also said that boys messed around more than girls. Especially on Wonder Days when the only expectation was exploration within the set boundaries, students reported that someone was always messing around when my observations were of children being playful or social.

At times, the students appeared to be confused by the lenient nature of the habitat. In a classroom, playing or socializing were considered going against the norms of the learning environment. This was a cultural condition of the school; if children were learning, they were talking about the lesson and sitting still. The habitat appeared to be confusing especially for the children sensitive to those norms. This feeling of confusion was resonant in the children's desire to have an assignment, a promoted interaction, when they went outside. Mr. Granger's students expressed a need to be given a task after a group of boys got sent inside. Gus, one of the children who was sent in for "messing around," explained that he did not know what he was
supposed to be doing. Even then, he could not say what he was doing wrong, he felt lost not knowing what the teacher expected him to be accomplishing. The freedom in the habitat was a contrast to the structure of the classroom. In many ways, the children embraced the difference as a relief, but too much freedom also caused anxiety and uncertainty about expectations. This finding was particularly supported by a three day progression of experiences in Mr. Granger’s classroom.

Early in January, Mr. Granger asked me to join his class for free time in the habitat at the end of the school day. Similar to a Wonder Day, the rules were simply around safety, what the students did in the habitat was up to them. The goal was to let the students explore with free interaction rather than a focus or prescribed outcome; the rules were to stay in the boundaries and be respectful of the people, plants, and animals around them. Mr. Granger had not joined his class on this type of exploration before. The students had the choice to take their notebooks and record what they found or not; less than half of the students took their notebooks.

The day was cold and the snow from the last few days covered the ground. Immediately, some of the students noticed animal tracks and started to follow them, discussing with each other and with me the actions of the animals that made the tracks. A few boys wandered around without a specific purpose. Girls gathered and dispersed, some discussed what they observed and others discussed plans for the week. I stood next to Mr. Granger near the concrete picnic table, observing the students looking toward the pond. One of the girls called my attention to a vexed
expression on Mr. Granger’s face, what Mr. Granger later called “my ugly face,” and she directly asked him if he was mad. “No,” he said flatly, “just watching.” I followed his gaze to a group of boys including Gus and Peter, the boys who were wandering. The boys laughed, pushing each other away, one boy smacked another in the back of the head with a big smile on both faces. Mr. Granger watched for a few minutes and noticed students carrying large branches from the scrub oak. The perception of unfocused activity clearly irritated Mr. Granger and after a short discussion, he called the names of five boys and took them inside. The other students, stunned by the extraction of their peers, regained their composure and continued to investigate tracks leading inside of the fixed trashcan on the patio, the dried stalks of the flowers in the butterfly garden, and anything they could focus on, perhaps for fear of getting pulled inside. After five more minutes, the rest of the class and I went in.

The situation that day troubled me. I left the school feeling conflicted as a researcher and a teacher; on one side, I was intrigued by Mr. Granger’s reaction because I empathized with him. It took me some time as a researcher to not intervene when children appeared to be unfocused. On the other hand, Wonder Days were intended to give children the opportunity to do what they needed that day, whether it was playful or academic, focused or free. The next day, I met with Mr. Granger in the break-out area next to his classroom and told him about my paradox. He enthusiastically agreed that he spent that evening reflecting on the scenario; he explained that at the end of the day when he got in his car, he felt like he overreacted
when he took the boys inside. Mr. Granger asked me to come back after lunch for a
discussion with the class. When I opened the heavy classroom door, the students sat
on the floor of the burgundy classroom with all of the overhead lights off, huddled
around Mr. Granger’s chair while he read to them from a novel. The space in the
room was dimly lit by small desk lamps and floor lamps in each corner and the
students stretched out comfortably. The culture of this particular classroom that was
split between two teachers, Mrs. Amy Stafford in the morning and Mr. Granger in the
afternoon, was that Socratic discussions and read-alouds happened on the floor where
everyone was close. They were situated that way when I came into the room to
debrief the events of the habitat with the students.

Mr. Granger put a chair for me next to his at the front of the huddled students
and I sat down facing the group. As I moved carefully through the twenty eight bodies
to sit down, the children’s voices murmured expectantly; they knew a debrief about
the habitat was coming. Mr. Granger started the discussion with an apology; he
admitted to overreacting and wanted to hear from the students. For an hour, the
children talked openly and honestly about how much direction they thought they
needed to go outside. Gus, typically engaged by the habitat and comfortable outside,
was one of the students that Mr. Granger pulled the day before. Gus admitted to
messing around because in the snow, he felt there was not very much to investigate.
This was contrasted by a later go-along interview with Gus when he followed tracks
through the habitat and down the hill in a foot of fresh snow. Tyler, usually quiet
unless invited to speak out, echoed Gus’s feelings of uncertainty and admitted that he was unsure about what he was supposed to be doing. Not knowing caused some of the students, like Tyler, to feel anxious.

The feeling of relief or respite was contradicted. The students, who had done Wonder Days in the fall without issue, did not transfer the lack of teacher direction from science class to class time with their homeroom teacher. Accustomed to direction in every part of the day, the lack of direction was stressful. Most surprising was the reaction of Mr. Granger, and upon later reflection, my own reaction to the aimless drifting. As teachers, we have little tolerance for seeing a child doing nothing. The days are programmed down to the minute, each minute being more valuable than the last, to pack into the lives of children the academic content that we are required to accomplish in a year. The anxiety caused by observing students do nothing was unconsciously felt by the students fearful to do nothing. Students were programmed to constantly be on task, whatever that defined task was for the moment. Generally, the tolerance of the teachers for drifting limited the children’s tolerance for free action as opposed to a promoted focus. The only time the students demanded free action was in science specials class. It was part of the culture there. The sense of respect was also contradicted.

Few specific events illuminated the essence of “messing around” based on what I heard in the children’s attempts to define the ambiguous description, but infrequent observations of disrespect involved killing or squashing an insect or spider.
In most cases, the action appeared as an unconscious response. Walking inside 
through the library doors, David stomped on a wasp that landed on the top concrete 
step. He did not appear to think about it; he was walking, noticed the wasp, stomped, 
and walked inside without a second glance. Jimmy walked onto the dock, saw a 
spider moving, stomped on the spider with his right foot, then moved onto his belly to 
observed the pond. Jonathan had a similar reaction to a spider crawling on the ice in 
the pond. Jonathan’s peers saw him kill the unsuspecting arachnid and a boy yelled 
out, “Jonathan just squished a spider.” Three students next to him moved away from 
Jonathan, two muttering under their breath. In that instance, killing a spider was not 
socially accepted. All three boys seemed to have a programmed response to the wasp 
or spider, two living organisms that children perceived as dangerous or scary. Though, 
on Legacy Day, a group of sixth grade boys pulling weeds were not unconsciously 
acting but intentionally killing spiders. They sat around a boulder with trowels 
digging out alfalfa roots and for nearly an hour, discussed the details of finding a 
spider, and the spider’s responses as the boys pulled the spiders’ legs off and 
discarded the animal in the tall grasses near where they sat. A group of girls worked 
next to them and did not pay any attention to the actions of the boys; it was unclear if 
the girls chose to ignore them or simply were so caught up in their conversation about 
Fiona’s most recent dating interest that they did not know what the boys were doing. 
These boys around the rock were my only direct observation of students intentionally 
harming animals or plants in the habitat.
Play and Movement

Whether the students had a promoted focus or not, Carson's students were afforded the space and environment to move about in the habitat as long as the teacher tolerated the movement. Respite from social and academic aspects of children's days inside the building may have been related to the ability to move and play like a child in the habitat. They moved in playful ways that were not possible in other locations in the school, in ways that are part of childhood. The loose parts of the habitat that children could grasp, manipulate, interact with offered playfulness and movement. Children played with the cattail seeds, popping them on the hillside and watching the seeds swirl around. During the colder days, children were drawn to the ice. A fourth grade boy tentatively put his feet on the icy pond, slowly putting pressure onto his legs dangling off of the dock. Any icy patch that remained on the path or ground between the trees was an invitation to slip and slide along its surface. Children dangled their heads over the edge of the dock in all weather, putting their faces centimeters away from the water. In every of the mentioned instances of play, each was accompanied by laughter.

The children described their movements in the habitat as free and awesome; I observed joy and comfort. And despite warnings from teachers about the perils of hidden rocks, children ran. Children ran up the hill, down the hill, across the hill. Inside the school, children were not allowed to run, but they did. Children ran in the halls and every time they were scolded by the nearest adult. Yet, a child running in the
hallway looked out of place, while a child running in the habitat seemed natural. The possibilities for movement in the habitat were not afforded by any other part of the school. Even in gym class, the activity took place in a large empty room. In the habitat, children found movement afforded by the diversity of the landscape.

Similar to the movement of the girls on the frozen dock in Mr. Norris's class on the cold March day, children found movements unique to the habitat. The most common movement was children skating across the loose gravel on the trail, a movement that kicked up a cloud of pink dust around them as they walked. Feet moved through snow in the step-flick movement, feet moved in the grasses tapping the stems with tips of the shoes, feet moved next to the pond slurping down into the soft mud. When children moved from place to place within the habitat, the habitat's features afforded unique movements. Two boys bounded from large rock to large rock between two of the largest pine trees on a warm spring day. The rock sticking out of the cattails was a large step away from the pond's edge, toward the center of the pond. Repeatedly children leapt from the edge of the pond to the rock, surrounded by the tall brown reeds of the cattails. Most of the time, the leap was successfully dry but on occasion, a child would emerge with a wet foot. On a warm January day, Mrs. Foster's class walked down the hill into the drainage. Where the path had been compacted down in the snow, a long trail of ice still remained surrounded by the tall brown grasses standing tall, resilient after the snow melted. With the freedom to walk securely on the dry grasses, most of the children elected to slide down the icy chute.
slipping every five steps, arms flailing stretched outward. The most unique movement afforded by the habitat was the twisting and turning required to skillfully maneuver through the woods. The woods, formed by the scrub oak, was a nine foot tall maze of tangled branches. To get through the mired trunks and branches, children crouched down, leaned sideways, hiked legs up and over, and ducked low, slowly or quickly depending on how familiar the child was with the path. This movement invited children into the woods with a great sense of adventure, the final emergent theme.

Adventure and Imagination

The habitat was a place where students learned academic content, applied science and inquiry skills, and found relief from social and academic pressures in a peaceful setting. The habitat also nourished a part of childhood that is often left out of schools, which was the essence of adventure and imagination. The children at Carson found an outlet for the innocent exploration into their imaginations. Sometimes, this innate childhood tendency was promoted as in the case of building fairy houses, but children also found it through free actions, especially those afforded by exploring the scrub oak woods. There were numerous illustrations of this experience; in this section the findings illuminating children’s adventurous and imaginative endeavors in the woods, on the path down the hill, a child’s system of forts, and building fairy houses will be described.
In the Woods: The Lost Boys

In J.M Barrie’s story of *Peter Pan, or the Boy Who Wouldn’t Grow Up* (1928), the Lost Boys who lived in Neverland were Peter Pan’s accomplices in adventures with battles, explorations, and dreams. The group of boys, personified in several movies and novels since Barrie’s play, all shared the essence of adventure. The stories about them exhibited a love of playfulness and challenge but only for fun, not to harm or take away from anyone else. There were boys and girls that personified the spirit of the Lost Boys. Jenna, a stout fourth grade girl in Mrs. Frederick’s class, emerged from the scrub oak during a Wonder Day, her cheeks flushed and her eyes bright, yelling, “I made it through three times!” She was elated. Jonathan, like Peter Pan, had an antagonist named Houston, whom Jonathan blamed for any damage to the woods. The sense of adventure and exploration were in the woods and in unfamiliar areas. The students, like the Lost Boys, felt a sense of calm in the habitat but were drawn to the place by the sense of mystery in the woods and down the hill.

In the scrub oak, Jimmy and Bryan found adventure. Until this year, the woods were the boundary, not penetrable by students but instead a wall signaling where the habitat stopped. This year, the students were allowed to go into the scrub oak during science class. Jimmy, a thin boy with black short hair, was difficult to engage inside the classroom. He was not disrespectful nor rude, but easily distracted and often challenged by classroom assignments and tasks. In science class, he carried his notebook dutifully, but rarely recorded anything. Bryan was often at Jimmy’s side.
Bryan, a shorter blonde boy with the large brown eyes and tousled hair, was also
difficult to engage. When he focused and accomplished school work, he frequently
sang to himself impervious to anything around him. Bryan let the assignments go
until the last moment that he could get them done. Not because he could not, but
because Bryan typically would not attempt his school work in class. He would not
carry his notebook through science class pretending he was going to record
investigations, and he was not bothered if the teacher knew he was not going to
record anything. Jimmy and Bryan coveted explorations into the scrub oak. They
would enter at the top of the hill and consider themselves “the champions” if they
found a new way out at the other end, emerging in the gap between the woods on the
trail down the hill. Twice, Jimmy took a video camera into the woods and narrated his
exploration. His commentary on the video was more of his voice than was heard all
year in class. He commented on the height of the branches, where he had to duck,
where he was forced to retreat, and in a high pitched gleeful voice, declared when he
found his way out. When he was uncertain of the trail, his footsteps and his breath
slowed down, but when he found a familiar place in the trees, his footsteps and breath
quickened. He and Bryan often debated the best route as well as the origin of the trail
from wildlife or humans. Each time they went into the habitat, they patiently sat for
two minutes scanning the scrub oak for the best entry point. At the teacher’s word go,
they vanished into the woods and became occasional glimpses of Jimmy’s basketball
jersey or Bryan’s red t-shirt. The two boys personified a part of every child observed
in the woods; they were drawn into the challenges of finding their way out. Other children had humorous expressions of the essence of adventure.

