

**NATURE AS HEALER AND TEACHER -
THE IMPORTANCE OF RECONNECTING CHILDREN TO THE EARTH
FOR PHYSICAL AND EMOTIONAL WELLBEING**

by

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Dedication

This paper is dedicated to a few special people who, without their support, I would have been unable to complete it. Firstly, I have an enormous amount of gratitude to express to my mother, Patricia. She is my greatest encourager, my cheerleader, and non-judgmental listener. She was the first person to teach me how beautiful, irreplaceable and magical nature was. She was the first person to show me the simple and healing act of watching a twig sail down a stream. She is also the person who watched my brood of three young children on many occasions, which enabled me to write this paper page by page, despite being exhausted herself and recovering from breast cancer. What an example of resiliency and strength she is! Secondly, this paper is dedicated to my husband, Kyle. His unconditional support and belief in me steadied me in times of shaky self-doubt. Without his willingness to put his Saturdays on hold for almost three years in order to watch our children while I attended class and gained the knowledge and inspiration to get this paper to fruition, it would never have happened. Lastly, and most importantly, I dedicate this paper to my three beautiful children, Georgia, Sadie, and Hudson. Completing my Master's degree, and this project, has been a lifelong dream for me. There were times when it took me away from my mothering duties, and I felt so guilty! However, deep down I know that an achievement such as this will one day make you feel proud, and even more importantly, will show you that you, as well, can achieve just as much or more. Watching your three faces marvel over the miracles of nature is what first inspired me to learn more about the topic.

Abstract

Current research indicates that many children exhibit symptoms of nature deficit disorder (NDD), a condition that describes the growing gap between children and the time they spend in nature (Louv, 2008). NDD may be related to the increasing number of children diagnosed with ADHD, anxiety, obesity and other psychological and physical problems. Connected to this issue is the fact that children spend more time watching television and video games than ever before and this may be contributing negatively to their overall health. This paper aims to provide a background to the topic of NDD, followed by a comprehensive literature review. The question investigated throughout is if unstructured time spent in nature can *improve* children's overall physical and emotional health as well as their ability to learn. The review will highlight the research available on the benefits that nature provides for children in the areas of: psychological and physical health, environmental stewardship, outdoor learning and school gardens. There is an abundant amount of evidence to give credence to the idea that children need to be reconnected to nature in order to be fully healthy and reach their potentials. Recommendations are suggested to increase the connection between children and nature to promote overall health and wellbeing.

Keywords: Nature deficit disorder, attention deficit hyperactivity disorder, anxiety, emotional intelligence, forest schools, outdoor classrooms, school gardens, environmental stewardship, school counselors.

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Nature as Healer and Teacher: The Importance of Reconnecting

Children to the Earth for Physical and Emotional Wellbeing

"Teaching children about nature should be seen as one of the most important events in their lives." - Thomas Berry

"Then ran from one part of the garden to another and found so many wonders that they were obliged to remind themselves that they must whisper or speak low. He showed her swelling leafbuds on rose branches which had seemed dead. He showed her ten thousand new green points pushing through the mould. They put their eager young noses close to the earth and sniffed its warmed springtime breathing; they dug and pulled and laughed low with rapture until Mistress Mary's hair was as tumbled as Dickon's and her cheeks were almost as poppy red as his. There was every joy on earth in the secret garden that morning."

"The Secret Garden" by Frances
Hodgson Burnett

Chapter 1

The Problem

It has long been assumed that nature is an important part of childhood and humanity in general (Hunter & Sonter, 2010). As mammals whose survival depends on the Earth, human beings have perhaps taken for granted the quiet, ever-present 'nature.' (Louv, 2008). It has become a backdrop for our many advancements, developments and so-called progress. Nature is the generous giver of resources without argument.

Although we gather our sustenance from it, breathe the oxygen created by its trees and

rely on it every moment of our lives, there seems to be a disturbing trend in our appreciation and protection of nature (Curtis, 2010, Hunter & Sonter, 2010). Children and adolescents, in particular, are spending less time outdoors than ever before, despite a growing body of research that suggests that time in nature is extremely important to their physical, mental and emotional development (Constable, 2012, p. 12). With this decrease in time spent in nature, there is an increase in the amount of time spent indoors, engaged in electronic activities. There are also a greater number of diagnosed mental health issues, such as ADHD and anxiety, than ever before in young people (Louv, 2008, Tramonte & Willms, 2010). A pioneering researcher in this area, Richard Louv, author of *Last Child in the Woods* (2008), coined the term 'nature deficit disorder' to describe this alarming trend and its repercussions to the health of our children. An increasing body of research on this subject shows a definite connection between mental health, nature and learning in children and adolescence (Louv, 2008).

In the initial chapter of this paper, the topic of nature deficit disorder will be introduced. Specifically, *the problem* of nature deficit disorder and its relationship to the overall health of children and adolescents will be addressed. A detailed background to the problem will be provided with special attention given to the decline of time spent in nature presently as compared to the past and the implications of nature deficit disorder for mental health, physical health and learning. A concise statement of the problem will follow this as well as the purpose of this research, why this topic is so significant, recommendations that will be discussed further in this paper, and a summary.

In order to gain an in depth understanding on the topic of nature deficit disorder and how it relates to children, one must put it into historical context and explore its

origin. The last century has seen dramatic change occur in the way in which we relate to the land; our experience of nature has gone “from direct utilitarianism to . . . electronic detachment” (Louv, 2008, p. 16). The latter part of the 19th century and beginning of the 20th century saw early settlers to North America reliant on the earth for direct survival. Lifestyles were primarily agrarian, with families growing their own food, eating the meat from animals they raised and leading a life highly interwoven with nature. There was a direct and daily connection to the Earth/Mother Nature and a respect for what it provided; an understanding of one’s dependence on it was implicit. If a drought occurred, crops would die, and there would be neither money nor food. Children were outdoors, much of the time. Parental supervision was drastically less than it is presently, leading to childhoods that were rich with exploration and freedom, and the risks associated with it. Families were larger, but lived in smaller dwellings with fewer material belongings and luxuries. With the rise of the industrial age, immigration, continued advancements in machines and the factory production of goods, came dramatic change to the lives of many (p. 19). Towns grew as population demanded them to, and people flocked to these more urban areas where employment and community services were more abundant. Farms continued to thrive, but became less common; suburbs were born as the century progressed to its midpoint. In 1890, 40% of U.S. citizens lived on farms, while in 1990, only 1.9% did. What did this mean for children? Undoubtedly, time spent wandering the wilderness began to dwindle. According to Louv, the rural to urban migration trend has continued and is characterized by “a severance of the public and private mind from our food’s origins, a disappearing line between machines, humans and other animals, and the rise of a new kind of suburban form, [where] . . . images of the outdoor child seem

outdated” (p. 19). As the ‘progress’ of urbanization/suburbanization took hold, the lives of children and their relationship to nature saw dramatic change.