In fourth grade, Mrs. Murray’s class was exploring the woods after twenty minutes of nature journaling. With a silent hand signal, Mrs. Murray lined the students up near the library windows, and led the students up the hill. Mrs. Murray asked me to point out to the students a patch of mountain mahogany that grew on the edge of the woods. When we got to the top of the hill, the students fanned out and went into the woods. Isabella came out of the scrub oak twice, and when she emerged again, I handed her a video camera to carry on her next venture inside. She led a group of students, including Tony and Eddie, into the woods. She kept telling the boys with her, “You have to see this, it is so cool. Watch out here, there are trap door spiders everywhere. You have to see this, it’s like an old stream or something.” Her feet crunched through patches of snow and dried brown leaf litter dropped by the scrub oak, and the excitement of the voices around her were palpable. Rachel walked near her with a trash bag over one arm, laughing with another boy, announcing, “We’re going to eat Nate first,” joking about being lost and never finding a way back to civilization. The comment hung in contrast to the rooftops of the neighborhood houses only twenty yards behind her head. The students felt like explorers who forged new trails and discovered an “old stream.” In their imaginations fostered by the experience of maneuvering through the woods, they were somewhere undiscovered.
Later, in April, the weather was overcast and grey, the air cold and crisp. Mrs. Murray’s class ventured down the hill to a pile of branches in the “old stream” area and tried to answer the burning question, beaver dam or not a beaver dam. The students circled the piled up limbs of scrub oak sitting on the steep walls of the dried up stream bank. Eddie sat upstream of the branches and listened intently to the conversation among his peers with their teacher, looking for evidence that proved or disproved the pile of branches was a beaver dam. As his attention drifted, he found a long reed with what he thought were termites. Then he, Isabella, and a few other students noticed a pile of leaves and started moving them around, making gentle shushing sounds as the old leaves slid against each other and eventually revealed a block of concrete. The children reacted as if they found buried gold. No longer listening to the conversation about the beaver dam, which they determined was actually a washout of broken scrub oak limbs from above the stream, the five children moved the leaves with more urgency to uncover the concrete. The flurry of activity attracted the rest of the class, who converged around the children digging, asking questions of one another trying to figure out what as going on. Isabella told each person about the block of concrete with a dramatic flair. After a few minutes, Mrs. Murray, who gave no attention to the concrete, gently called her class to walk back inside and the activity calmed back down. Isabella and Eddie excitedly questioned each other about the origin of the concrete, then Eddie looked at me, pointed to the ground and stated matter-of-factly, “Where we find treasure.” His eyes were wide and
excited. Back inside, the children were spread out on the floor silently and furiously writing in their nature journals. Their reflections pondered the beaver dam and the concrete under the leaves.

Not all of the students were drawn to the adventurous dimension of the habitat. In response to an invitation into the woods, fourth grade Courtney simply replied, “No thanks. The woods are too woodsly.” She was content in the open and was very skilled at sitting still. Courtney, in contrast to Bryan, was more often observed with her notebook open, writing consistently, even as she walked. Beth also reported feeling discomfort in the woods, but her explanation was related to safety; it was important to her that the class stayed together and could see the teacher at all times. Many of the students understood that they could get hurt in the scrub oak. Jonathan’s mother had a dream that he was attacked by a mountain lion and he was not allowed to go play in the woods for a month. Ava felt safe in the woods at school, but in the same scrub oak woods that thrived behind her house, she was afraid to go in for fear of an earthquake. Rational and irrational fears hindered students from going into the woods. With a diverse landscape, one with open spaces and forests, the children were all able to find a place where they felt safe and comfortable. Only some of the children, the Lost Boys, were magnetically drawn to the adventure afforded by the woods.
Another sense of adventure and imagination was discovered in a series of forts that a group of boys had established in the woods. Similar to Sobel’s (1993) descriptions of children’s forts as special places, Jonathan had an elaborate system of forts in the woods around the habitat including, lookout’s, central bases, and protective covers that comprised a very special place to him. Jonathan was a petite ten-year-old boy. He had wide brown eyes that always wandered; even when Jonathan made occasional eye contact, it was more like he was looking above or through the person speaking. Jonathan lived nearby with his father during the week and routinely moved with his younger brother from his father’s to his mother’s home on an alternating schedule. His mother’s house was too far away from school to walk to the habitat. The first indication of Jonathan’s system of forts was during a Wonder Day in science class in late January. The rest of Mrs. Frederick’s fourth grade class was allowed for the first time to explore the habitat and the children bounded in and out of the woods with loud excited voices. Jonathan passively observed the activity, standing next to Mrs. Hudson’s side at the top of the hill, watching with surprising focus and growing anxiety. Near the end of the class time, Jonathan urgently told Mrs. Hudson in his high, squeaky voice, “They need to be careful! That is my sanctuary.”

In March, Jonathan introduced me to his private retreat. On another warm day during science class, Jonathan and Zachary were in the scrub oak where a pipe drained water from the overflowing pond above. I heard them talking and made my
way into the woods as the branches pulled my hair and held onto my sweater with
every move I made forward. In the woods, Jonathan was a comfortable, confident
boy; in three years of knowing him, it was the first time I observed him with such
certainty. Jonathan was in one of his forts, showing Zachary the door and defenses, a
tall rose shrub without leaves so the small, hair-like thorns were obvious. I asked if I
could come in. I hiked my leg up and over a large oak trunk and Jonathan proceeded
to walk me through a tour of the fort. He opened the branches that worked as doors by
moving them aside, he pointed out the branches that afforded climbing to get a view
up above the scrub oak, and the limbs that afforded flexible bouncing under his
weight without breaking. Jonathan was able to point out the ability of these branches
both by memory and by the features of each limb.

His knowledge of the scrub oak was immense. Jonathan held up a broken tree
limb as big around as an adult’s leg and taller than his small body. “I call these big
toes,” he announced. The end of the limb, where it was once attached to the trunk of
the tree, was rounded, with bulbous bark on all sides and did, in fact, look like the toe
of a giant. “How much do you come here?” I inquired, stooping over to lean against a
sturdy branch Jonathan pointed out to me. “Often...Usually three days a week.
Because of my best friend and we have a ton of forts and it’s just these trees,” he
paused and looked up. “It is a perfect hiding place and it reminds me...” Jonathan
stopped talking and returned to his usual distant look. “Does your friend go to school
here?” I asked. Zachary, answering for Jonathan who was still somewhere else, said,
“She doesn’t go to school here anymore.” When the school split last year, it was hard on the children. The friendships they had established in school were physically divided based on school boundaries. Jonathan returned to instructing me and pointed behind him, “This is actually one of the forts right here. See this big tree here, it is a natural branch that we use as a fort.” I asked if we could all go in that fort and we moved ten feet down the hill climbing over a large crooked tree trunk. Still, the bare branches pulled at my clothes and I was thankful for my sunglasses that protected my eyes as the short grey sticks pushed on my face. In the fort, a clearing with a circumference of maybe two feet, Zachary and I huddled as Jonathan continued. He and Zachary explained that the forts were for a club; only a few people knew about the forts. Zachary only recently obtained entry to this club, and he clearly respected Jonathan’s expertise on the forts in the area. Jonathan continued to point to the features of the woods above and around us, “See this place, it has its own defenses. So if someone or something wants to get in, then you kind of have to get past this [branch] going this way so it might get hurt so it has its own defenses.” I was beginning the see the fort’s form take shape through Jonathan’s perspective. I started to see the doors, the protection, the lookout towers.

I asked Zachary and Jonathan if they would take the video camera and document a tour of the forts. Zachary’s face lit up behind his thick glasses and he jumped forward to take the camera. I showed him how to operate it and they were off. Jonathan’s confidence radiated as he called “action” and “cut” while Zachary
followed loyally as the cameraman. The following exchange illustrated the boys’
dynamic and Jonathan’s detailed knowledge of the woods:

Jonathan: This place.. this place is an entrance and you can... This is where
we go through. It's kind of hard but we should not go because it's a little
dangerous. I don't want the cameraman to get hurt.
Zachary: Really? I think I could get that through that place easy.
Jonathan: It's just spiky.
Zachary: This whole place is spiky!!
Jonathan: If you look up here this is a back door, so you climb up here and
you can easily come up. So, now were going to go to another fort of mine.
Zachary: Okay.

On their tour, Jonathan revealed details of the area such as the poison ivy patches, the
way the water flowed when the snow melted, and the location of the nearest storm
sewer. He explained that he liked to imagine that he was in the story of *The Lion, The
Witch, and The Wardrobe* when he was alone in his forts, imagining that the farthest
fort was the witch’s castle. In a later interview, Jonathan described the sensation of
being in the woods, “I would say that it felt like I had been trapped in a barrel for a
hundred years and I had just been set free.” It was his imagination that created the
pathway for him to make such discoveries.

The forts were not composed of any human-built additions to the trees; the
forts were created by Jonathan’s perception of shelters and structures afforded by the
way the scrub oak overlapped in crooked, tangled ways. Jonathan was fiercely
protective of the scrub oak trees. He resented any adaptations people had made to the
trees using hammers, nails, or boards. He began to tell me about a boy named
Houston, real or imaginary, I was never sure. Houston was responsible for all of the damage to the scrub oak according to Jonathan and therefore, Zachary. In his squeaky voice, Jonathan explained, “He is like a rebellion who tries to take over the fort. I have seen a tree that has paint all over it and BB bullets shot right through it. I think it’s mean. Houston is the only one I know who would bring a BB gun down here and has a paintball gun. He’s already taken over one of our forts.” Zachary interrupted to ask which fort was taken over. “It used to be the Central, now I have a new one,” Jonathan replied matter-of-factly. Zachary was intrigued, “Is it dangerous there?” Jonathan, still in his sweet innocent voice without any hint of contempt replied, “Actually, he still doesn’t know but there’s poison ivy there and we always avoid it but it’s just in one spot. And he has walked through it like fifty times.” Zachary cackled maliciously and Jonathan remained serious. Jonathan was deeply, emotionally connected to the woods.

Other children reported having forts in the area, though none of them as complex as Jonathan. David, a sixth grade boy in Mrs. Foster’s class, guided me on a tour of his fort that he discovered walking through the drainage on his way to school. David’s fort was down the hill and off one hundred yards along the stream bed. It appeared to be a cluster of scrub oak until he took me inside. He and his friend, along with both of their younger sisters, were playing hide-and-seek and he tucked himself into a circular clearing similar to one of Jonathan’s forts up the hill. When we crouched down with our knees to our chins, the school disappeared along with the
house rooftops, and the setting instantly became more remote. David’s place was secluded and private, which would improve, he informed me, when the leaves were back on the trees.

The Path Down the Hill

The allure of adventure in the habitat was related to its unexplored parcels. Within the traditional boundaries of the habitat, within the walls of the scrub oak, a child was able to see the entire habitat from any one place. Up on the hill, the students had a clear perspective as if they could look down on the habitat. Once I realized that some of the children were really drawn to the woods, I noticed that there was little mystery within the boundaries. Instead, the habitat was straightforward. From the rock steps, the children could see the pond, across the pond, up the hill, and into the butterfly garden. Within the boundaries of the scrub oak, with the exception of the lookout over the drainage, every other area was revealed. In her book, My Grandfather’s Blessings, Remen (2000) wrote about the essence of the mystery in what was not visible:

“Not knowing where you are going creates more than uncertainty; it fosters a sense of aliveness, an appreciation of the particulars around you...The truth is that we are always moving toward mystery and so we are far closer to what is real when we do not see our destination clearly” (p. 289).

This passage helped explain the students’ desire for the woods or to go down the hill; the areas they sought were unfamiliar and not straightforward. The tangled branches
in the woods challenged their determination and the stream bed at the base of the drainage was not visible from anywhere else other than the path leading down the hill. The mystery of what was undiscovered held the children’s spirit of adventure and imagination. Peter explained the exploration down the hill with a sense of expertise. “I felt like I was one of the people on the Discovery Channel. They are out there so much and know so much about it and I felt like every day I learned something and felt like a professional.” Until I experienced this mystery with the children through their words and by following them into the nooks and crannies of the space, my adult perspective was simply knowing the path within the boundaries. The children’s possibilities for the place were much greater.

Children felt a great sense of confidence and trust going down the hill, but the area with less tangible boundaries created uncertainty for the teachers. Kara Schneider was a science teacher who had a close relationship with Carson through grant work that provided planning time for teachers. Mrs. Schneider provided science lessons for each grade level and relieved each classroom teacher for half of a day. Mrs. Schneider had a baby in November, so her work with Carson this year was limited to the role of substitute teacher in order to give her freedom and time with her newborn. On a warm day in January, Mrs. Schneider was a substitute in science class and took the sixth grade class out to the habitat for a Wonder Day. With an outdoor education background and prior work as a field biologist, she was very comfortable taking children outside. Mrs. Schneider allowed Mrs. Foster’s sixth grade class to go
down the hill. Most of the students poured over the hill as soon as their two minutes of silence ended, while only a group of three girls stayed back to enjoy the quiet time to investigate dried milkweed pods in the butterfly garden. Audrey was overheard saying, “Wait. Wait. Let me write that down.” Voices rose up out of the drainage. Mrs. Schneider noticed a group of boys perched on the limbs of a large scrub oak; later she recalled that she was suspicious about their activity. As she got closer to the boys, they eagerly called her over. They wanted her to help them. They had questions. The boys hanging over the branches of the tree two to five feet above the ground had discovered large, woody galls, insect encasements formed by mutations in the tree. The boys were curious about the bubbles and excitedly asked Mrs. Schneider to explain what they observed. Mrs. Schneider was surprised. Her suspicions told her that the boys in the tree were up to something, when in fact, the tree afforded the boys the ability to climb up and discover a closer look at the galls. The galls were also at the edge of the woods in the habitat, but the boys did not notice them there. One possible explanation was that they had fresh eyes in the expanded boundaries that were eager for the common features to attend to as new information. Another explanation was that the boys felt the freedom to climb down the hill that they did not feel in the habitat’s boundaries. Climbing up offered them not only a fresh perspective, but a closer look at the galls.
Fairy Houses

During my first year teaching science at Carson, I developed a challenge based on the Small Worlds Principle (Sobel, 2008) and my daughter’s favorite activity of building fairy houses. First, a fairy house is a shelter created by natural materials that are not growing or fixed onto something else. The idea for calling it a fairy house was that fairies would not live beyond their means to survive. The fairies would use loose materials and not pull plants or cut limbs to construct houses. Then, the childhood and nature design principle of small worlds stated: “Through creating miniature representations of ecosystems or neighborhoods, we help children conceptually grasp the big picture. The creation of small worlds provides a concrete vehicle for understanding abstract ideas” (Sobel, 2008, p. 45).

Using those two concepts, the sixth grade students were told that lightening had struck the east wing of Carson’s building causing all of the children to be shrunk down to a height of two inches. Using lightning as the source of their size gave them permission to use their imagination; many of the students rooted in logic reminded me that lightning would not shrink them. Also to get them started, I reminded them that the grocery store would be too far away to travel at this size, therefore the children were challenged to form a new life in the habitat using only the natural materials found there to survive. Their task was to build a miniature representation of a shelter they would want to live in as a fairy house, without harming the habitat in
the process. After a short discussion about what they would need to stay alive, they went out and began.

The overall theme of the small worlds activity was childlike playfulness and imagination. The students loved the activity and spent the following three weeks intently building shelters, zip lines, and water jugs from acorns. Surprisingly, they also formed social allegiances and tribes based on trade; the students who built near the water supplied the water to other tribes, while the children who built near the edge of the scrub oak supplied acorns in return. All of this activity was meticulously recorded by three boys in a twelve page field guide in which they drew maps of the tribes and trade routes, documented the animals that could be used for transportation, food, and water. The most striking feature of the field guide was the labeling of each plant and animal with accurate common names, not simply “frog” or “bird” but “leopard frog or chorus frog”, a list of native birds, and each of the fruit bearing shrubs and the best use for each resource. The students created a small world with one simple nudge from the teacher.

Curious to see if another group of students would respond with such depth to a simple prompt, Mrs. Hudson agreed to spend her last week of class with the sixth grade students using the same promoted focus. She used the same flip-chart page that I saved over the years and we worked on a scripted introduction using the same language I used two years previously. With a part-time science schedule, the students’ time for the project was shorter than three weeks. For most classes, the fairy
houses had to be completed in one forty-five minute science class period. Once the fairy houses started to be constructed in small tucked away parcels in the habitat, other students took notice. Mrs. Hudson decided to do the activity with fifth grade and Mrs. Frederick’s fourth grade class. Mrs. Cruz’s class chose to do a pond investigation instead of fairy houses on their last day of science class and Mrs. Murray’s class was on a field trip on their last day of science specials.

Both boys and girls were engaged by the notion of building fairy houses. As Mrs. Hudson set up the lightning story with the children gathered in the science classroom, the students looked at each other uncertainly. As Mrs. Hudson continued, hushed utterances like, “Yes!” came from around the room. Tom, a troubled young man in fifth grade, known for his abusive language towards teachers including Mrs. Hudson, was more focused on the group’s conversation that I had ever observed him. He raised his hand immediately, standing up when Mrs. Hudson called on him, said simply “I’m ready.” She asked him to wait until everyone in the class had a chance to ask their questions, eyeing him with a small curious smile. She was not accustomed to his contributions, his readiness, or raising his hand. As soon as he sat down, Tom raised his hand again. His first question was if it was okay to build a house boat on the pond. He raised his hand again. “What if you found a dead insect on the ground?” Mrs. Hudson answered that yes, if it was laying on the ground and it met your needs, the children could incorporate a dead insect. Five boys stood up to leave and Mrs. Hudson remembered one last reminder, “There have been other classes working on
the same projects. If you see other shelters, please...,” and Tom interrupted shouting out, “Don’t jack stuff.” Mrs. Hudson smiled calmly repeating, “Yes, as Tom says, please don’t jack stuff from other people’s shelters.” Tom was a hard-edged child with a rocky history. He was also not typically a child who participated in science class. He was ready. The voices in the room rose as the students started forming their ideas, and they walked to the habitat.

During the two minutes of silence, Tom, usually with his head down during the time, was alert, scanning the surroundings, his eyes pausing at the nearby fairy houses. When Mrs. Hudson quietly and calmly told the students that they may begin, they exploded off of the rock steps like popcorn and fanned out into the habitat. Tom took two large steps to the dock and sat down cross-legged in a small muddy area under the large pine tree on the pond’s edge. For twenty-five minutes Tom worked with two other boys creating a very small, solid shelter constructed of packed mud and small rocks. The boys’ conversations were respectful debates about materials and locations, sharing responsibilities for who would go gather and who would build, and a lively conversation about where they would find food. Tom was unfazed by the attempts of another boy in class to engage Tom in an argument; the other child stood on the dock taunting him and Tom continued to work. At one point, Tom looked back and made eye contact with me sitting on the rock steps, then looked at the boy and went back to his shelter. If Tom were a child that was concerned with consequences, I would report that my presence influenced this resilience to the other boys teasing. But
Tom was not a boy concerned with consequences; he was truly immersed in his experience. Tom asked the boy to bring him materials and as if surrendering to the understanding that Tom was not to be perturbed today, the boy became the courier of large rocks, mulch, and sticks.

In every class, all grade levels, the students naturally grouped up with other students and discussed a plan before they reached the habitat. Most of the students worked together to form a communal type residence, but some children worked alone. Holly, a sixth grade student in Mr. Norris’s class, was a quiet, intelligent child with short blond hair that curled under at the base of her neck and chin. She was tall, graceful, and carried an innocence about her. Holly stayed on the steps and everyone else exploded into action around her. At first she appeared to be disinterested in the activity, but as I observed her actions, I noticed that she was gathering pebbles from the rock steps and collecting them in her cupped palm on the other hand. In a few minutes she stood up and meandered toward the trail wrapping around to the picnic table, between the table and the pond, up the hill, and ended up with two fistfuls of materials at the bottom of the small pine tree closest to the pond from the hill. She warned another group of girls gathering (June’s group) about a red-winged blackbird nest in the cattails and asked them to be careful. She emptied her hand carefully in a small contained place next to a rock, stood up, pulled up her pants and surveyed the area. In less than one minute she sat down and began to build using her materials and the soft mud at the base of the tree. June, Fiona, and Julie decided on a place next to
the pond just beneath Holly, but Holly did not look their way again. Like Tom, she was enthralled. Holly’s older brother was one of the boys who created the small world field guide two years ago; I wondered about the stories he shared with Holly and his family during that time..

A pattern of activity quickly emerged through every class. The excitement launched children from the rock steps after two minutes of silence. The students either walked with intention to a place and immediately started, like Tom, or meandered gathering items like Holly. The children were relaxed, most of them exchanging easy-going conversations or just silently focused on a small space. A fifth grade boy named Nick fashioned a bow and spear out of sticks and grass to hunt grasshoppers. A group of sixth grade girls created separate rooms within a soft hole under some grass and leaves at the edge of the scrub oak. They laughed as Remmy came out of the woods on a hunt for materials, with a pair of grey boy’s underpants hanging from the end of a long stick. Another group of fourth grade girls found a flat spot with mud tucked away in the shade of the scrub oak behind the pine trees up the hill. They moved slowly, talked, stood, stooped, and turned so calmly, I felt serene just sitting with them. They started building shelters on the ground and ended up finding a flat place on the crook of a branch and tree trunk; the girls moved their small beds and doors up into the trees. Another group of sixth grade boys found a small indentation of clear ground at the edge of the habitat. They used a log to start and ended up with a commune of four structures including a well, irrigation ditch, and
fence. This was the typical pattern in every class. The fifth grade students discovered the mulch pile on the side of the school from the Legacy Day and created a trail system from shelter to shelter throughout the entire habitat. The trail of mulch was bright red in contrast to the browns of spring on the ground, and the color highlighted the elaborate communities the students built throughout the week. In each class, the students created a shelter and gathered food in less than twenty-five minutes. Mrs. Shaw’s students were observed later peering out into the habitat through the library windows, pointing to the shelters. Mrs. Foster’s students convinced her to give them thirty more minutes at the end of the day to continue working. She walked out with them through the library doors and each child scattered to his or her shelter; she looked at me in awe and said, “I don’t know what the project is. All I know is that they begged me all day to come out and finish it.” Mr. Granger’s students also found extra time to work on their fairy houses, finding gaps in time to finish a fence or roof in their small shelters between the younger students who came outside to plant the trees that remained after Legacy Day. Mr. Granger’s boys asked for his audience at their shelter on the edge of the scrub oak, boasting that the roof was still intact after a spring rain storm.

The spirit of adventure and imagination lived in creative movements in the habitat. Spanning several decades, Cobb (1959) and Sobel (1993) understood the infinite, self-selected challenges in nature that stimulate children’s imagination, and therefore nourish what Mercogliano (2007) called children’s “inner wildness.”
Mercogliano (2007) documented, this type of play has been neglected by schooling for decades. The typical schooling environments that foster children's natural inclinations to play are preschools, not sixth grade classrooms. Yet, the evidence here indicated that these children in middle childhood craved playful opportunities during the school day. As Sobel has advocated in twenty years of writing, children found forts, the woods, and small worlds as a way of stimulating natural curiosity and joy. The findings here support Sobel's (1993) findings about children's special places. In each theme of the findings related to adventure and imagination, the children were able to freely interact with the environment in comfortable ways outside of the direct observation of the teacher. The children who experienced adventure and creativity chose their path through the woods and the place, materials, and social accommodations for their fairy house. The children felt safe in their choices, and when the children felt anxiety, the evidence supported that the children understood on their own how to alleviate that sensation. Finally, the children created organized worlds; Jonathan's forts existed in a system that he could share with Zachary, Jimmy and Bryan systematically explored divergent trails through the woods, and Mrs. Shaw's fifth grade students created a path linking each fairy house in a system of red-mulch trails. In a school where the participants reported constant access to electronic media, when given the opportunities, they expressed joy, imagination, and creativity through short and simple activities in the natural setting of the habitat.
Summary

The final portrait of the habitat was comprised of five themes: (1) critical thinking and curiosity; (2) ownership and identity; (3) peace and calm; (4) respite and respect; and (5) adventure and imagination. Although each theme had unique resonant dimensions and textures, they also shared recursive nuances that washed throughout each theme. The common elements of each experience included intellect, movement, joy, confidence, wonder, familiarity, respect, and relationships. The habitat was imbued with the children’s individual memories and shared stories full of wonder and humor. The children experienced the habitat as embodied organisms who thought, felt, and moved and discovered depth in their understandings, emotional connections, and freedom of motion afforded by the diverse landscape. The following chapter will interpret these findings as an aesthetic whole comprised of an expansion of the students’ awareness, a balance of activity and relationships, and a culture of kindness that radiated from the habitat.
CHAPTER VI

DISCUSSION AND COHERENCE

"The piecing together of the portrait has elements of puzzle building and quilt making... A tapestry emerges, a textured piece with shapes and colors that create moments of interest and emphasis," (Lawrence-Lightfoot, 1983, p. 16).

The portrait of Carson Elementary’s schoolyard habitat illuminated children’s experiences in nature when a natural setting was used as a classroom during the school day. The coherence of this study, the final tapestry of the themes and dimensions woven together, supported the literature that schools can provide encounters with the natural world in a local, manageable way. Using the lens of ecological psychology, the findings indicated that embodied experiences in a natural setting at school nourished the cognitive, emotional, and physical facets of childhood including critical thinking and curiosity, ownership and identity, peace and calm, respite and respect, adventure and imagination. Present in all of those distinct yet interrelated themes was intellect, movement, joy, trust and confidence, safety, comfort and familiarity, respect, and relationships between students and teachers.

The nature of this research investigation was exploratory; throughout the process questions emerged, but the study began with the following queries:

- What were the daily activities of children in middle childhood in a naturalized schoolyard implemented in a public school as a classroom setting?
• How did children feel while they were in class in the natural area of the schoolyard and how did they feel after their time outside?

• Did time in nature during the school day lead to a greater connection to the school community for children in middle childhood?

• What were the benefits to children in middle childhood of a natural area in the school’s yard?

To answer the initial research questions, and the questions that evolved throughout the process of building the portrait of the habitat, three interpretations of the findings will be presented in this chapter and woven together with supporting literature. The three interpretations of the findings were: an expansion of awareness, a balance of free and promoted actions, and a culture of kindness. The chapter concludes with a discussion of the study’s limitations and trustworthiness, implications for research and practice, and questions for future investigations. But first, it is important to revisit the theoretical framework of ecological psychology that provided the scaffolding for the aesthetic whole.

**Ecological Psychology**

The study began as an inquiry into children’s experiences of a schoolyard habitat where experience was defined by Hart (1979) as they way children know, act, and feel in a setting. Using the ecological psychology of Reed (1996a, 1996b), James Gibson (1966), and Eleanor Gibson (1969), the knowledge, actions, and feelings were understood through the children’s embodied encounters with their surroundings.
through free actions and actions promoted by the teachers or other children. Embodied encounters were explained as the social, cognitive, and emotional qualities of children’s development not viewed through silos; on the contrary, these qualities were understood as areas within each child that nourished one another. For example, Alizea’s encounters with the galls were emotional; her wonder and surprise led her through a process of questioning and physical interaction with the galls to find out what they were. Through repetitive encounters with the habitat, the children’s senses were open to constant streams of information and the children had the freedom to attend to the information in the setting that drew them in from infinite possibilities due to the habitat’s diverse affordances. Audrey also found the galls, but she worked through her understandings after two years of observing the same scrub oak branch. Through these repetitive exposures over ten months to six years, the children developed deep understandings about the ecology of the habitat, an environmental literacy and ethic of care for the habitat, and the ability to ask questions about their surroundings. Then, in powerful ways, the children explored the answers to their questions.

In schools, students asking questions is desirable. The common response to anything in schooling is, “So where is the learning?” The answer, in the context of Carson Elementary’s habitat was: everywhere. Although the evidence coalesced into one relevant dimension of critical thinking and curiosity, a dimension that strongly implicates the habitat as a source of intellectual development, the aspects of
questioning, inquiry, problem solving, and understanding the intricate interrelationships of the habitat were evident throughout the other dimensions of the study. The learning infiltrated every aspect of the children’s experiences enhanced by their freedom to both select and be led toward the focus. The findings suggested something inclusive of academical but also inclusive of social and emotional nourishment. By encountering the natural world in a trusted environment, children’s sensory channels were open, they had the freedom to attend to details that interested them individually, and they were allowed to move; those liberties allowed student to student exchanges about their observations, intellectual understandings about local and relevant plants and animals, and an expansion of the children’s awareness of the exact place they inhabited in the world.

**Application of Ecological Systems Theory**

The complex systems influencing public schooling are difficult to understand. Using Stanley’s (2010) implementation of Bronfenbrenner’s model of ecological systems theory (EST), the politics of education’s impact on students was brought to light (Figure 6). Bronfenbrenner’s EST, comprised of nine propositions within five nested systems, provided a way to understand the layers of children’s experiences within school as influenced by the many layers in both their shared and individual experiences. Each child’s unique constellation of experiences were comprised of these nested systems. With the physical and historical context set, the EST model helped to understand both the permanence of the habitat in the culture of the school.
and conversely, the tentative nature of the habitat in an uneasy school district political system. Under the leadership of Gabriella Cannon, Carson Elementary was relatively unaffected by the district in the creation of the habitat; in the sweeping changes during the study period, this exterior system became more influential on the inner nested systems and therefore had the potential to impact not only the teachers, but also the children. An uncertain variable in the school’s future was the new principal and her vision for the school. Moore and Wong (1997) documented the use of a green schoolyard and, despite its powerful transformative effect on the school culture and

![Diagram of Bronfenbrenner's Ecological Systems Theory applied to Carson Elementary.](image)

- **4th-6th Grade Student** operating in the habitat as single embodied organism
- **Micronystem**: Teacher's use of the habitat - frequency, value, connection to other learning
- **Mesosystem**: Schoolwide cultural value of the habitat and a new principal selected by the superintendent
- **Exosystem**: School district with a new school board and superintendent highlighting work of Carson
- **Macrosystem**: Competing values of school board (private school vouchers) and superintendent's schools of choice
- **Chronosystem**: Dimension of time

*Figure 6: Bronfenbrenner's Ecological Systems Theory applied to the context of Carson Elementary. Adapted from Stanley (2010).*
students, everything but the garden was turned back to a traditional schoolyard after little more than ten years. Schools function within larger systems and the unpredictable nature of the decisions made within those systems have effects on schools, teachers, and students.