Clearly there are myriad reasons why children began to spend less time in nature. Some of these reasons were the inevitable changes to civilization and lifestyle, as well as the rapid rise of television, video games and other screen related entertainment. In Nature Valley’s recent ad, three generations of people are asked what they did/do for fun (<http://freerangekids.com/nature-valleys-get-kids-outside-ad>). The first generation are people in their 60’s-70’s. the second generation are in their 30’s-40’s and the third generation is children today. The first two generations responded with descriptions such as: “We’d go blueberry picking. . .make forts you could actually sit in. . . put fish in my basket” while the current generation laments enthusiastically and unanimously over activities all related to technology and individual pursuits such as video games, email and text. This is a clear and poignant example of the term ‘nature deficit disorder.’ According to Richard Louv, the term “is not a medical diagnosis, but a description of the growing gap between human beings and nature, with implications for health and well-being” (2009, p. 26).

It is difficult to make the argument that nature is bad for children. Why, then, do children spend less time in it anymore? Louv explains that there are a number of forces contributing: “poor urban design, disappearing open space, parental fear of ‘stranger danger’, amplified news cycles and sensationalized entertainment media, competition from computers and video games, the over structuring of childhood, and the devaluing of natural play” (2009, p. 27). Other common barriers to nature include concerns over allergies and injuries, weather, getting dirty, adults that do not want to take their children

outside and a fear of being kidnapped and/or molested (Discussions with parents in Surrey, B.C., 2015).

The question naturally arises from many as to why spending time in nature is necessary anyway? If children prefer the technological devices, screen time and time alone inside, why is that a problem? At least they are occupied, not causing trouble and they are safe from criminals, dirt and allergens. Times have changed, and we have to change with them. Right? This conclusion seems intuitively wrong and now a growing, and alarming, body of research is beginning to demand attention as the mental and physical wellbeing of our children is showing several disturbing trends (Louv, 2010, p. 26). The National Wildlife Federation reports that the childhood obesity rate in the United States has doubled in the last 20 years (<http://nwf.org>). Children are spending half as much time outside as they did two decades ago (Juster et al., 2004). In a typical week, only 6% of children aged 9-13 play outside on their own. This is in conflict with advice handed down by the American Pediatric Association who recommends 60 minutes of daily, unstructured play as being essential to children's physical and mental health (American Pediatric Association, 2008). Even more disturbing is that rather than spending time in nature, the average American child spends 44 hours per week (more than 6 hours a day) staring at some kind of electronic screen (Rideout et. al., 2005).

The classroom today has become a challenging place to teach and learn. There are diverse learning needs, larger class sizes and more demands to meet curriculum expectations, despite an increasing number of children with emotional problems that need to be addressed before real learning can happen (Johnson, Flom, Hubbard & Reidt, 2011). Large caseload numbers combined with a lack of resources overwhelm school

counselors. Clearly, there is a problem here that parents, educators and all of society need to be addressing.

As previously mentioned, statistics show that the physical and emotional health of many children is at risk; obesity, anxiety and ADHD are on the rise and this trend does not appear to be slowing down (Fjortoft, 2001, p. 1). The time is ripe to address these issues. Louv, (2008) states that the use of stimulants such as Ritalin “continues to rise in numbers, especially for younger children. Between 2000 and 2003, spending on ADHD for preschoolers increased 369% (p. 101). Side effects can be very negative and these medications do not cure the ailment. We need to be looking at more preventative measures. Taylor and Kuo (2002) have conducted an array of research on the area of children with ADHD. They recently found that “attention performance for un-medicated children clinically diagnosed with ADHD was better after a simple twenty-minute walk in a park, with a natural setting” and indeed that “ADHD may be set of symptoms aggravated by lack of exposure to nature” (p. 46). The relationship between nature and ADHD will be examined in more detail in Chapter 2 of this paper.

The previous paragraphs have sought to provide a general background to the problem that this paper will discuss: nature deficit disorder. Put clearly, the problem is that children are spending less time in nature than ever before in history, and the physical and emotional implications of this include, but are not restricted to: high rates of anxiety, ADHD, obesity, vitamin D deficiency, myopia, and a disconnection from environmental stewardship (Louv, 2008). This is not to say that these afflictions are *caused* by a lack of time spent in nature, rather that there is a *relationship* between them. In addition, the

paper will seek to answer the question: can unstructured time spent in nature *improve* children's overall physical and emotional health as well as their ability to learn?

The second chapter of this paper will be a comprehensive and detailed literature review of this topic. This research will focus on several areas related to NDD such as: the relationship between ADHD, anxiety and nature, the positive and therapeutic benefits of nature for mental and emotional wellbeing, the increase in the rate of childhood obesity, myopia, blood pressure, type 2 diabetes and vitamin D deficiency, how time spent in nature can improve children's sense of environmental stewardship, and the myriad benefits of school gardens and the forest school/outdoor classroom approach.

The third chapter will review the problem of nature deficit disorder, what the research is telling us, and suggest several recommendations for reducing the effects of nature deficit disorder in order to improve the mental, physical and emotional wellbeing of children and adolescents. Suggestions will be given to enhance the relationship between nature, learning and the whole child in order to promote overall health and wellbeing. In particular, ideas will be put forth for how teachers, administrators and school counselors can be advocates for bringing awareness to this issue, educating teachers and parents, and utilizing nature as part of the therapeutic process. Also, recommendations will be made for increasing the use of school gardens and outdoor classrooms/forest schools for all children as part of a preventative philosophy.

In the fourth chapter, a detailed summary and the implications of this paper and its research will follow. The problem, the review of its literature, and the recommendations provided will be summarized in order to provide a final discussion of

the significant implications for children and education. Concluding remarks and personal statements on this topic will complete the paper.

"Each new year is a surprise to us. We find that we had virtually forgotten the note of each bird, and when we hear it again, it is remembered like a dream, reminding us of a previous state of existence. . . . the voice of nature is always encouraging."
-Henry David Thoreau, 1817-18

Chapter 2

Literature Review

The following chapter seeks to provide a comprehensive review of the current literature available to date on the topic of nature deficit disorder. As mentioned in the previous chapter, NDD affects children on all levels: physically, emotionally and academically (Louv, 2010, p. 26). Therefore, this chapter will be organized into subheadings that review the different themes of this topic. The first subsection will review literature focused on how nature may improve *psychological* and emotional wellness in children, specifically the symptoms associated with ADHD and anxiety as well as emotional intelligence and resiliency. This section will also examine research pertaining to the area of nature therapy and children. The second subsection will review literature on nature's positive effects on children's *physical* wellbeing and the current state of children's health with regards to obesity, asthma, vitamin D deficiency, blood pressure and myopia. Connected to this section will be mention of the increased use of screen time by children and adolescents and how this relates to the above negative physical effects. Following this will be a subsection on the importance of growing environmental stewardship in children. The final subsection will review the research

done on outdoor classrooms, forest schools and school gardens to demonstrate nature's ability to improve learning and overall health in children.