The other useful application of EST in the analysis of the children's schoolyard experiences was within the outside experiences and home cultures that students bring to school. At the center of this model is one child, not all children; this is important to the portrait of Carson's habitat because values from outside the school played a part in each child's experience. Chelsea was able to make connections to the habitat from family outings to nearby trails and parks, while Zack made connections from the habitat to the feeling that he had when he was looking for deer antlers with his grandfather. On the other end of the continuum, Michael Z. referred to the habitat as his first time in the wild and Sophie claimed that the habitat was the one place outside where she felt safe. The habitat did not hold the same value for all students. An appropriate analogy was athletics and physical education class. The students who played competitive sports outside of school felt comfortable in Carson's physical education class, while the students who did not play sports enjoyed the class and the opportunity to participate in sports in a caring environment. Similar to the findings of Dyment and Bell (2008) the habitat offered something unique to students who felt a sense of belonging outside and at the same time, offered something to students without exposure to nature outside of school.
Expansion of Awareness

Nature provides "the most open-ended experiential universe possible, supporting all of the physical, social, and psychological dimensions of development. It is the source of dynamic perceptions that stimulate thought and build knowledge" (Moore, 1997, pp. 10-11).

Reed (1996a) claimed that humans learn by interacting with information in the environment instead of by learning about it. Traditional, public schools are held accountable to broad academic standards and in elementary schools, teachers are responsible for a lot of content in a short amount of time. As a result, children are taught about things without the opportunities to interact with them. The students at Carson often related their experiences in the habitat to getting out of their books and into the world. In the documentary about the school, a fifth grade girl compared the habitat to a "pop-up book." The children had an innate understanding that the habitat offered some quality to their school day that was unique.

In the children's experiences of the habitat, the structure and form of the portrait were created by a complement of children's time alone and children's time with other students or teachers along with their embodied interactions with the place. Borrowing on Lawrence-Lightfoot and Davis's (1997) metaphor of a tapestry on a loom, the "structure of overlapping threads (the warp and the weft)" (p. 247), the type of experiences children had were woven between their way of knowing the habitat through their senses and whether the experience was shared with a teacher, in
interaction with other children, or in solitude. In every experience, the cognitive, emotional, and physical parts of the child were nourished by the other.

To illuminate this understanding, consider two figures. Figure 7 views the components of each child as separate compartments. When represented in this way, the essence of children’s experiences appeared to be relegated to fixed boxes with boundaries. Instead, consider a more fluid model (Figure 8). In this representation, the children’s experiences were overlapping and woven like the tapestry metaphor. Every experience held components of questioning and thinking, emotion, and movement, stillness, and sensory connections. In addition, children drifted between experiences on their own and experiences with other children and interactions with teachers. Steady throughout the entire woven experience was perceptual learning.

Children were aware of the information in the habitat through their senses and the sensation of multiple senses being stimulated at one time. Children attended to sensations internally when they observed two minutes of silence on the rock steps; children attended to sensations in exchange with other children as they interacted with the habitat’s affordances with excitement, inquiry, and adventure. Jimmy was ducking and weaving through the tangled trunks of the woods; his breath and pace quickened when he was familiar with the trail, while his breath and pace slowed when he was uncertain and had to reassess his location. He was alone, but had been on the trails with Bryan and Tim that morning when he first discovered a new route; alone he needed to find their route again using the smallest details of the scrub oak as
\begin{table}
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 & child or child-to-child & child-to-teacher \\
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cognitive & & \\
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emotional & & \\
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\caption{Qualities of each child’s experience viewed separately.}
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\begin{figure}
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\includegraphics[width=\textwidth]{figure8}
\caption{Expansion of awareness is the nourishment of each component and reflects the children’s embodied encounters with the habitat.}
\end{figure}
landmarks. After his first time in the woods, he could not wait to get back and talked about the experience with a feeling of joy. In two minutes Jimmy’s experience represented each aspect of the embodied experience beginning from a physical movement and desire for adventure. Alizea started her experience in a different place; her curiosity about the galls drew her thinking to the form of questions, to herself and to her teacher. As she wondered out loud, she verbalized elations and surprise, strong emotions that made her want to know more. As she felt the texture of the gall, opened it up, and moved her face closer to the larva inside, she stood up and sat down, pulling the gall closer to her face, then pushing it away. Her’s, too, was an active exploration with the same qualities as Jimmy afforded by loose parts of the habitat that she was drawn to. Ultimately, it would take away from Jimmy’s experience to only label it as a physical one as much as it would take away from Alizea’s experience to say it was only about intellect. The second figure (Figure 8) allowed a way to represent each facet of the children’s experiences as overlapping and interconnected, folding in upon the others in the same way as the threads of a tapestry. The portrait of the habitat that emerged illuminated a unique kind of setting that advocated for children’s inclinations and nourished their development.

To date, the literature has sorted out cognitive, academic, physical wellness, and emotional benefits of contact with nature. What made the inquiry into Carson Elementary’s habitat so unique was that the children’s experiences were beyond academic, although there were academic components throughout the place. The final
portrait of Carson’s habitat suggested that interactions with nature both alone and with others provided benefits to children’s wellness holistically. The structure of ecological psychology suggested that the benefits of deep thinking, ownership, calmness, respite, respect, adventure, and imagination were realized through sensory immersion in the natural setting where the children felt safe. Carson Elementary created a place for children to nourish their child-qualities emotionally, physically, and socially. The children expanded their awareness of the natural setting while rooting to the place through meaning and relevance.

**Balance of Free and Promoted Actions**

The expansion of awareness was an extension of the children outward into the habitat from the anchor of their stories and interests. The final portrait included texture from the quality of relationships and freedom in the children’s experiences. The children discovered and explored the habitat either alone, with each other, or in exchanges with a teacher. These categories were helpful to discern because the habitat was a classroom. In a classroom, the teacher typically promoted the focus for learning as well as when social interactions could occur. Instead, the habitat was a place at Carson where the students had a balanced ability for free and promoted interactions and social dimensions.

Using Reed’s (1996a) frames of interaction, children’s encounters with the habitat happened along a continuum of free actions and promoted actions. Promoted actions were encounters between the student and the habitat where the focus was
directed by a teacher or other students. For example, Mrs. Foster asked the students to
draw the topography of the habitat after studying landforms, therefore focusing the
children’s attention to the shape of the habitat; or in the case of peer focus, Audrey
called Remmy and Ginger’s attention to the oak galls. Free action was considered
interaction between the student and the habitat where the focus was selected by the
individual child or teacher on their own. Free action was based on previous
experiences in the habitat or a new discovery, but it was through the freedom of the
individual to attend to the information that was meaningful to them on that day.
Arguably, the habitat as an area built and amended by the school was a promoted
space; the focus in the habitat as an outdoor classroom was selected by the school.
The balance was found by the children freely choosing their interactions in the habitat
and the teacher promoting the focus without constraint.

To understand the relationship between free and promoted interactions
between students and teachers, the two continua intersect and form four
interdependent quadrants (Figure 9). When viewed in this way, the experiences were
easily categorized among the quadrants: (1) the students had the freedom to select
information (Quadrant I), (2) the students promoted the focus for one another through
questioning and probing (Quadrant II), (3) the teacher promoted the focus for the
children (Quadrant III), and (4) the teachers had the freedom to select information for
themselves and for the students outside of the curriculum (Quadrant IV). The final
graphic showed a balance of free and promoted activity and student’s time facilitated
by their teacher. When viewed in this manner, each quadrant would not exist well in isolation of the others; quite the opposite of being mutually exclusive, each type of experience was complementary to the others. Lurking just beyond these types of experiences were what Reed (1996a) called constrained action; constraint on the children's encounters was observed in the teacher's intolerance of children's movement, exploration, and anything else that was outside of the classroom norms.

There is a natural tendency for teachers to dictate the learning and constrain the focus to what resides in the curriculum. The difficulty for teachers resides in a tension between children's freedom to discover and the tendency for teachers to constrain the

Figure 9: A balance of free and promoted actions between teachers and students.
children’s actions to what is written in the school norms for movement as well as in the curriculum.

To illustrate the model, the children had the freedom to select information (Quadrant I). Jimmy was able to explore in the woods while Beth wrote poetry on the rock steps. Rocky circled the pond while Michael Z. roamed through the trees up the hill. The children also had the freedom to promote a focus for their peers (Quadrant II). Audrey drew her classmate’s attention to the galls; groups of students gathered at the edge of the pond pointing to the well-camouflaged chorus frogs when they began chirping. The children were comfortable and familiar in the habitat and felt trusted by the teacher. Rather, if the children’s experiences were only free, students felt anxiety about knowing what to do, unsafe, and an overall sense of uncertainty from the teachers on how to use the space. This was evident in the sixth graders’ anxiety about having a Wonder Day in the snow and Mr. Granger’s intolerance of the children drifting through the habitat as they tried to find focus. Although the students had freely explored the habitat in science class, they had not done so with Mr. Granger. Their confidence and familiarity with the rules with that teacher were uncertain and Mr. Granger felt the impulse to constrain the interactions. In the same manner, teachers promoted interactions in the habitat (Quadrant III). Mrs. Hudson gave the children the idea for fairy houses and Mrs. Murray created structure around nature journaling. Yet, if children only encountered the habitat through teacher promoted interactions, that be equally detrimental to the potential of the children's experiences.
When Mrs. Foster’s class mapped the topography of the habitat, they had a focus on the landforms; the students were seeking information pertinent to one quality of the habitat related to the Earth science curriculum. If all of the children’s experiences were solely promoted based on the curriculum, the information they attended to may have been limited and the themes related to children’s creativity, imagination, and respite from academic pressures may have disappeared.

Teacher’s tolerance for children’s free actions in the habitat took practice. It was typically the teachers with regular habitat time in their schedule that were more inclined to promote the students’ focus and trust the children to find their own information, rather than dictate a focus and physical movements through constraint.

When the substitute teacher for Mrs. Murray took the fourth grade class outside, Steven did not see the pond. His focus was on the teacher’s movements through the habitat and the experience created a sense of shame for him when he was reprimanded for reaching into the pond. The natural tendency of teachers to manage students’ behavior and interactions constrained the experiences of the children. Instead, the habitat created moments of inquiry in the relationship of free and promoted interactions between children and teachers. When the four corners were balanced, constrained action was not the norm and the experiences had more nourishing richness for the children’s relationships as much as for their knowledge of the place. It was also a nourishing experience for the teacher.
When the teacher was engaged alongside the students in the habitat the joint attention created balance (Quadrant III). Mrs. Murray nature journaled alongside her students and Mrs. Hudson examined the pond with the children on the dock. When the teacher and student interactions were negative or when the teacher had less tolerance for children's choices in the habitat, the students found that their experiences were shaded with anxiety and shame. Equally, the lack of a teacher as a guide also hurt the children's experiences. If children only interacted with other children or spent every experience alone, a lack of teacher insight would have been missed; conversely, if the teacher was outside treating each experience as whole group instruction, the children would have missed out on their peer's contributions or worse, their own thinking. The students depended on the teacher as a touchstone of safety and familiarity as they moved throughout the habitat in exploration. In that way, the habitat nourished relationships between teachers and students.

Lastly, the teachers had the freedom to nourish their own explorations in the habitat (Quadrant IV). When the children encountered the habitat with freedom the teachers were equally free to discover details in the place. Mrs. Hudson was elated when she found her first dragonfly nymph in the pond muck. Her laughter and verbal response was excited and similar to Alizea's awe-struck utterances. Mrs. Murray reenacted her thinking about the tracks she found in the snow and drew as she smiled and shook her head when she told the students in her class that she just was not sure what left the prints. While it is rare to observe this phenomenon in traditional schools,
when teachers had the freedom to find their own focus they found deeper meanings in the information the habitat had to offer. Ironically, the children recognized the need for their teachers to explore; in the interviews, a common student response when asked what their teachers did not know, the children replied that the teachers missed out on the wonder of exploring for the sake of exploration. The children often wondered why they did not see adults in the habitat more often. There was a lovely interplay between the four corners of the grid and the free/promoted and student/teacher balance in the range of experiences over the year. The balance of interactions contributed to another revelation; the habitat had its own unique culture of kindness.

Culture of Kindness

Similar to the findings of Moore and Wong (1997), the portrait indicated an overall culture of kindness resonated in the habitat; this result was not visible until the final narratives were constructed because it came from a quality found inside of the school that was not present in the data. Carson Elementary was a school where a small number of children created large disturbances. These children often struggled with interpersonal relationships. The number of children who struggled was magnified by the intensity of the disputes between children, and the magnitude of disturbances that those children were able to create. Those disturbances were absent in the habitat. Students who created interpersonal struggles inside the school building were observed acting in natural cooperative relationships with their peers and teachers in the habitat. The data formed by participant observations, video and audio
recordings, maps, and interviews revealed no indications of bullying or social malice between children or social groups.

With consideration of the occasional instances with killing spiders or crushing wasps, the habitat symbolized an overall sense of respect. The dissonance, however, came from the repetitive refrain “messing around,” a term that was difficult for children to define. Instead of specific actions, messing around was rather a heightened sensitivity for other children’s actions that did not garner each individual child’s feeling of deep respect. Audrey preferred a quiet environment and Jimmy was drawn to play; neither child was acting in a way that harmed the habitat but Jimmy’s louder actions with more movement were perceived as such. In my observations, though, the children drawn to the playful and adventurous affordances of the habitat were as respectful as the children who sought solitude. Furthermore, the children who sought solitude were not observed to be perturbed by the adventurous children at the time of the activity, although they did report later that they were bothered by the noise and activity. In addition, nothing in the evidence indicated cruelty or bullying among children. The most likely actors to engage in social disputes elsewhere in the school were not only engaged in respectful interactions with the habitat, but were observed being helpful, playful, and kind.