Definition of terms:

1. ***Nature Deficit Disorder:*** A description of the growing gap between human beings and nature, with implications for health and well-being (Louv, 2010, p. 26)
2. ***Outdoor Classroom:*** A space that is outside where learning takes place. It can be created and interpreted in a way that suits each individual establishment and the children who go there to learn. The activities there can be self-chosen, adult-initiated, or child led. The concept originated in the Forest School movement (Constable, 2012, p. 5)
3. ***Forest School:*** A childcare concept taken from an education style common in rural Denmark and Scandinavia. More recently, Forest Schools have been adopted in the UK, especially for pre-school settings. While every school varies, children attending Forest Schools often spend their entire day outside, dressed for the weather. There is little or no indoor space used, and the setting of a forest itself is optimal: "within the established boundaries of their woodland, children had a camp, with a shelter crafted from the trees, and a firepit. . . they were taught to use simple tools" (Constable, 2012, p. 7).
4. ***Nature therapy:*** an innovative, experiential therapy style that occurs in nature. This relatively new field uses nature's healing elements to support the therapeutic process and employs strategies such as: gestalt, art and drama therapy, eco-psychology and transpersonal psychology (Berger, 2008, p. 316).
5. ***School Garden:*** a living laboratory on the grounds of a school where lessons are drawn from real-life experiences with nature and children are encouraged to be active participants in planting, growing, and harvesting plants and flowers (Koch, 2014, p. 28).
6. ***Emotional intelligence (EI):*** the capacity to manage personal, social and environmental change effectively. It includes skills such as optimism, flexibility, self-motivation and resilience (Opper, Maree, Fletcher and Sommerville, 2014).

7. ***Restorative environment:*** environments that promote recovery of physical and mental capacities, such as the ability to deal with stress and focus attention. There is increasing evidence that natural environments are more restorative than built environments (Carrus, Pirchio, Passiatore, Mastandrea, Scopelliti and Bartoli, 2012).
8. ***Biophilia:*** The concept that our instinctual affinity for nature is the very essence of humanity and binds us to all other living things (Wilson, 1986).
9. ***Naturalist Intelligence:*** the eighth, and most recently added, intelligence added to the list of multiple intelligences, developed by Howard Gardner. The naturalist is an individual who is able to recognize flora and fauna and make important distinctions about the natural world; they are often very apt in the areas of hunting, farming and biology (Gardner, 1995).

Psychological Benefits of Nature for ADHD, Anxiety, Emotional Intelligence and Resiliency

The Centre for Disease Control and Prevention has labeled ADHD “a serious public health problem” with symptoms that often persist into adulthood, and more than 7% of American children now diagnosed (as cited in Kuo & Taylor, 2004, p. 94). In “A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence from a National Study,” 1053 parents and legal guardians of children diagnosed with ADHD in the United States answered 49 questions via a questionnaire format, regarding common after-school and weekend activities (Kuo & Taylor, 2004). The t-test results indicated that “green outdoor activities significantly reduced symptoms [of ADHD]” for their children (p. 1583). Moreover, ratings showed that green outdoor activities reduced ADHD symptoms *more* than built outdoor activities (such as playgrounds) or indoor activities (p. 1583). The researchers concluded that time in nature holds promise to supplement current approaches to the treatment of ADHD, with the added advantage of

being free, non-stigmatizing and free of harmful side effects associated with pharmaceutical drugs (p. 1580). In a more recent study by the same researchers, “Could Exposure to Everyday Green Spaces Help Treat ADHD? Evidence from Children’s Play Settings” (2011), data was collected from 421 parents of 5-18 year old children with ADHD. Parents reported where their child played most of the time during the past week and the severity of their child’s ADHD symptoms. The most common play settings included: big trees and grass, indoors, open grass areas and built outdoor spaces, such as playgrounds (p. 282). Taylor and Kuo found that the children who regularly played in the ‘big trees and grass’ and ‘open grass’ areas had less severe ADHD symptoms than the children who had played predominantly in the built outdoor or indoor spaces.

Limitations of this study include its reliance on parental reports, it is subjective, and it is correlational, not causal. Despite these limitations, it is a large scale study which attempts to link the healing powers of nature with ADHD. Taylor, Kuo and Sullivan have conducted many studies on ADHD and have repeatedly demonstrated the positive effects of nature:

Green outdoor spaces foster creative play, improve children’s access to positive adult interaction—and relieve the symptoms of attention-deficit disorders. The greener the setting, the more the relief. By comparison, activities indoors, such as watching TV, or outdoors in paved, non-green areas, increase these children’s symptoms.” (as cited in Louv, 2008, p. 106).

Van Den Berg and Van Den Berg (2011) found similar results in a study they conducted entitled “A Comparison of Children with ADHD in a Natural and Built Setting.” The researchers examined the behavior, cognitive and emotional functioning of

12 children with ADHD who were enrolled in a special care program at either a farm or a neighborhood in the Netherlands. Researchers observed children building a cabin (natural setting) or exploring a neighborhood (built setting) and asked them to evaluate their experience, describe how they felt and perform a concentration test. All children performed better on a concentration test in the woods rather than in the town and also displayed more positive behaviors in the wooded setting (p. 438). The sample size of this study was quite limited, but the findings do suggest that nature may help alleviate symptoms of ADHD.

Science is continually advancing its understanding of how the human brain functions with relation to anxiety. Lederbogen, Kirsch, Haddad, Streit, Tost and Schuch (2011) placed 32 healthy German volunteers from rural areas, towns and cities under stress and conducted functional magnetic-resonance imaging (fMRI) to examine neural processes. Researchers found that the volunteers living in the country had the lowest levels of activity in their amygdalas, the part of the brain responsible for memory processing and the fight or flight reaction, while the volunteers living in the city had the highest levels of activity in their amygdalas. In addition, the study revealed that whether the volunteers grew up in rural environments or urban environments impacted their perigenual anterior cingulate cortex (pACC), the part of the brain that helps to regulate the amygdala's functioning: "people who spent more time growing up in the city had a more active pACC under stress, regardless of where they currently live. . . highlighting the importance of early urban exposure on brain processes" (p. 501). Clearly, the sample size of only 32 individuals is very small, but the findings of the MRI scans in this study strongly indicate that living in a nature setting positively affects brain activity and the

stress response. There are also implications here that nature could have calming effects on the brain, thereby alleviating the symptoms of anxiety as well.

In 2000, Nancy Wells, assistant professor at the New York State College of Human Ecology, conducted a study which demonstrated that being close to nature improves a child's attention span: "when children's cognitive functioning was compared before and after they moved from poor to better-quality housing adjacent to natural, green spaces, profound differences emerged in their attention capacities" (as cited in Louv, 2008, p. 105). Although common medications used in the treatment of ADHD, such as Ritalin, offer temporary sustained attention and improved academic productivity, they may do very little for a child's long term success and carry unpleasant side effects such as depression, growth suppression and sleep problems (p. 108). Using the research-based knowledge regarding the positive effects of nature on ADHD symptoms is a practical and healthy solution.