The habitat’s culture of kindness was not disrupted by the children, but was sometimes unintentionally interrupted by the adults. The tolerance of the teachers for out-of-the-classroom behavior was the only indication of discomfort or anxiety that I
observed with the children. The only interruption to that curiosity and exploration was the adults. Sobel (1993) found that children in middle-childhood were expanding their sense of independence and preferred to be in natural areas out of the watchful eye of teachers and parents. Mercogliano (2007) called this the development of self-determination. Carson’s students were sometimes caught in the tension between pleasing the adult nearby by following the classroom rules and satisfying a natural tendency (running, breaking ice, touching water). The children’s sense of independence relied on the teacher’s tolerance of children attending to the information that they found on that particular day. When the teacher had less tolerance for children’s choices in the habitat, the students found that their experiences were shaded with anxiety and shame. When the students understood the expectations, and the teachers could allow for more movement and independence, students were able to nourish their cognitive, affective, and physical selves. The findings indicated that the children wanted to be successful in the eyes of the teachers and they wanted to expand into the habitat the way they innately could as children.

The findings strongly supported that the culture of kindness stemmed from the habitat’s diverse affordances. For example, Audrey could stay in the quiet butterfly garden to examine the milkweed pods that captured her curiosity that particular day while the rest of their class spread out down the hill to explore the woods. Jimmy could seek out trails in the woods while Beth wrote poetry at the rock steps. Jenna could explore the woods for the first time and Courtney could avoid the woods that
were “too woody,” and both girls could reach the bottom of the hill. Even in activity where the focus was promoted by the teacher for example, when Mrs. Foster’s class mapped the topography of the habitat the children were able to position their bodies in places that were comfortable to them. Some children sat at the concrete picnic table like a desk while others stood and walked up the hill while they wrote. The likely explanation of the unique culture of kindness found in the habitat was the infinite possibilities of information for children to attend to based on their preferences in free actions as well as the room to spread out, and up, and around through movement. This concept comes from Reed’s (1996b) claim that when ecological information can be taken through the senses, the perceptual quality “allows us to experience things for ourselves,” (p. 2). Through the independent freedom to select meaningful information from the surroundings, perceptual learning occurred through the activity of the body (E.J. Gibson, 1969; Heft, 2001). When children chose their experience based on the information they wanted to attend to, they learned qualities of self-determination and independence, and they expanded their awareness of nature, each other, and their local environment.

**The Search for Goodness**

Lawrence-Lightfoot (1983) repeatedly reminded the reader that portraiture was a search for goodness. A friend recently said to me, “Sometimes to find goodness, you have to look at the ordinary.” As portraiture is a methodology that
searches for what is right, as opposed to what is wrong, in education, his statement resonated in the final portrait of the habitat. What appeared to be ordinary experiences of children outside were infused with goodness, deep learning and connections, and a sense of place. Children in Carson Elementary’s intermediate grades found play, imagination, and nature, all ordinary things that have slipped away from childhood. In Carson’s habitat a sense of joy and wonder washed over every experience bringing a sense of kindness and community to the students. The culture of the habitat was one of kindness, respect, and joy. What a gift. In an age where schools are bully-proofing, rewarding positive behavior through prescribed programs, and locking exterior doors out of fear based on school violence events, finding a place where kindness and acceptance was the norm was a refreshing discovery. Furthermore, as solo experiences were nourished by social experiences, the school also benefited. The individual child was nourished by the community, and the community was nourished by the interactions between and among the children. Both could only benefit from the place symbolizing kindness and affection. In this sense, the habitat or natural schoolyard, advocated for children by creating a place for them to be children.

Limitations

There were inherent risks that limited the final story as a researcher and teacher in the same school. This dual role both inhibited the objectivity of the portrait and enriched the relationships with the actors in the portrait. As the science specials teacher for Carson in the three years leading up to the study, I had the opportunity to
build relationships as teacher to student with all of the children in the school. Freeman and Mathison (2009) discussed the ideal role of the researcher in children’s constructivist research as a friend, or in the “least-adult role” (Mendell, 1991 as cited on p. 60). The least-adult role was difficult to obtain, but because I resigned my position as the science teacher at the beginning of the data collection for the study, I removed myself from the position of teacher-authority in the habitat. This allowed me to observe the students’ experiences without managing behavior and freed me in a way that allowed me to follow individual students into into the woods or down the hill without concern for the rest of the group. It allowed me to see the experiences from the students’ perspectives as opposed to their experiences from the perspective of the teacher. The transition from the teacher to the observer took time. In participant observations, I took on a “there/not there” position where I was available to children to exchange ideas and discoveries but also attempted to remain in the background to observe authentic student interactions.

Other factors that influenced my objectivity in the study included some of the cultural rituals, including circling the tracks, 2 minutes of silence, and bellies on the dock. These routines came as a result of my first year as the science teacher. I taught the students in my class to sit quietly for two minutes, to lay on the dock so they would not accidentally fall in the pond, and to circle the tracks so other children could also see them (and not step on them). While this study was not intended to objectively define the benefits of such rituals, my perspective as researcher may have influenced
the value I saw in those routines. Additionally, there was some evidence that the teachers who took their students into the habitat during class time did so as a favor to me to provide me opportunities for participant observation. Again, the point of inquiry was not to understand the teacher’s motivations for taking their students into the habitat (although, that creates another interesting research endeavor). The study remains reliable because the children encountered the habitat during the school day, the phenomenon I intended to study.

The limitations of the study were countered by portraiture as the methodology, triangulation of the data sources, and thick descriptions (Geertz, 1973 cited in Lawrence-Lightfoot & Davis, 1997, p. 8) of narrative inquiry. Portraiture was chosen as the most fitting methodology because it invites the reflexive voice of the researcher into the narrative. As a teacher in the school, it was necessary to be considered in the narrative because I could not obtain the least-adult role. The data was gathered in multiple, complementary sources meant to triangulate the information. Children’s accounts of the habitat were written and drawn, reported verbally, and observed. Each participant’s data in the sub-group was compared throughout the data collection; every encounter was an opportunity to deepen my understanding of that child’s experience drawing on the multiple sources of data. And finally, the aesthetic whole was a coherent, written account of the children’s experiences told in thick descriptions as defined by Geertz (1973). The detail of the encounters lent to the reliability and resonance of the final portrait. The children were also allowed the
opportunities to both contribute to the rich descriptions and the data. Go-along interviews gave the Key Actors opportunities to illuminate areas of the habitat using their words as well as frame the setting through the video lens. Go-along interviews, photographs, and drawings allowed the participants to contribute to the study, expanding from the objects of the study to the co-creators of the study.

Implications

"To see a wren in a bush, call it "wren," and go on walking is to have (self-importantly) seen nothing. To see a bird and stop, watch, feel, forget yourself for a moment, be in the bushy shadows, maybe then feel "wren"-- that is to have joined in a larger moment with the world." (Snyder, 1995, p. 179).

The research leading up to this study created a solid foundation for the claim that time in nature promotes children’s wellness. The literature from an expansive set of academic fields indicated that children’s cognitive, emotional, social, physical, and creative development are linked to contact with nature. From this literature, it was reasonable to start with the anticipatory framework of this study with a claim that children need nature. The previous literature also found that children’s access to natural settings was limited. Parental fears, busy roads, and video games are among the list of culprits keeping children indoors. Inquiries into children and nature can appear deceptively mundane, especially in schooling research where academic performance is the ultimate endeavor. The importance of this study and other studies like it are critical because as previous literature suggested, and this study confirmed, nature can no longer be assumed a part of childhood. It is in the diminished access to nature that studies like this are so vital. Thus, schools like Carson Elementary had an
ample opportunity to provide connections to nature for children through the schoolyard habitat.

When considering the implications of the study, I remembered something that I always tell my students. They should know why an investigation was important. If they can’t answer the simple questions, “So what?” and “Who cares?” then the point of the investigation is lost. I felt this way at the end of this tremendous inquiry into children’s experiences in Carson’s habitat. Who will care about this research? Why did this study matter? The study bears importance for researchers concerned with children and nature and teachers. The implications for three topics of concern were related directly back to my problem statement in Chapter One: children’s sense of place, schooling, and environmental literacy. The fourth implication of the study deals with portraiture as a methodology to investigate children and nature.

Sense of Place

The children at Carson felt as sense of place in the habitat as defined by Orr (cited in Hutchinson, 2004): “[T]he competent and knowledgeable affection for a specific locality,” (p. ix). The children were competent in the habitat. Peter described a feeling of expertise using the analogy of hosting a Discovery Channel television documentary when he was moving through the area down the hill. Audrey claimed one branch of the scrub oak and studied a particular cluster of galls over two years. Every child identified the exact location where they first spotted a leopard frog. The children had knowledge of the habitat that increased over time. Marissa described a
three year process of understanding the habitat beginning with a mulching project, then a leaf litter investigation, then the reason that the leopard frogs made their home in the pond. Her knowledge of the place grew with every habitat encounter. Through the deep knowledge and competence in the habitat, children found affection for the place. They used words like special, beautiful, peaceful, and alive to describe the habitat. Their stories were anchored to specific moments in time within the place and were deeply personal to them but shared with other children and their teachers. Each child had the freedom to attend to the affordances in the habitat that suited them individually and created strong memories. Those memories created affection and anchored the children to the place. As Gary Snyder’s passage quoted at the beginning of this section stated, the children joined in the habitat and were not just passive observers of it. Gus’s memory of the exact place where he observed the mason bee the year before was a perfect example of such competence and affection. By observing the unique shape and color first, then having a name, he understood the bee and the flower and the conditions for the flower, and the greater sense of the moment.

The students described the habitat as special and unique knowing that very few schools had such a rich learning environment. The outdoor space was a point of pride for the teachers, the administration, and the parent community. The habitat comprised the school’s identity. The children associated their own identity in the habitat. Alanna could verbalize that the habitat was part of her. Perhaps children
craved that belonging and attachment to school. The strong sense of place came from the belonging of Carson’s community and a belief in the space as something important for children. The study did not suggest that every school would require a habitat to find such a sense of place; what the habitat provided was a way for children to connect to their school by having a unique, natural, interactive setting that was not necessarily available to them anywhere else, where they felt safe. They were allowed and trusted to go outside of the school building and found rich, deep experiences there.

Did the habitat provide a stronger sense of place for children at Carson? Using Bronfenbrenner’s (1979) ecological systems theory model, the systems surrounding the school identified Carson by the habitat. But more importantly, the evidence implied that the habitat provided a stronger sense of belonging for the students and a place where social disruptions were put at bay. The children that accessed nature with their families and the children that had no access to nature, were equally afforded independent interactions with the loose parts of nature allowing for intimate experiences that were observed in this study, and undoubtedly some stories that were not observed by the portraitist. Through these personal interactions, the habitat was a place for children to create their own stories and infuse the setting with personal meaning. The children did feel a sense of place in the habitat; the evidence from their experiences implied that it also created a stronger sense of attachment to the school itself.
The learning in Caron’s habitat happened through rich, deep experiences. Eleanor Gibson (1969) called it perceptual learning, as the children’s sensory channels were open to information, the children’s understanding of the natural setting drew deeper. Carson Elementary created a place for children to access nature in a safe, independent, intellectual, and playful way. The inception of the habitat came from within the school; this was not a project brought to the school and put upon the building from an outside entity. The ownership of the habitat stemmed from the work and stewardship that came from one class of fourth grade students and grew to a sense of identity for the entire school. The following findings are useful for Carson Elementary as their use of the habitat goes forward, as well as for schools and teachers who are seeking advice for the use of outdoor green spaces.

The strength of Carson’s habitat mirrored that of natural systems; its stability as a learning place came from its diversity of affordances for children. The pond and dock, the woods, the open spaces, the butterfly garden, and the immediate access from the school building provided an infinite variety of ecological information for children with diverse interests to attend to. Children needed the opportunity to manipulate the habitat’s loose parts. They were not asked to stay on a trail, instead they were actively encouraged to touch, bend, feel, lay down, and explore the loose parts. Although Steven described the sense of the habitat as a museum, it was not treated as such. Touching was not just acceptable, it was promoted.
Children needed multiple encounters with the habitat. The proximity of the habitat to the school made it manageable for teachers, especially science specials class, to access the habitat multiple times in a day and over a school year. The children with multiple opportunities to interact with the habitat showed the deepest forms of questioning and understandings of the place. Additionally, from multiple encounters with different teachers, the children needed consistent expectations of what teachers tolerated in the habitat and what they did not. When the expectations varied too much, the children felt anxiety and sometimes shame about their actions.

The two minutes of silence ritual was important to the children and to their success in meeting the teacher’s expectations. The two minutes was a time for the children to be still in their movements and their minds in preparation for their encounters with the habitat. It was also a time when the birds, frogs, and insects adapted to the presence of the group and carried on with their calls and chirps. The two minutes was the time that most children heard the presence of the chorus frogs. The children reported the two minutes as a special, valuable time for them, too. After the two minute introduction to the place, a balance of quiet investigations and opportunities to verbalize and interact with other children was vital. Even in Mrs. Murray’s silent nature journaling encounters, the children were allowed to talk through their observations either at the end of class in the habitat, or in the classroom. Not new to good instruction, the concept of reflection for children was very important.
to their experiences. Children needed to exchange their discoveries with their peers and their teachers.

The children even benefited from the encounters that occurred when the teacher took the children outside for a short, unstructured time. Especially evident in the respite theme, students found a sense of relief from short times in the habitat in addition to longer class times with a promoted focus. While longer, consistent periods in the habitat were best for nurturing the children’s depth of knowledge about the place, short and infrequent encounters were still beneficial for children’s well-being. It offered the children a time to awaken their senses, to physically move about, and to take a rest from the social or academic pressures associated with their classroom. Indeed, short encounters were far better than no encounters at all. Part of the sense of instant reprieve may have been attributed to the school-wide use of the habitat offered through science as a specials class starting in primary grades over multiple years. The children in this study who went to school at Carson during primary grades had a sense of familiarity and comfort which appeared to lend to the benefits of short, free encounters. This also supported children new to the school; the experienced children did not hesitate to familiarize new students, nor a new science class teacher, to the habitat.

Children needed ways to give back to the habitat. The evidence strongly indicated that planting one tree or spreading one bucket of mulch was a strong, meaningful experience for children who loved the space so much that they felt an
urgent need to take care of it. The children saw immediate results from their work in
the habitat. Delaney described the habitat as “glowing” after the Legacy Day as she
stood on the hill and looked out over the freshly mulched pines and newly planted
seedlings. Gus described a feeling of gratification as he led me through the work done
on Legacy Day and the weeks after with the murals and additional plantings. The
children felt pride in their actions and a general sense of reciprocity.

Lastly, the freedom that children had to visit the habitat outside of school
hours was critical. Chelsea and Isabella visited the habitat outside of school hours
with their families. Jimmy and Bryan made plans to explore the scrub oak on the
weekends. The forts in the scrub oak provided Jonathan with a sanctuary. The culture
of the habitat was a community space. This was critical to the children’s sense of
place and sense of ownership there. A fence or other barrier to children’s after-hours
access would have inhibited the power of the children’s bonds to the habitat.

Environmental Literacy

In 1995, Sobel reminded us that children cannot be asked to save what they
don’t know or love. As children at Carson Elementary grow up in Carsonville,
Colorado, the world faces more urgent environmental issues. The children were aware
of these issues looming in the newspapers and on the television with images of
hurricanes, fires, tsunamis, and oil spills. The children were not impervious to these
dramatic, traumatic events. But, the expansion of awareness at Carson began with the
children’s locale; they learned the forms and functions of native plants, local wildlife,
and their immediate place within a watershed system. The natural next step for the students was stewardship. Without a teacher’s lesson or curriculum, they felt empowered to protect the habitat by forming a clean-up club and planting trees with younger children in the school. The third grade children felt motivated to donate money from their fundraising event to purchase more plants for the butterfly garden. The children were not asked to solve issues too complex even for governments of world powers. The children were given the opportunities to create ways to give back to the habitat, a place they were given the opportunity, first, to love. An environmentally literate population will require that citizens are aware of the systems in the world around them. No doubt, the children at Carson Elementary in fourth, fifth, and sixth grades were aware of their natural world. Will they be more environmentally literate collectively? Only a longitudinal study would provide such insights.

*Portraiture and Children's Experiences of Place*

The paradox of children’s research is the necessity to understand the perspective of the child and the inability for the researcher to be a child. At the same time, understanding children’s unique lived experiences “requires a multiplicity of methodological approaches” (Greene & Hill, 2005, p. 4). Portraiture provides “analytic rigor and human connection, both inquiry and intervention” (Lawrence-Lightfoot, 2005, p. 10) offering a methodology that integrates multiple recommended
approaches to researching children’s experiences. Yet within the prominent literature
describing methodologies to uncover children’s experiences (Christensen & James,
2000; Freeman & Mathison, 2009; Greene & Hogan, 2005), portraiture has yet to be
cited as a valuable methodological approach. Portraiture is also left out of
methodological endeavors investigating sense of place, yet Lawrence-Lightfoot’s
search for goodness created a compelling way to investigate place for the wide
variety of academic fields interested in the topic of study.

In the study of Carson’s habitat, portraiture was employed in a unique way;
instead of a portrait of people in a setting, it was a portrait of a place experienced by a
variety of actors. Research portraits commonly create an artistic and empirical
account of an individual person or groups of people acting in a particular culture or
setting. The portrait of Carson’s habitat has implications for studies of children’s
experiences of place because it creates an artistic account of a particular setting
comprised by a group or culture. The questions guiding the investigation were not
about who the children were, but who they were in the context of a very specific,
geographically and temporally bounded setting. Their feelings, actions, and
knowledge were understood in the context of the habitat and collectively they
assembled an aesthetic portrait of the habitat; in other words, the stories of many
children became the rich texture and detail of a specific place in order to illuminate
the place itself. The portrait of place is likened to a collage: each individual child is an
individual portrait comprised of stories, feelings, thoughts, and actions. When viewed
together through emergent themes and stories that resonate with one another, the
individuals form an artistic expression of a whole: a place. Portraiture's many facets
of data including the ability for the researcher to include herself in the setting,
provides an array of stories that inform the themes leading to the final portrait of a
place, not of individual students.

To create the final portrait of a place, multiple forms of meaningful data were
incorporated into the research design. According to Miles and Huberman (1994), the
representativeness, reactivity, reliability, and replicability of a study includes "several
data collection methods; don't overly depend on talk, or on observation, to make
sense of the setting" (p. 266). Portraiture provided a balanced structure that was
inclusive of multiple forms of data. Children's experiences are commonly understood
through drawings and maps (Freeman and Mathison, 2009; Sobel, 1993), photographs
(Freeman and Mathison, 2009; Rudkin & Davis, 2007), video (Carpiano, 2009;
Kusenbach, 2003), and interviews individually, in groups, and conversations that
accompany drawings, maps, and photographs (Christensen & James, 2000; Freeman
& Mathison, 2009; Westcott & Littleton, 2005). Portraiture gives researchers
interested in children's experiences a methodology inclusive of all of the approaches.
Each source then informs an iterative process of questioning for the portraitist,
allowing the portrait flexibility depending on what the students report or reveal.

Just as children's drawings or maps can be compared through cross-case
analysis (Freeman & Mathison, 2009), multiple portraits of individual places can be
compared for resonance and common themes. The use of portraiture to inquire into children’s experiences of place could contribute to a common discourse from multiple fields of study including formal schooling, geography, planning and development, children’s wellness, ecological psychology, and environmental education. Individual portraits of children’s experiences in bounded settings could be tested for common resonance and themes and then serve the global dialogue about children’s places and their experiences in them. This opportunity to illuminate children’s knowledge of, actions in, and feelings about places are especially relevant to the studies of children in nature.

Further Research

This exploratory study generated research questions throughout its iterative nature as well as questions to investigate in future research. Among these questions are suggestions for longitudinal studies and an inquiry into teacher experiences. A longitudinal study of students at Carson Elementary including past alumni of the class who began the habitat in fourth grade would provide deeper insights into the lasting qualities of the children’s experiences in the habitat and the significance of the experiences for the children’s environmental literacy. A longitudinal study could also investigate which of the Carson children entered into the environmental field as scientists, engineers, or activists. Another question that was too broad for the scope of this investigation should focus on the teachers. What was the experience of the teachers in the habitat? How did formally trained classroom teachers have to adapt to
include an outdoor classroom as part of their school day? What precluded some teachers from taking their students outside during class time while other teachers made the habitat a weekly habit? Also primed for further investigation was the teacher’s own free and promoted actions in the habitat. When the teachers had time to attend to what they were interested in, what was their experience in the habitat? In addition, further studies will need to investigate the school administrators support for naturalized areas in schoolyards like Carson’s habitat. How does administrator support encourage or diminish the quality of children’s experiences in green schoolyards? Lastly, the study begs the question of how children in urban settings experience a schoolyard natural area. Further qualitative studies would illuminate the benefits of green schoolyards for children with demographic characteristics unique from those of Carsonville, Colorado.

**Conclusion**

Lawrence-Lightfoot developed portraiture as a research method to both “inform and inspire readers,” (1997, p. 10). With the fresh momentum to reconnect children to nature, schools can find inspiration and understanding from Carson Elementary’s schoolyard habitat and the fourth, fifth, and sixth grade students’ encounters with the natural world. The children experienced wonder and inquiry, ownership and identity, peace and calm, respite and respect, and adventure and imagination in nature during the school day. They expanded their awareness of the natural world, balanced their self-determination and focus with teacher facilitation,
and created a culture of kindness. The children were honored to be part of the experiences in the habitat. These experiences were shared by foundational feelings of trust, safety, confidence, familiarity, and an understanding that the habitat was something unique and special.

As the children and nature movement generates momentum, green schoolyards are growing as part of the mission to reconnect kids to nature (Blair, 2009; Hutchinson, 2004; Louv, 2005). Understanding children’s experiences in one natural schoolyard contributed to a scholarly understanding of child development in nature (P. Kahn, 1999) and how children construct meaning of places and how place meaning develops (Heft, 2001). The children’s school day encounters with the natural world illuminated opportunities for children to be children and nourish the intellectual, physical, and emotional facets of their embodied selves.

In an educational era that seeks to find what is wrong with education, the study of children’s experiences in green schoolyards allowed a pivot from the pathology of schooling, or what schooling is doing wrong, to the goodness that exists in one public school (Lawrence-Lightfoot & Davis, 1997). Schools do have the opportunity to break down barriers to children’s time in the natural world by offering interactions with nature during the school day. In this study, a well-established green schoolyard became the subject of children’s experiences so that schools, scholars, and educators can gain insight into what children do, feel, and think about while they are immersed in the natural world. This understanding has the opportunity to inform
other green schoolyard projects in their design and incorporation as part of the school
day.
APPENDIX A

SUB-SAMPLE PARTICIPANT DESCRIPTIONS

Mrs. Murray's 4th Grade

Courtney

Courtney was a ten-year-old girl with light brown hair and dark-rimmed round glasses; Courtney attended Carson since Kindergarten. She wore bright colors and was often observed with her notebook open in one hand while she wrote and walked at the same time. Her movements were slow and deliberate, her voice was quiet, and she was consistently observed near the butterfly garden. She reported her favorite places under the pine trees or on sitting on the large rocks next to the pine trees near the pond. She described the habitat as pretty, cold, and shady. Courtney joined the CARE clean-up club after school.

Eddie

Eddie was a ten-year-old boy with dark brown hair and a wide face with large brown eyes. Eddie's hair was short and black with gelled up spikes over his eager face. Eddie was a student at Carson since Kindergarten. His movements were often energetic but he was very skilled at sitting still and recording his observations in his notebook for long periods of time. Eddie was often observed with Tony both in the habitat. He took great pride in his drawings of the smallest details of the habitat. Eddie's favorite place in the habitat was on the dock because the pond changed every
time he went outside. He noticed spiders crawling on the ice and mud in the water. He described his nature journal drawings as accurate, not just good.

Isabella

Isabella was a ten-year-old girl who started at Carson in first grade. She had strawberry long hair, freckles, and an eager positive character. She was unrelenting in the habitat; she stepped through snow in spotless white leather shoes and often moved through the habitat with small skips and hops. Isabella was a founding member of the CARE clean-up club and during one of the clean-up sessions after school, Isabella’s mom joined the group to help. Isabella often visited the habitat outside of school hours with her grandparents. Her favorite place was between the pond and the hill where she found a butterfly wing two years previously. She was interested in the different colors of the habitat and used the two minutes of silence to find the best colors to visit each day.

Marissa

Marissa was a ten-year-old girl who started at Carson in first grade after moving to Colorado from Nevada. She had white-blonde hair, round gold glasses, and a big smile. She was a bright, confident girl who was accustomed to excelling at school. She had a special interest in science as the daughter of two geologists and was very comfortable outside in any weather. Marissa’s favorite place was the butterfly garden in the summer and the pond in every other season because, “you can still see
things in the pond when everything else is practically dead.” Marissa also reported a feeling of calm and enjoyment from being able to go outside and sitting under a tree.

**Michael Z.**

Michael Z. was a quiet boy who always appeared to be pondering something, even when standing in line to go outside. He had dark brown hair contrasted by blue eyes and always wore an athletic shirt and shorts or pants. Michael was mysterious; he moved deliberately, spoke deliberately, and paused to think before responding to children or teachers. Michael started every day on the hill near the library because he could be alone; Michael sought solitude to investigate and explore. Marissa also enjoyed the area up the hill, “because deer go out there and sometimes, if I’m lucky, I’ll find deer tracks out there.”

**Pete**

Pete was a ten-year-old boy with a contagious laugh and small, wire framed glasses. Pete had Cerebral Palsy and walked with an electric blue metallic walker with burly wheels that allowed him to walk along the trail and into the lower grasses in the habitat. Rachel was usually his helper that walked out to the habitat through the series of ramps in the building that led to the playground and then around to the habitat. There was a boulder next to the top rock step near the pond where Pete would sit at the beginning of two minutes of silence and was often observed sitting there recording observations in his nature journal. He reported that his favorite places were
the butterfly garden and the picnic table and described the habitat as quiet, peaceful, pretty, with life, and “good smelling.”

Rachel

Rachel was a ten-year-old girl with white blonde hair that swept just above her blue eyes and a large smile. Rachel was witty and unique; no matter what the class was doing, she always had a slightly different beat to her actions than the children around her. She was a caretaker and felt compelled to constantly tend to Pete. When she walked outside with him, she carried his notebook after she sharpened his pencils. Rachel was consistently observed sitting near Pete during nature journaling. She always spoke with passion or with a giggle. She was a founding member of the CARE clean-up group, although she did not attend the clean-up times after school because her mother could not rearrange transportation home.

Steven

Steven was a quiet ten-year-old boy and the younger brother of Elizabeth; tall, thin and freckled, Steven was often unsure of himself in academic situations. He also paused before responding and often hesitated when he spoke wanting to make sure he was answering the way the teachers wanted him to. Steven was exciting to observe in the habitat. Where he was lacking confidence in the classroom, he moved with great certainty outside. His body relaxed, he poked and prodded the ice on the pond, reached into the water laying on the dock, sat in the tall grasses without hesitating, and watched everything around him. Steven’s starting point for every class was the
rock steps next to the pond, but he favored going to a new place every day rather than
starting at the same place each time. "I don't have a favorite place," Steven explained,
"I think it's all pretty good."

Tony

Tony was a quiet nine-year-old boy who started at Carson in third grade.
Tony's hair laid flat, cut in a straight line across his forehead above his sleepy eyes
that never stopped moving when he was thinking about something. He moved slowly
and deliberately. Tony was consistently observed with Eddie. Tony described his
favorite place as the butterfly garden where the flowers leaned against the building,
but he reported that he started his time in the habitat in a new place each day. Tony
reported his experiences in the habitat with sensory information: he heard an airplane
before he looked up to see it, he felt the cattails, he twisted the weed and felt the roots
loosen.

Mrs. Frederick's 4th Grade

Ava

Ava was a petite quiet ten-year-old girl with dark brown hair, dark skin, and
brown eyes so dark they looked near black. She came to Carson in third grade from
Washington. Ava's actions in the habitat were often away from other social groups of
children. She stayed close to the teacher's side except for the days that she explored
the woods with her classmates. Her favorite place in the habitat was on the dock
where she looked for creatures.
Kellen

Kellen was a ten-year-old boy with longer sandy blonde hair that whisked across his forehead and down around his shoulders. Kellen started at Carson mid-way through his third grade year; he was earnest to get into the habitat every time he came to science class. Kellen asked repeatedly when it was time to go outside. His favorite place was on the dock and he used the adjectives pretty, sparkly, and cool to describe the habitat.

Jenna

Jenna was a ten-year-old girl who came to Carson in preschool; she remembered the habitat being part of the school but did not remember the first time she went into the habitat. Jenna had long brown hair in one length that framed her large eyes and wide cheeks, which turned pink when she was excited. Her voice gained a higher pitch at the end of each statement and she had a sing-song quality to the way she spoke about the habitat. Jenna’s favorite place in the habitat was at the concrete picnic table where she enjoyed watching for birds and the dock.