Results from Canada's National Longitudinal survey of Children and Youth showed that the prevalence of anxiety problems among children and youth ranges from 2% to 12%, with these problems affecting their quality of life and school experience; unfortunately treatment is often delayed well into adulthood (as cited in Tramonte & Willms, 2010, p. 19). There is compelling research showing that nature can provide a calming reprieve from the symptoms of anxiety: "people who watch images of natural landscape after a stressful experience calm markedly in only 5 minutes: their muscle tension, pulse and skin-conductance readings plummet" (Louv, 2008, p. 46). It is easy to imagine what could happen for children with anxiety if they spent significant time in nature every day.

In “Psychological Restoration through Indoor and Outdoor Leisure Activities” (2014), Weng and Chiang conducted a study with 203 Taiwanese students to assess what types of activities were most successful at alleviating stress and anxiety. They discovered that outdoor activities were the most superior in lowering anxiety symptoms and restoring attention, compared to indoor activities (p. 203). Additional discussion of their study reiterates the anxiety reducing powers of nature: “when people are exposed to a natural environment, their attention is redirected to the landscape, alleviating their negative thoughts. . . they replace their negative emotions with positive emotions and thereby restore the balance of [themselves]” (p. 204).

Bernstein, Borchardt and Perwien (1996) conducted a review of anxiety disorders in children and adolescents and recommended a multimodal approach as a treatment plan: “cognitive behavioral interventions, psychodynamic psychotherapy, family therapy and pharmacotherapy” (p. 1116). All of these treatments are in *reaction* to the symptoms children and adolescents are experiencing; none are preventative. The researchers explain that “while anxiety disorders are one of the most prevalent categories of psychopathology in children and adolescents, the studies evaluating pharmacological treatments for these disorders is scarce” (p. 1117). Although this study is older, it is somewhat alarming that the use of pharmaceutical drugs for children in the United States has increased over 369% since 1990 (Louv, 2008, p. 101), despite there being a “scarce” amount of studies that evaluated how these treatments were affecting children. The intense marketing by pharmaceutical companies within the past 15-20 years demands further research and skepticism. There is a definite gap in the literature available on the

relationship between nature and anxiety in children; clearly more robust studies that seek to demonstrate that nature can reduce the symptoms of anxiety are needed.

Although the area of nature therapy is relatively new, with most studies dating within the past decade, there is compelling research with regards to its efficacy (Baker, 2009). In her review essay, “Nature’s Pervading Influence: A Therapy of Growth,” Lynne Baker discusses the myriad emotional benefits derived from horticultural therapy: “increasing confidence and building self-esteem skills. . . stress, too, can be relieved as individuals are able to find a sense of peace, relaxation and well-being simply through communing with nature” (p. 95). Regardless of ability levels, activities can be created to foster progress and emotional growth for every child, and healing affects take place as “plants are nurtured and begin to show signs of growth and development” (p. 95).

Another branch of nature therapy, Wilderness Therapy (WT), is also showing promise as an intervention to rehabilitate adolescents at risk of or already participating in at risk behaviors (Margalit & Ben-Ari, 2014). In one study, 93 male students in Israel identified as at risk for problematic behaviors participated in a 10 week WT program. The study sample was made up of four groups from within the same boarding school: full intervention, control and two partial intervention groups (p. 181). The full intervention group took part in several multi-day backpacking trips, as well as other WT activities, while the control group did no WT at all. Results of the study found that members of the full intervention group showed improvement in cognitive autonomy and self-efficacy that persisted through a five month follow up (p. 193).

In a rigorous qualitative study by Chawla, Keeva, Pevec and Stanley (2014), natural schoolyards were found to decrease stress, improve attention, reduce problematic

behavior and increase resilience in children of all ages (p. 13). The researchers examine three types of nature among children of varying age groups from elementary through secondary school. The types of nature included wooded areas, an outdoor classroom containing a butterfly garden, hills and a pond, and a school garden. Through videos, photos and semi-structured interviews with students, teachers and parents, the researchers found several positive outcomes from the elementary students: “they found these areas relaxing and stress-free when compared to their normal academic environment. . . they reported feelings of safety, respite, freedom and attention stimulated by seasonal changes” (p. 11). These exciting results were echoed by the older students with 46% of their interview answers containing the words calm, peace and relaxation (p. 12). These same students cited four reasons for these feelings: “being outdoors in fresh air in nature, feeling connected to a natural living system, caring for living things successfully, and having time for self-reflection” (p. 12). Nature clearly has a calming effect that children are well aware of.

In “Going on a Journey: A Case Study of Nature Therapy with Children with a Learning Difficulty” (2008), Ronen Berger writes that this new field, and a program he developed, ‘Encounter in Nature,’ uses “nature’s healing elements to support therapeutic processes” and has been used with hundreds of schoolchildren from the “entire special needs spectrum—developmental delays, autism, learning difficulties, ADD, severe behavioral and emotional disorders (p. 316). The ‘Encounter in Nature’ program operated in nature within or near the school grounds for two hours per week throughout the school year and was facilitated by a therapist and teacher. Over the course of the

year, the facilitators found nature to have both an educational and healing effect on the children:

There was a considerable difference between the way the children behaved in the classroom activities and their actions in nature. Apparently, nature raised their level of motivation and cooperation; they play, worked, and created together in a more spontaneous way. It seems that work in nature call for 'creative doing', which gave our children, who come from wide-ranging experiences of failure, a chance for a positive experience, working and expressing themselves in ways that are not exclusively verbal or cognitive (p. 322).

Overall, this study suggests that nature can have a profound impact on children, particularly on the development of self-confidence and self-esteem.

In the aforementioned section, it was reported by numerous researchers that nature has positive effects for ADHD, anxiety and healing. There is also reason to believe that time spent in nature can improve emotional intelligence (EI) as well as resiliency (Opper, Maree, Fletcher & Sommerville, 2014). In one study, "Efficacy of Outdoor Adventure Education in Developing Emotional Intelligence During Adolescence," a group of 76 grade 10 male students in South Africa participated in a 23 day outdoor adventure program consisting of physically and mentally demanding activities in a remote, outdoor location. The authors of the study used the Bar-On Emotional Quotient Inventory: Youth Version which is made up of five subscales: interpersonal abilities, intrapersonal abilities, stress management, adaptability, and mood (p. 193). EI was measured before, immediately after and three months post study in the program. Results indicated that the outdoor program raised overall EI among the

participants in all 5 sub-scale areas, with the largest improvements found in intrapersonal abilities and adaptability (p. 195).

Nature was also found to increase resilience in younger children in a study conducted in Scotland, with 10 children aged 4 and 5. (McArdle, Harrison & Harrison, 2013). The 'Nature Nurture' program consisted of 10 sessions (one afternoon per week) that took place in the woods and focused on free play and collecting treasures from nature (p. 238). Parents and teachers completed questionnaires at baseline and program completion; all qualitative data was analyzed using the PERIK model used in childhood centers to assess positive development markers and resiliency (p. 239). Researchers found that all participants displayed several positive emotional development markers over the duration of the program, including: increased confidence when facing a new or unfamiliar challenge, self-control, empathy, perseverance and motivation (p. 250). Although this sample was small, it displays the potential that nature can have on building resiliency in children.

In another study with preschool aged children, "Contact With Nature and Children's Wellbeing in Educational Settings," 16 children aged 18-36 months of age at a childcare center in Italy were observed in outside free play versus indoor settings (Carrus, Pirchio, Passiatore, Mastandrea, Scopelliti & Bartoli, 2012). The study's aim was to observe the effect of the outdoor play on the children's social interactions, ability to focus direct attention and stress. Quantitative data analysis was conducted and revealed several positive outcomes in favor of the outdoor play setting: more small group play and self-organized play, fewer interventions by educators, fewer episodes of boredom and less crying. Children were also able to *more* accurately complete a directed attention task

(coloring inside a drawing or pasting pieces of paper within the lines of a drawing was the task used for this study) *after* spending time in nature outdoors (p. 308). Again, nature lends itself to being an educational and healing environment, but also a restorative one as well. The aforementioned studies offer compelling evidence regarding the benefits that nature offers for psychological wellness in children and adolescents.

Physical Benefits of Nature

In addition to the myriad psychological benefits mentioned above, nature also presents itself as a dynamic and rough playscape that challenges children and adolescents physically (Fjortoft, 2001). Studies done internationally are revealing a disturbing tendency that children are becoming more sedentary, especially by adolescence, the result being serious physical health issues such as obesity and motor problems (2001, p. 111). In “The Natural Environment as a Playground for Children: The Impact of Outdoor Play Activities in Pre-Primary School Children,” Ingunn Fjortoft conducted a study with 46 kindergarten children in Norway. The aim of the study was to investigate “how children’s playing in the natural environment might stimulate their motor fitness” (p. 112). The experimental group was offered free play in the forest for 1-2 hours per day, while the control group used the traditional outdoor playground. Of note is the description of the forest area: “the topography was undulating with terraces and slopes and a dominant cliff traversing the area, which afforded slopes for sliding and cliffs for climbing. . . the playscape [had] loose parts, natural objects, and materials to play with (p. 114). At the end of the study, which lasted nine months, both groups were tested with the Eurofit Test of Physical Fitness: the Motor Fitness Test. Results found that the

children in the experimental group became strikingly better at mastering rugged land compared to the control group. The motor fitness tests showed a tendency that the children in the forest playscape “performed better in motor skills than the children on the traditional playground,” the main reason being that “as a child perceives the functions of a landscape and uses it for play, the landscape might have a functional impact on children’s behavior and play performance (p. 115). It seems evident that a natural landscape for play is synonymous with an enriched environment that benefits children physically, as well as emotionally.

The increase in sedentary indoor lifestyles has undoubtedly contributed to physical childhood conditions such as obesity, type 2 diabetes, asthma, and vitamin D deficiency (McCurdy, MPhil, Winterbottom, Mehta & Roberts, 2010, p. 102). As electronic devices and a demanding school/extracurricular schedule have become the norm for many children, these changes have promoted physical inactivity despite a growing body of evidence that suggests that time spent in nature directly benefits physical health. Since the 1970’s, children have seen approximately a 50% decrease of time spent in unstructured outdoor activities, while research shows that living within half a mile of a park may actually lower a child’s risk of obesity by more than half (Ohri-Vachaspati, Llyod, DeLia, Tulloch & Yedidia, 2013). The relationship between asthma and obesity may also reflect the sedentary lifestyle led by many children, and low physical fitness may be related to the development of asthma: “[children] who spent 5 or more hours a day watching television were more likely to experience asthma in comparison with those who watched television less than 1 hour a day” (McCurdy et al.,

2010, p. 106). Additionally, an ecological study in New York City from the same article found that areas dense with trees were correlated with a lower prevalence of asthma.

Lack of physical activity in nature has also been linked with vitamin D deficiency, which affects over 10% of the pediatric population in the U.S.; children and adolescents simply aren't spending enough time outdoors to benefit from the sun's provision of vitamin D (McCurdy et al., 2010, 106). In another study conducted in Austria, a schoolyard redesign took place at one school in order to make it more natural and green, while the control playground remained the same; blood pressure decreased among students at the intervention school only (Kelz, Evans & Roderer, 2013, p. 119). Similar results regarding blood pressure were found in another study with primary school children in the United Kingdom: "children engaging in 'green exercise' [in nature] have lower blood pressure than when engaging in standard exercise indoors" (Duncan, Clarke, Birch, Tallis, Hankey, Bryant & Eyre, 2014, p. 3678).

In a comprehensive article, "Using Nature and Outdoor Activity to Improve Children's Health," McCurdy et al. suggest that physical activity increases as children spend more time outside in nature (2010, p. 108). Furthermore, "green" school grounds, which contain a diverse variety of features such as trails, trees and gardens, may affect the quantity and quality of physical activity among elementary school children. Fifty nine schools across Canada were surveyed in an attempt to evaluate how much these aforementioned "green" features influenced the physical activity of their students: "Seventy percent reported that their "green" school ground promoted more vigorous activity," which also would lower obesity, type 2 diabetes and asthma (p. 108).

The same authors also report that myopia, or nearsightedness, has substantially risen in the past 30 years, with approximately ten percent of children in America being myopic (McCurdy et al., 2010, p. 110). Higher levels of outdoor time was associated with less myopia in one cross sectional study of 12 year old participants, and a second study in 2009 of 1249 children revealed significantly less myopia in children who spent more time outdoors (p. 111). The studies mentioned in this section provide compelling, research based evidence that nature positively impacts children's physical health in many significant ways, including: lowering obesity, asthma, type 2 diabetes, blood pressure and the incidence of myopia and raising the levels of vitamin D.

"I go to nature to be soothed and healed,
and to have my senses put in tune once more."
--John Burroughs, 1837-1921

Environmental Stewardship in Children and Adolescents

Spending time in nature not only promotes healthy psychological and physical development in children, it also contributes to a positive attitude towards the natural world (Gill, 2014, p. 10). In fact, experience of green environments is associated with greater environmental knowledge. Encouraging children to become environmental stewards for the Earth begins with building the bond between child and nature: "den-building, bug-hunting and pond-dipping make visible the intensity of children's relationships with nature. These primal activities not only show how closely attuned are our senses to the workings of the natural world, but also speak to a deeper spiritual bond with landscapes and living things" (p. 40). Cheng and Monroe (2010) developed a children's connection to nature index and used it to examine the factors influencing children's pro-environmental choices. In analyzing nearly one thousand and five hundred fourth grade student's answers using their index, the authors discovered that the

children's connection to nature, previous experience with nature and perceived family values towards nature most strongly influenced their interest in performing pro-environmental behaviors (p. 48). In another study, "Moulding Urban Children Towards Environmental Stewardship: The Table Mountain National Park Experience," two hundred and sixty thirteen year olds participated in a three day nature learning experience in an urban national park (Ferreira, 2012, p. 251). Using a 28 item, likert style questionnaire, the author found positive changes in attitudes towards animals, the value given to plants, the importance attributed to environmental conservation and personal/governmental involvement in conservation issues (p. 269).