Jonathan

Jonathan was a ten-year-old boy who started at Carson in Kindergarten. He was a lanky child with large brown eyes and short brown hair that always looked like he just woke up; Jonathan wore baggy t-shirts and pants two inches above his ankles. He had a high squeaky voice and when he spoke, he looked above the person he was speaking to. His eyes often wandered. Jonathan was fiercely connected to the woods
surrounding the habitat and he called his system of forts in the woods his sanctuary. Jonathan had an intricate knowledge of the woods and described his nemesis, Houston, as a boy who constantly took over his forts and damaged the trees. It was never determined if Houston was an actual child or part of Jonathan’s elaborate and creative imagination.

Zachary

Zachary was a tall, solidly built ten-year-old boy with blonde hair cut squarely around his face and thick glasses that magnified his brown eyes. Zachary spoke with certainty if he had something to contribute. He had a difficult time sitting still evidenced by rolling on the floor and playing imaginary sword fights with Kellen during the first interview. Zachary enjoyed the area up the hill next to the library in the habitat, but was also intrigued by Jonathan’s systems of forts in the woods. Zachary treated his friendship with Jonathan like an apprentice to an expert; Zachary learned about Jonathan’s entrances, natural defenses, and look outs with every opportunity. He described the habitat as a cool view, windy, and fun.

Mrs. Cruz’s 4th Grade

Alice

Alice was a tall, thin ten-year-old girl with long dark hair who started at Carson at the beginning of fourth grade. She had a quiet voice and a slight lisp. Alice described a feeling of curiosity in the habitat. She remembered seeing the habitat through the library windows on her tour of the school as a new student, then
remembered exactly where she was when she saw her first frog in the pond. She described the habitat as beautiful and quiet and her favorite place was the large pine tree next to the dock.

**Blaine**

Blaine was a ten-year-old boy with longer light hair that sometimes fell into his eyes. He had a freckled face and wide eyes; Blaine was Audrey's younger brother. Blaine started at Carson in second grade and reported walking through the woods when he was not in school. He reported running into a raccoon late at night and feeling scared, but also reported that the drainage was full of life. Blaine also reported that Carson was the best school for him giving it five out of five stars. His favorite place was the pond dock.

**Devon**

Devon was a nine-year-old girl who came to Carson the previous year. She was a social child with black hair, brown eyes, and a wide smile. Devon's favorite place in the habitat was on the dock under the shade of the large pine tree because her friends could sit with her in that place.

**Michelle**

Michelle was a nine-year-old girl in her first year at Carson Elementary and the younger sister of Travis in sixth grade. Michelle moved from Texas with her family who together spent the evening of Back to School Night in the habitat using nets to search for dragonfly nymphs in the pond. She had a fair complexion with light
freckles and white-blond hair. She described the habitat as colorful, interesting, and “smells good!”

_Lilly_

Lilly was a quiet nine-year-old girl who spoke so lightly that she was difficult to hear; Lilly was David’s younger sister. She had long brown hair with gold highlights, large blue eyes, and a small thin frame to her body. Lilly was easily muted by the girls around her when she was inside, but moved with direction and determination when she was in the habitat. Inside, Alice spoke over Lilly and Devon interrupted her, but outside, Lilly was observed showing the girls how to do leaf rubbings in her notebook. Her favorite place was the butterfly garden, which she described as pretty, smelling good, and with her favorite colors. Lilly also enjoyed the pond because of the cattails and animals.

_Phil_

Phil was a nine-year-old boy with shorter black hair, dark brown eyes, and olive skin who started at Carson in Kindergarten. Phil was a thorough student who made sure he communicated what he meant in the interview and in his writing, but did not seem interested in what other children were saying or doing. He reported feeling immersed in nature when he was in the habitat as well as a sense of giving back to the habitat by pulling the weeds at the beginning of the year. When Phil talked about the weeding, he also spoke about taking care of the habitat. Phil wrote, “I
like laying on the dock and looking at the water and the water glisins \textit{sic} at me.” His favorite place was the woods.

**Mrs. Hart’s 5th Grade**

\textit{Adam}

Adam was an eleven-year-old boy with brown hair and large brown eyes. Adam kept to himself socially and enjoyed fantasy stories and creative imaginary play. He was often observed sitting still and quietly in the habitat. While other children scurried around building fairy houses, Adam sat at the top of the hill, knees tucked to his chin, face turned up toward the sky as he leaned against a post. But Adam’s sometimes vacant look was deceiving; his writing described the habitat as amazing, stunning, and awesome and he recalled the exact location where he found his first leopard frogs, where he felt a tree, and where he heard bird calls.

\textit{Alizea}

Alizea was a tall eleven-year-old girl in her first year at Carson Elementary. Alizea was a girl with a creative flair for style; she wore tutus over leggings, sequined fingerless gloves that covered her dark arms up to her elbows, and she often came to school with colorful metallic additions to her hair. Alizea was a self-proclaimed insect admirer who joked that her mom found her interest gross and for boys. She was a social girl but also very intrigued by the habitat and especially the galls on the rabbitbrush near the picnic table. She reacted vocally and physically every time she noticed new information and was fearless to find new perspectives, for
example, when she put her whole head and body into the blooming plum covered in bees to get a closer look at a butterfly.

_Ella_

Ella was a small ten-year-old girl who started at Carson in Kindergarten. Ella was a student featured in the habitat for the documentary the district filmed about the habitat at Carson. Her favorite place was the dock and the pipe under the dock. She had a lot of enthusiasm for the habitat and lamented not being able to spend more time in the habitat during the school day.

_Chelsea_

Chelsea was a tall eleven-year old girl with long blonde-brown hair all one length nearly at her waist. Her eyes were soft and kind, she moved calmly, and she sat very still. Chelsea started at Carson in Kindergarten; she visited the habitat frequently outside of the school day with her mom and younger brother who had a keen interest in insects. Chelsea reports that her brother is going to be an entomologist. She drew the finite details of the habitat from memory and reported a feeling of freedom and excitement even before getting outside into the place. Throughout the observations and interviews Chelsea reported a long-term curiosity about the galls on the rabbitbrush, which was where she started every time her class was in the habitat.

_Logan_

Logan was a smaller ten-year-old boy with olive skin, dark wavy hair, and a toothy broad smile. He started at Carson when he was in second grade when he was
adopted along with his two brothers, and was immediately drawn to the habitat; when
it came to the habitat, he spoke and moved with enthusiasm. His favorite place was
the pond dock; he wrote: “Favorite place because you get to see the fantastic pond
grow awesomely [sic].”

*Michael A.*

Michael A. was an eleven-year-old boy who arrived at Carson in forth grade.
He lived nearby in an apartment and related his time in the habitat to the time he
spent in a field near his home. Michael A. expressed a lot of gratitude for the habitat
and reported that he preferred to be alone in the habitat. He also reported that the
habitat made him feel special. He was often observed sitting at the picnic table with
another boy.

*Rocky*

Rocky was a petite ten-year-old boy with blonde hair in a crew-cut above
large intense eyes. Rocky arrived at Carson in first grade after being adopted from
Russia; he struggled with a behavioral disorder that made it difficult for him to create
bonds to the teachers and students in school. Rocky’s favorite place in the pond was
the clearing of cattails that revealed the water’s surface on the far side, opposite from
the dock. He was consistently observed there, peering into the water or placing his
toes on the frozen surface.
Sophie

Sophie was a petite, blonde ten-year-old girl with a young voice who was not afraid to speak her mind. She described herself as an “outdoorsy girl” who also needed reassurance that she was safe. Sophie came to Carson in Kindergarten. Best friends with Ella, the girls were consistently observed together asking one another questions and speaking over one another as they shared their findings with the teacher. Sophie’s favorite place was the butterfly garden because it was beautiful, interesting, and big.

Zack

Zack was a confident eleven-year-old boy who started at Carson in first grade. He was a tall, thin, athletic boy with spiked blonde hair. Zack was a student always in favor with his teachers and someone Rocky turned to for support in the classroom. He reported experiences with his grandfather where they looked for deer and elk antlers for his grandfather’s crafted chandeliers. He spoke about the habitat as a place with a peaceful feeling where he liked to go watch for frogs.

Mrs. Shaw’s 5th Grade

Tom

Tom was an eleven-year-old boy whose physical presence and intimidating effect made him appear to be a high school student. Tom had sandy blonde hair and freckles; he also had a hardened exterior. Tom had the unfortunate reputation of handling interpersonal issues with violence and with threatening teachers. It was not
uncommon to see him at the table in the principal’s office or walking with the school social worker through the hallways. Tom had been removed from science class for telling Mrs. Hudson to f--- off. Tom’s observed behavior in science class when the activity was building fairy houses was completely opposite of his modus operandi, though. He was engaged, energetic, and resilient to another boy’s taunting. Tom sat at the edge of the pond with two other boys and built a small shelter without incident.

**Mr. Nick Norris’s 6th Grade**

*“Boss”*/Raymond

Raymond, who liked to be called Boss, was a twelve-year-old sixth grade boy who came to Carson in fourth grade. He was a stout child who struggled with his weight and learned to defend himself against the teasing of classmates by throwing out the first insults. Boss was a boy with closer relationships to teachers than to his peers. He was close friends with Sappire; the two defended one another against a group of boys in their class until the end of the year when Boss spoiled their friendship with comments that were hurtful to Sappire. Boss’s favorite place in the habitat was down the hill where he spent weekly nature journaling time with Mrs. Dekan, his fifth grade teacher. Boss expressed a strong sense of respite from social pressures when he was in the habitat.

*June*

June was a petite sixth grade girl who was eleven years old. June had short, wavy light blonde hair, pointed features and small wire frame glasses. She moved to
Carsonville from Wisconsin at the beginning of the school year. She expressed a sense of peace and solitude when sitting alone in the habitat, although she was most often observed drifting through the habitat with one or two other girls. Her favorite place was near the library up on the hill overlooking the habitat.

_Sappire_

Sappire was a self-assured sixth grade girl who was eleven years old; she came to Carson in second grade. She had small eyes on a wide face with small wire frame glasses and dark brown hair all one length. Sappire was often in a hooded sweatshirt zipped to the top and jeans that gathered in a bulky way above her wide skateboard style shoes. Sappire was a strong girl who did not circulate through the other social circles of girls in her grade, instead she moved from social group to social group and stood up to teasing by a group in her class that she only referred to as "those boys." She was a strong advocate for Boss until he said hurtful things to her at the end of the school year that put some distance between the two children. She described the habitat as "a giant woods for kids." Her favorite place in the habitat was on the dock where she looked for small, black aquatic snails.

_Mr. Skip Granger and Mrs. Amy Stafford's 6th Grade_

_Archer_

Archer was an eleven-year-old boy who started at Carson Elementary in first grade. He was thin with golden brown-blonde hair that he wore short in a short rise like a wave above his forehead. Archer was reserved physically; when he spoke with
great enthusiasm his body was still and only his eyes and hands moved. He looked out for Frank who shared a love of all things reptiles and amphibians. The two boys had a keen sense of seeking out snakes in the habitat; during the go-along video with Archer he found a small garter snake less than four inches long under the deep leaf litter in the woods. His favorite place was the dock where the highlight of his elementary school tenure was finding a leopard frog.

Audrey

Audrey was a self-directed, confident young woman and the older sister of Blaine. Audrey was a twelve-year-old girl who started at Carson in fourth grade. She was typically observed wearing her long brown-blonde hair pulled straight back from her face in a ponytail and in a purple hooded sweatshirt with cartoon-like skeletons on the side. Audrey was easily both social and solo; she was intrigued by oak galls for multiple years and she shared those observations and subsequent understandings with Remmy and Ginger.

Damien

Damien was an eleven-year-old boy with gelled blonde hair and bright blue eyes who came to Carson in fifth grade. Damien’s physical build was athletic and he was always dressed in popular brands of clothing, yet he did not limit himself to one social group of kids. Instead, he was observed exploring the habitat with Archer, Frank, Gus, and a variety of other girls and boys. Damien was a naturally inquisitive student who was not afraid to speak his mind in class even if it meant challenging a
teacher. The students in his class liked and respected him. Damien’s favorite place in
the habitat was the pond dock which he described as quiet, cool, and beautiful.

Frank

Frank was an eclectic twelve-year-old boy who attended Carson since first
grade. Frank’s life-long passion was for reptiles and amphibians and his dream career
was to become a herpetologist. Frank was tall with dark hair, a long square face, dark
eyes, and very long fingers that he used to hand feed crickets to the science class pet
tiger salamander. Archer was Frank’s close friend who looked out for Frank socially.
Frank could remember every exact location where he encountered frogs or snakes in
the habitat. His strongest memory was of a garter snake hunting for grasshoppers near
the library walls up the hill. His favorite place in the habitat was under a large pine
tree next to the path where he found the largest garter snake he had ever seen.

Ginger

Ginger was a thin eleven-year-old girl who was a student at Carson since
Kindergarten. Ginger had a hearing impairment and was affected by Moebius
Syndrome, a neurological disorder that affected her nervous system and caused her to
be unable to move her facial muscles. Ginger described the habitat as “A place of
wonders.” She reported a relaxed feeling in the habitat and although she started each
day outside exploring a different location, she always spent time at the concrete
picnic table looking out over the drainage.
Gus

Gus was a thirteen-year-old boy who came to Carson in fourth grade. Gus was an understated child with a huge smile and large eyes that he looked up through even when he made direct eye contact. When his hair was long, he let his bangs hang over his face. He cut his hair in a very short military-style crew cut half-way through the school year. Gus was a child who did not speak with confidence about the habitat inside at the library table, but once he was outside walking around, he was an expert on the habitat. His passion was fishing and his comfort outside was evident in the observations and interviews. Gus’s favorite place was the pond where he remembered observing a dragonfly laying eggs on the surface of the water. He was often observed laying in the tall grasses down the hill.

Peter

Peter was a twelve-year-old boy who came to Carson in fourth grade. Peter had blonde hair, light eyes, and a kind smile. Peter often wore a large red Carhart brand jacket and a baseball hat. He was more mature than his male classmates and had a sense of wisdom uncommon in children his age. Peter’s father lived on a large rural property outside of Carsonville where Peter had the freedom to explore and roam. Peter was straightforward, honest, and kind. His favorite place was down the hill where he felt “peaceful, calm, and restful.” He described his feelings down the hill using the analogy of an expert on the Discovery Channel. Peter was observed alone more than he was with other students in the habitat.
Remmy

Remmy was an eleven-year-old girl who attended Carson Elementary since Kindergarten. She was a small, athletic gymnast with strawberry blonde hair and light freckles; Remmy was a girl other students enjoyed being with and she was always smiling. Remmy’s favorite place in the habitat was at the concrete picnic table overlooking the drainage.