In another study conducted by Morag and Tal (2013), fifth grade students in two communities in Israel participated in long term nature based educational programs that lasted several days at a time, over a year-long period. The students re-seeded areas, cleared paths, and worked collaboratively with each other in these outdoor field experiences. Through interviews with the students and their teachers, the researchers found that students reported high levels of satisfaction with nature and higher conservation awareness than prior to the study.

Chawla and Derr (2012) conducted a highly comprehensive review of this topic and found several essential themes, firstly:

Essentially every type of environmental behavior, from recycling to environmental careers, has been linked by research to a childhood spent in nature. Thus, a sustainable world in which people take care of the natural environment is predicated on children having regular access to direct experiences in nature (p. 527).

A second theme found was the importance of social support; from early childhood through adolescence, it is extremely beneficial to have ‘guides’ (ex. parents or teachers) who share in a love of nature experiences, model compassion and concern for nature and encourage their environmental knowledge (p. 527). The last theme that emerged through the research review was that direct learning experiences in nature such as place-based education (often referred to as outdoor education), environmental service learning, nature centres and wilderness programs are essential for children and adolescents to acquire and practice the skills of environmental stewardship (p. 529). In summary, “if we want our children to protect the Earth, we need to give them an appreciation for it and a sense that they are connected to it” (David Suzuki Foundation, 2015, p. 6).

“Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts” -Rachel Carson, *The Sense of Wonder*, 1998

“I began to garden. I got scratched, tired, and dirty. I broke my fingernails and ruined my shoes. I yanked out what I could have kept and put in more of what I didn’t need. I pouted and wept, cursing the enormity of the task. I was resentful and unappreciative. But when I ventured afield, sidelined by things that seemed much more entertaining or important, I always came back to this patch of patient earth. Time after time, I realized that everything I want or need—the living truth of life, love, beauty, purpose, and peace—is taught to be right here, no father away than the ground beneath my feet.

-Karen Maezen Miller, *Paradise in Plain Sight*, 2014

Outdoor Education, Forest Schools and School Gardens

The previous sections have reviewed the literature that discusses the benefits of nature for psychological, physical and environmental reasons. It is vital, however, that school systems become more involved with the nature movement in order to improve student learning. Children spend roughly 5-6 hours per day at school, with many of them

struggling to achieve within a traditional learning setting. The question then becomes: can children become better learners by spending time in nature? If we examine this from a ‘whole-child’ perspective, we can see that nature benefits children in *every* way, with learning being improved as well. If children feel better both emotionally and physically, they will be more apt to learn. Perhaps it is time to view children more holistically, rather than in a compartmentalized manner. According to Nedovic and Morrissey (2011), children who engage in outdoor learning environments have “richer imaginative play, increased physical activity, calmer, more focused play and positive social interactions (p. 281). The researchers recorded children’s responses in the renovation of a childcare centre garden; both adults and children overwhelmingly preferred the natural elements (plants, water, dirt) of the renovated centre compared to items such as commercial toys and manufactured climbing apparatuses. In addition, children’s concentration and attention spans are also improved with time spent in the outdoor classroom (p. 282).

In “A Comparative Study of the Impacts and Students’ Perceptions of Indoor and Outdoor Learning in the Science Classroom,” researchers conducted a 6 week long action research study involving two third grade classrooms in Malaysia (Dhanapal & Lim, 2013). One class received science lessons indoors, while the other received the same lesson outdoors. Students completed quizzes before and after both learning experiences. Results indicated that the students who received the lesson outside performed better on the quizzes as well as preferred learning outdoors (p. 22). In another study involving third grade students, one teacher in rural United States sought to prove that nature provides a meaningful context for science and literacy learning and can contribute to

student achievement on standardized tests (Eick, 2012). The students learned in an outdoor classroom for the duration of a school term and results revealed that student scores on a standardized test were above the statewide passing rate and above the school's third grade as a whole.

Davis, Rea and Waite, (2006) conducted a thorough literature view into this topic with the aim of determining whether outdoor learning and forest schools do indeed make a worthy contribution to the education of children. They found that while Forest Schools have been the subject of limited research, certain principles have emerged from the mostly qualitative research done:

Forest School is a process which builds on an individual's innate motivation and positive attitude to learning, offering them the opportunities to take risks, make choices and initiate learning for themselves. [It] maximizes the learning potential of local woodland through frequent and regular experiences throughout the year. Forest School helps everyone to understand, appreciate and care for the natural environment (p. 5).

Studies appear to be more plentiful on the use of outdoor classrooms for preschoolers and kindergarteners than for older primary, intermediate and secondary students, according to the writer's research. One possible explanation for this may be due to the curricular demands that begin once children begin grade one and onwards.

Learning through play seems to be more acceptable for very young children, and less for older children. In one study comparing two kindergarten groups, results indicated that children who participated in a nature kindergarten program were more closely connected to nature than the group who learned indoors (Elliot, Eycke, Chan & Muller, 2014).

Additionally, this study supported the idea that education within nature is extremely important in early childhood, because it fosters the development of positive feelings and attitudes towards the environment, as well as cultivates a community of learners in a natural way (p. 122).

In “A Post-Occupancy Study of Nature-Based Outdoor Classrooms in Early Childhood Settings,” researchers compiled data from 11 outdoor classrooms in the United States in order to see how play in naturalized areas affected learning (Dennis, Wells & Bishop, 2014, p. 35). Findings indicated that play with natural elements (ex. sticks, leaves, stones and mud) engaged children longer than commercial play materials, supported greater cooperation between peers and improved pro-social behaviors (p. 36).

The outdoor classroom also promotes learning on a holistic level, rather than dividing subject to subject, which cultivates a more authentic, engaging and dynamic learning experience (Wirth & Rosenow, 2012, p. 42). When children are engaged in learning activities in the outdoor classroom, they “were developing skills in a variety of domains simultaneously” (p. 44). Furthermore, students were covering subjects across the curriculum while engaged in one activity: “. . . as children construct a castle out of tree limbs, they share ideas through language [language arts], experiment with concepts of size, scale, weight and balance [mathematics], move hands and bodies through space to manipulate objects [physical education] and work cooperatively on a shared plan [personal planning]” (p. 44).

Oftentimes, children that are performing poorly academically are the same students who have behavioral or social emotional issues (Wirth & Rosenow, 2012, p. 43). When given the opportunity to learn in an outdoor environment, there is often a reduction

in behaviors and an increase in positive emotions; children begin to self-regulate their negative feelings and increase their courage and confidence. When children are feeling courageous, connected to others and happy, they are better able to learn.

In her book, “The Outdoor Classroom” (2012), Karen Constable provides compelling history and evidence of the efficacy of Forest Schools. The philosophy of Forest Schools originated in rural Denmark and Scandinavia where the children spend most of the day outside regardless of weather and with minimal indoor time (p. 6). Britain adapted it for use in preschool settings and then into regular settings, after visiting Denmark. They saw increasing confidence and higher self-esteem in the children within their Forest Schools; the children became more inquisitive and explored with increasing passion (p. 8). A Forest School was started at Bridgewater in Britain as a way to empower children with problematic behaviors from difficult backgrounds and increase their self-confidence. According to Constable, the growth of self-esteem occurs because the children are given “achievable activities, where each small step is rewarded, every step of progression is praised and where the outcome is always far less important than the journey” (p. 9). There is more freedom to explore and less structure placed on the children, so behaviors commonly seen in the classroom (such as being unable to sit quietly at one’s desk) disappear when in the outdoor classroom. Furthermore, the children who struggle with academic achievement and social skills in the classroom often turn into the leaders outside; giving them this positive experience in the outdoor classroom allows their self-esteem to increase, which helps them to become more capable learners. Clearly, the outdoor classroom or Forest School can provide a non-threatening

environment whereby students can learn holistically while simultaneously increasing self-esteem and academic achievement.

School gardens, which could be viewed as a type of outdoor classroom, can be a powerful tool for creating environmental and nutritional awareness in children (“School Gardens Grow More Than Food,” 2014, p. 28). It is essentially a live laboratory where children engage in important learning behaviors: observation, discovery, experimentation and nurturing. In addition to these significant learning actions, school gardens allow a child to participate in the cycle of growing food, from seeding to harvesting; students will learn where food really comes from and take an active part in its creation. School gardens have been shown to increase a child’s interest in food and improve their attitudes towards eating more healthfully. Additionally, “students will get to share their bounty with their classmates. Eating with their peers is one of the most important inspirations for children to try new foods” (p. 28). Research by the Columbia Teachers College has revealed that school gardening and cooking programs are the two things that are effective in getting children to eat more vegetables and there are psychological benefits as well: “children who garden in schools improve their self-esteem, behavior, social skills, and interpersonal relationships, as well as develop life skills, including working with groups” (p. 29).

Swank and Swank conducted a thorough literature review into the effectiveness of school gardens with regard to academic, social and personal development (“Student Growth Within the Garden,” n.d., p. 4). Research findings were extremely positive in favor of integrating gardens into schools. Not only do they promote academic learning across curricular areas, but they also provide unique and authentic social and emotional

learning experiences, while simultaneously supporting positive attitudes towards health and the environment. Robinson and Zajicek (2005) conducted a study involving 281 children that examined the effects of a school garden on student life skills such as working with others, leadership, self-understanding, communication and decision-making (as cited in Swank & Swank, n.d., p. 6). The researchers concluded that, following the students' involvement in the one-year garden program, there was a significant improvement across all aforementioned domains of life skill development. Therefore, providing children and adolescents opportunities to learn in an outdoor environment and/or school garden is beneficial for overall health and wellness.

In summary, this chapter has sought to provide a comprehensive review of the literature available on the myriad benefits of nature. According to the cited research mentioned in this section, nature holds great promise as both a teacher and a healer for children and adolescents. From a psychological standpoint, spending time in nature can alleviate symptoms associated with ADHD, anxiety, stress, and depression while promoting calmness and positive emotions (Kuo & Taylor, 2004, Weng & Chiang, 2014). Additionally, there is compelling evidence that nature can improve concentration, which places it in a position to replace potentially harmful pharmaceutical drugs currently being prescribed at an increasing, and alarming, rate to children (Kuo & Taylor, 2004, Louv, 2008). There are a multitude of physical benefits as well, including a reduction in obesity, heart rate, blood pressure, diabetes and myopia and an increase in vitamin D levels and fine and gross motor skills (Fjortoft, 2001, McCurdy et. al, 2010). Environmental stewardship also increases when children spend time in nature, and this is a vital skill to possess as we go forward in protecting this planet (Chawla & Derr, 2012).

Lastly, the final subsection of this chapter reviewed the benefits associated with outdoor classrooms, forest schools and school gardens. Evidence presented was overwhelmingly positive; children learning outside in nature and utilizing gardens show improvements both physically and emotionally (Constable, 2012, Swank & Swank, n.d.). To conclude, research is delivering a clear and powerful message in favor of connecting children more with nature in order to improve their overall health.

"Young people increasingly are isolated from the land and deprived of the joys and responsibilities it teaches." - Alice Waters, www.greenhearted.org

"A great way to teach ecological literacy and respect for the Earth, along with important food production skills, is to help your students grow a garden. So get your hands dirty, grow something both healthy and delicious, and teach your students what might end up being the most important thing they ever learn." -www.greenhearted.org

Chapter 3

Recommendations

As parents, teachers and communities go forward with the growing nature movement, it will be imperative that practical solutions and ideas for alleviating NDD are made available. The first step is awareness. When individuals who are invested in children become knowledgeable about this topic, it will be difficult to turn a blind eye. Once awareness of NDD and the benefits of nature have become known, the next step is implementing strategies for bringing nature and children closer together. Research on this topic is gaining momentum at a quick rate, and there are many agencies internationally that are already succeeding at increasing the nature to child connection, from the David Suzuki Foundation to the Project Wild Organization (<http://www.davidsuzukifoundation.org>, <http://www.projectwild.org>) . This chapter will provide a set of recommendations designed to increase this aforementioned connection. Consideration will be given to different areas including: teachers and school districts, teacher training programs, school counselors, parents and the community at large. The intention is to share and build upon strategies and programs that already exist, while making them specifically garnered towards children in preschool, elementary and

secondary schools. The vision of the writer is to grow awareness and inspire adults to take action in connecting children with nature.

Schools can ideally serve as a bridge or hub, connecting students back to nature via school personnel, such as teachers, administrators and school counselors (Figure 2). The school holds a significant amount of influence over a child's life, beginning with the fact that over 6 hours per day is spent there. If schools were to make nature a part of their school plan and vision, the sphere of influence could easily be expanded to include members of the community at large, especially parents and even medical health professionals. For example, if a teacher or school counselor becomes knowledgeable and committed to this topic, the possibilities are endless. The following fictional story offers an example:

Annie, a new School Counselor, recently completed her M.Ed. in School Counseling. She posted into a position unsure of what to expect. Her caseload was quite large, and Annie found herself looking for alternative ways to help her teachers and their students cope with a high rate of ADHD and anxiety that was found in the school's population. This had been of concern for several years, with ADHD and anxiety being frequent topics for referrals at School Based Team meetings. Annie had attended several in-services at her school district counseling meetings looking for strategies that could assist these students. The sheer number of students requiring therapeutic interventions to alleviate their emotional, social and academic distresses was daunting. She had trained her staff on the MindUp program, as she firmly believed that a preventative model would work best. If teachers could embed mindfulness strategies into their daily routines, she was hopeful that students would become less anxious and she could target her counseling

time for more severe cases. MindUp had shown some success, but the referrals at School Based Team continued to pour in. She happened upon a book about the phenomenon of Nature Deficit Disorder. The information seemed so intuitively correct, and yet people didn't seem to place much discussion time on this. Annie realized it had never been mentioned in teacher training, or in School Counselor training for that matter. She thought about her school's recent \$80000 playground renovation – the safest and largest playground in the district, all bright plastic and metal and padded ground – and she pondered about her school districts new commitment to technology—with millions being spent to purchase ipads for every school. Something felt amiss.