Tyler

Tyler was a tall twelve-year-old boy who came to Carson in fourth grade. He had short black hair that looked wet with gel, a wide face with freckles, and typically wore athletic jerseys from baseball teams. Tyler was soft-spoken and had a a kind, polite character. Tyler’s favorite places were the pond dock and down the hill, where he explained that it always felt like an adventure. He also described the habitat as unique from other places he had access to.

Mrs. Lynn Foster’s 6th Grade

Alanna

Alanna was a cantankerous eleven-year-old girl who started at Carson in Kindergarten and had strong memories of the class that started the habitat. She had shoulder-length brown hair and turtle-shell oval glasses. Alanna was often observed with Elizabeth and both girls shared a love of reading fantasy novels. She described her experiences in the habitat using analogies from her novels, including vivid
memories from visiting the same place at the dock repeatedly over several years.

Alanna also claimed that there was a piece of her in the habitat.

Beth

Beth was a twelve-year-old girl who began school at Carson in Kindergarten. Beth had very long brown hair parted straight down the middle of her head and worn tucked behind her ears. She had a kind face with dark brown eyes and she nodded and smiled when she sat listening to her teachers or her peers. Beth was usually dressed in a 4H sweatshirt with the name of the club she belonged to raising rabbits. She loved to write poetry and reported that she found inspiration for her writing in the habitat. Beth was very close with Delaney, whom she was often observed with in the habitat, but she was also observed sitting alone quite often. Beth reported trying to find a favorite place in the habitat, but she did not have one because she liked to wander around. She described the habitat as peaceful and a place to respect nature.

Bryan

Bryan was a shorter boy who was eleven years old and attended Carson for more than three years. Bryan had blonde hair that tousled to one side of his head and wore baggy t-shirts and jeans with wide skateboard style shoes. Bryan was difficult to engage in the classroom and he left his work until the last minute; when he was forced to come in to school early to complete his work, he would sing out loud and complete the assignments in record time. Bryan was often observed with Jimmy; both boys had an attraction to the trails in the woods surrounding the habitat.
Connor

Connor was a thoughtful eleven-year-old boy who came to Carson in fifth grade. He was tall and thin with short brown hair, a lot of freckles, and small brown eyes. Connor was observed both on his own in the habitat and with other boys. Connor enjoyed technical descriptions of the habitat and what he understood; his enthusiasm for the habitat was evident when we talked as Connor’s thoughts would run together without a breath. Connor’s favorite place in the spring was the flowering plum tree next to the pond because of the fragrance of the flowers and the bees that covered the blooms early in the season. Otherwise, Connor favored the two small boulders between two pine trees because, “a small space can hold a lot of life.”

David

David was a shorter eleven-year-old boy with short brown-blond hair and a cowlick just over his right eye that pushed his straight hair up away from his forehead. David started at Carson in fourth grade and was Lilly’s older brother. David enjoyed building forts; at home he built them with his sister and dad out of blankets in his family room. He had forts in the woods that he discovered last year while walking to school and playing hide and seek with his sister and their friends. While David was a social boy often observed with Bryan and Jimmy, he was also observed on his own exploring in the habitat. David’s favorite place in the habitat was
Delaney

Delaney was an eleven-year-old girl who started at Carson in Kindergarten. Delaney had shoulder-length dark blonde hair, blue eyes, and thin glasses. She was tall and thin. Delaney was a meticulous recorder in the habitat; her drawings and writings were neatly organized in her science notebook and on each page. An academic child, she described the habitat as an outdoor classroom where “we observe all the plants and life and we will draw them and write descriptions and figure out what they are.” Delaney moved through the habitat as methodically as her notes. Her close friend was Beth whom she was often observed exploring with. Delaney’s favorite place was the far side of the pond because she could investigate the pond away from the crowd that gathered on the dock.

Elizabeth

Elizabeth was twelve years old and started at Carson in fourth grade and Steven’s older sister. Elizabeth was a tall girl with blonde hair and oval glasses. She spoke in animated expressions and shared of love of fantasy novels with her close friend Alanna. Elizabeth felt a close connection to the habitat because of work she had done with Mr. Granger hauling buckets of mulch. She identified the work with proving to the boys in her class that girls were strong and capable of laborious tasks. Her favorite place was in a patch of mountain rose shrubs they had planted as a class in fourth grade. She described it as calm and peaceful where not a lot of people went.
**Faye**

Faye was a twelve-year-old girl who came to Carson in Kindergarten. She was tall and thin with straight brown, shoulder-length hair that framed her freckled fair face and light eyes. Faye called herself clumsy and was not afraid to laugh at herself when she tripped. Faye had a love of writing fiction stories and spent a lot of free time outside of school creating intricate stories. Faye was observed with Alanna and Elizabeth and other girls in her class when she was in the habitat; she was rarely observed alone.

**Fred**

Fred was a new student to Carson in sixth grade and twelve years old. Fred was an unique individual with short blonde curly hair and one eye that closed slightly more than the other when he was making loud proclamations to the class or his friends. Troubled by the amount of trash he found in the scrub oak, Fred became a founding member of the CARE clean-up club and appeared to be setting out on an expedition with a large stick and gloves during the clean-up times after school. Everything Fred did had flair and energy. He was often observed running in long strides through the habitat, always anxious to get to the next place.

**Jake**

Jake was an athletic blonde eleven-year-old boy with a wide smile and kind tired eyes who came to Carson in fourth grade. Jake was a social boy but was often observed alone in the habitat; the habitat appeared to give Jake access to a quieter
more inquisitive part of himself that he did not have when he was with his friends or playing football. He repeatedly used the word “wonderful” to describe the habitat and considered himself very lucky to have the habitat at his school.

*Jimmy*

Jimmy was an eleven-year-old boy who arrived at Carson in third grade. He was a thin, lanky child with black hair and black eyes. Jimmy was often observed with Bryan and any other boys who would explore the woods. He described feeling energetic and good after spending time in the habitat. He and Bryan made plans to spend the weekends in the woods; Jimmy did not have access to another natural setting where he could explore.

*Renne*

Renne was a very social eleven-year-old girl who came to Carson at the beginning of sixth grade. She had hair that covered her shoulders, thin wire-framed glasses, and braces that wrapped around one protruding front tooth. Renne was always observed with other girls in her class and rarely observed recording in her notebook. She reported a strong attraction to the colorful qualities of the habitat and recalled the color as part of her first impression at the beginning of the year.

*Tim*

Tim was an eleven-year-old boy who started in Kindergarten at Carson Elementary. With dark wavy hair, dark olive skin, and dark eyes, Tim was the ladies’ man in his class because he was charismatic. It was not uncommon to see a group of
two or three girls watching Tim’s movements or flirting with him in the habitat. He was often observed moving through the habitat with groups of his peers, helping other children hop onto the rock in the pond to spot the chorus frogs, or leading a group of boys into the woods to explore. He reported that his routine was to go to the top of the hill to look out over the habitat, then go down to the dock to look at the pond. He described the habitat as challenging and fun.

*Travis*

Travis was a twelve-year-old boy who moved to Carsonville from Texas at the beginning of sixth grade; Michelle was his younger sister. Travis was an average height with short, tidy auburn blonde hair and freckles across his nose and cheeks. Travis was a polite boy who tended toward the background when surrounded by his classmates, although he always watched carefully the actions of the children around him. Travis’s favorite place in the habitat was the pond, which he described as comforting and cool.
APPENDIX B

PARTICIPANT CONSENT AND ASSENT

Consent Form Approval: Approved

Date: OCT 26 2010  

Study Title: Children's Experiences of a Green Schoolyard

Principal Investigator: Kelly Keena

COMIRB No: 10-1037

Version Date: 10/14/2010

Version No: 3

Your child is being asked to be in a research study. This form provides you with information about the study. The person conducting the research will describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding whether or not to take part.

Why is this study being done?

This study plans to learn more about the experiences children have in the schoolyard habitat (referred to by the school and by students as "the habitat"). Your school has been chosen for this study because the school provides a unique outdoor classroom setting. This is a doctoral dissertation project for Kelly Keena who is also the science specialist at your school. The goal of this research project is to understand how 4th, 5th, and 6th grade students feel about, know about and act within the natural setting of the habitat.

This form provides you with information about the study. Your child, along with all students in 4th-6th grade are being invited to participate in this project.

What happens if my child joins this study?

All students who participate in this study will be observed in the habitat by the researcher. If your child joins this study, he/she will be asked to take photographs and create drawings of the habitat (not of people) to demonstrate the favorite or special places in the habitat to the researcher.

Some of the students will be asked to participate in one to two formal interviews. Each interview will take approximately 45 minutes, and will be audio taped. It will be conducted before school, after school, or during lunch at the students' convenience. One interview will be requested in November/December and the second interviews will be requested in April/May. Only thirty-four students will be interviewed as part of this study. If your child joins the study, he/she may or may not be interviewed.

Each interview will be conducted by the researcher and will focus on (1) students' activities during class time in the habitat based on the photographs and drawings completed by the students and (2) students' perceptions of the habitat, how they feel, and what they think about when in the habitat. The interviews will be with individual students, but the students are given an option to ask a friend to join the conversation.

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Consent Form Approval

Both the records that identify you and the consent form signed by you may be looked at by others.

- Federal agencies that monitor human subject research
- Human Subject Research Committee
- The group doing the study
- Regulatory officials from the institution where the research is being conducted who want to make sure the research is safe

The results from the research may be shared at a meeting. The results from the research may be in published articles. Your name will be kept private when information is presented.

- Some things we cannot keep private. If you give us any information about child abuse or neglect we have to report that to Colorado Human Services. Also, if we get a court order to turn over your study records, we will have to do that.
- Some things we cannot keep private: If you tell us you are going to physically hurt yourself or someone else, we have to report that to the Colorado Human Services. Also, if we get a court order to turn over your study records, we will have to do that.

The photography, video, and audio recordings will be kept digitally in a password protected file and backed up on a memory stick. The memory stick will be kept locked up and will be destroyed three years after the study.

Agreement to be in this study

I have read this paper about the study or it was read to me. I understand the possible risks and benefits of this study. I know that being in this study is voluntary. I choose to allow my child to be in this study: I will get a copy of this consent form.

Signature: ____________________________ Date: _______

Print Name: __________________________

Consent form explained by: __________________________ Date: _______

Print Name: __________________________

Investigator: __________________________ Date: _______

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What is this study about?
I am being asked if I want to be in this study. The goal of this study is to see what I do, feel, and think about when I am in the habitat during class time.

Why are you asking me?
I am being asked to be in the study because I am in 4th, 5th, or 6th grade at Castle Rock Elementary.

What Do I Have to Do or What Will Happen to Me?
If I am in the study, I will:
• Be observed by Mrs. Keena during free time in the habitat;
• Be videotaped when I have free time in the habitat.
If I am in the study, I might be asked to participate in:
• Interviews about the habitat;
If I am in this study, Mrs. Keena might use my drawings and photographs of the habitat as part of the study.

If I am in this study I will be asked questions. I will be asked about what I like about the habitat at school, how I feel about the habitat and when I am in the habitat, and what I do in the habitat during school.

Will this Hurt?
Being in this study will not hurt.

Do I get anything for being in the study?
I will not receive anything for being in this study. I will join this study as a volunteer.

Can I ask Questions?
I asked any questions I have now about the study. All my questions were answered.

I know that if I have a question later, I can ask and get an answer. If I want to, I can call Mrs. Keena at 303-387-5000.

Do I Have to Do This?
I know that I do not have to in this study. No one will be mad at me if I say no.

I want to be in the study at this time. ☐ yes ☐ no

I will get a copy of this form to keep.

Child's Printed Name: __________________________
Child's Signature: __________________________
Date: __________________________

Witness or Mediator: __________________________
Date: __________________________

I have explained the research at a level that is understandable by the child and believe that the child understands what is expected during this study.

Signature of Person Obtaining Assent: __________________________ Date: __________

Initials: __________
APPENDIX C

INTERVIEW GUIDE

Interview Scripts

Interview 1:

I would like to ask you some questions about the habitat here at school.

The reason I am asking you questions about our habitat is because I would like to know, from you, what it is like to be a student in a school with a habitat. I would like to know about what you do, what you think about, and how you feel when we are outside in the habitat during our class time, or any other time you are in the habitat.

It is very important to be honest with me while we talk about the habitat. I am very interested in your answers and will not be mad or hurt at you if you say something that I may not agree with. That is okay to do here. Ok?

In our literature studies, we often hear from the characters about how they are feeling. I am going to ask about your feelings, which means how you would describe your emotions just like the characters we read about in our novels. Does that make sense?

Would you like to ask me any questions before we begin? You are welcome to ask me questions anytime here.

1. How old are you?
2. What grade are you in?
3. How long have you gone to school here?
4. How would you describe the habitat to someone who does not go to school here?
5. I am going to say a statement and I'd like you to answer with a true or a false.
   Here is the first statement, tell me if you agree (true) or disagree (false):
   a. I like spending my time with other people.
   b. I enjoy spending time inside.
   c. I enjoy being where I can be alone.
6. If you could choose any way to spend your time in the habitat, what would you do?

7. How do you feel after you spend time in the habitat?

8. Do you come to the habitat when we are not in school? What do you do when you come to the habitat?

9. What is the best story you can tell me about a time you were in the habitat?

10. What would you like the teachers here at school to know about our habitat that you think they do not know?

Those are the questions I had to talk to you about today. Do you have any questions for me?

I want to show you the form that you signed to be part of this study. Remember the part that says you can see our conversation when it is all typed up? I wanted to remind you that after I type up these notes, you can look at them with your parents and make sure that you said what you wanted to say. Is that reasonable?

Thank you very much for talking with me.
APPENDIX D

EVENT MAP PROMPT

When we go into the habitat, what happens? What do we see, hear, feel, smell?

Today we are going to do an event map. This is a map of what we do and feel. Today we are going to be outside in the habitat while we make our map and we are going to all use the same “base map.”

What is a base map? It is a map of the basic landmarks in an area. [Show the base map on the projector]. Here is the base map for today. Let’s orient ourselves. Here is the library, the steps, the trees, the rock steps where we will do 2 minutes of silence, the dock, the picnic table.

What will you do with the map?
Walk around as you normally do when you explore. You will notice that down the hill is not on this map…what does that mean? The boundaries are on the map, please stay within the boundaries.

Walk a path that you can record. When you arrive at something that catches your attention, or at a place that has an important memory, record that as an “event” on your map any way you would like. Here is an example of an event map by a woman who teaches nature journaling (Hinchman, p. 18). She uses words to record her “events.” On this event map (p. 57) she uses drawings and labels, like a scientist.

We learned how to draw sounds when we studied bird calls. You could record the sounds like Hannah Hinchman does on p. 127.

The map of events should be done individually.
REFERENCES