Annie decided to take a risk and do some research on the nature 'movement.' She requested a meeting with her principal, who was thankfully quite supportive, and he urged her to bring the topic up via a short presentation at the next staff meeting. Nervously, she did so. Her staff was skeptical, but very interested. A few other teachers spoke to her later and they formed a small 'Nature Committee.' The next step was in reaching out to the Parent Advisory Committee. Annie presented her findings to the PAC and a long and productive discussion ensued; there was a large amount of parents who felt alarmed by their children's 'addiction' to video games and phones, their apathy towards the wilderness, and the lack of wild spaces in their suburban neighborhood. One parent suggested that a volunteer system be put in place whereby parents could assist in constructing a school garden/outdoor classroom in an unused corner of the school's gravel field. Excited brainstorming ensued, and Annie felt hopeful.

Annie decided to host a series of parent meetings to continue to bring awareness and inspiration about the topic; she was careful to give practical, but non-judgmental

suggestions to parents around bringing children closer to nature. Her presentations always ended with a practical handout of resources and strategies for families to try. She also worked with staff on what had been now dubbed ‘The Nature Initiative’ at her school and was employing some Nature Therapy techniques into her counseling strategies. Word was spreading fast to other schools, and Annie realized that what she had initially felt was intuitively right – that children need to reconnect to the Earth—was, in fact, what a lot of people had been waiting to hear and learn more about, so that they too could become inspired to make change in the lives of children everywhere.

While this story is clearly a work of fiction, many of the ideas are taken from the writer’s own teaching experiences. It is an idealistic story, but the writer would like to assume that all great and necessary change begins with ideals and hope.

There are some school districts in British Columbia who are already striving to shrink the gap between nature and children. The Gulf Islands School District #64 has a program, GICEL (Gulf Islands Centre for Ecological Learning) that brings trained biologists into their schools to teach hands on lessons outside, about local plants and wildlife (<http://www.gicel.ca>). GICEL strives to connect people with nature as part of a core vision that a direct and personal connection with nature is paramount to understanding the sustainability challenges facing us. In the West Vancouver School District, on Bowen Island, the school has a fully functioning school garden that provides food for the school lunch program, as well as a frequently used outdoor classroom and an emphasis on conservation and environmental stewardship (<http://www.sd45.bc.ca/schools/bowenland.ca>). The David Suzuki Foundation has a wealth of information, easily accessible online; schools can register to become a ‘Green

School' by completing environmental challenges (<http://www.davidsuzuki.org>). The Blue Dot Movement is gaining momentum as an initiative committed to bringing Canadians together to compel all levels of government to recognize our right to fresh air, clean drinking water and healthy food to eat (www.bluedot.ca). Large school districts such as Surrey and Vancouver, who enroll the majority of the province's students, would be wise to connect their staff to these districts and share information on what has worked and what hasn't. Bowen Island and the Gulf Islands have the advantage of being geographically placed in the midst of nature, but the students in more urban and impoverished neighborhoods, like inner city Surrey for example, have students that could perhaps benefit the most from time spent in nature as they simply do not have the same access to it.

In Annie's story above, several recommendations were embedded; a summary of those, and additional recommendations, is as follows:

Teachers:

Teachers would be wise to form a school garden and connect with other interested staff and administration to do ease the burden of doing so. The following websites are valuable: www.kidsgardening.org, www.greenhearted.org, www.schoolgardenwizard.org, and www.edibleschoolyard.org. It is also recommended that teachers strive to advocate for an outdoor classroom, or 'green' classrooms as much as possible with potted plants and planter boxes. The informative website, www.evergreen.ca, is dedicated to informing educators and the public on creating greener, more sustainable areas. Teachers hold a fair amount of autonomy when it comes to how they create lessons and units and how those units are implemented. There is a

highly comprehensive website, Project Wild, that is a wildlife-focused conservation education program specifically designed for K-12 educators. Accessing nature-based curriculum is literally just a click away (<http://www.projectwild.org>). It is important that teachers design their units with a sensitivity and awareness of the diversity of learning styles in their classrooms. Howard Gardner's theory of multiple intelligences recognizes a 'naturalist intelligence,' which may not always be accommodated for in traditional classroom settings (Gardner, 1995). The student who exhibits this intelligence often displays a high degree of interest and ability in flora and fauna. This intelligence surely deserves recognition and development. It would also be informative and inspirational for all involved if teachers strove to organize a parent night to educate and inform parents about the NDD issue and what can be done to alleviate it. Another significant step for teachers is to consider speaking to administration at the district level about the possibility of creating Forest Kindergartens/Primary classes at a few 'choice' schools within the district as a pilot project. Lastly, it cannot be overstated how vital it is to work closely with all willing staff, parent and community members. It truly does take a village.

School Administrators and School Districts:

School administrators and District Principals are in a crucial and influential position, one that potentially allows them to remove barriers to natural playgrounds and nature in general (there are clearly legal restrictions/reasons why playgrounds are being created in the 'safe' manner that they are, but this may not be in the best interests of children's overall wellbeing). District Principals, Superintendents and Assistant Superintendents in the area of staffing have the opportunity to allocate funding to create a position for a Helping Teacher in the district with the title of "Nature Initiative

Educator;” this individual’s role would be to create Professional Development workshops for other teachers as a way of growing awareness of NDD and its effects and creating information that could be made available to School Counselors as well as parents.

Another recommendation would be to work towards the inclusion of curriculum dedicated to learning about nature, in nature. These district level employees also are in the position to consider creating and implementing a choice program of Forest Kindergarten/Primary Class at several sites within the district (similar to the choice programs of French Immersion, Fine Arts or Montessori, which are currently successful). The leaders at the district level are in a powerful position in which they could make their vision of alleviating NDD clear to other districts, the public at large and the media.

Teacher Education and School Counselor Master of Education/Arts Programs:

Universities that currently offer teacher training degrees could include a course/s on NDD and the benefits of including nature in education strategies and therapeutic strategies (ex. Nature Therapy, Ecopsychology, Horticultural Therapy, Restorative Therapy). Simon Fraser University is advertising for the first time a Master of Education degree in Ecological Learning (www.sfu.ca). However, it would be so beneficial to begin nature education before teachers even begin teaching in classrooms.

Parents and Community

Parents and members of the community could begin to become informed by reading Richard Louv’s “Last Child in the Woods” (2008). The latter part of the book contains a comprehensive list of further resources and practical suggestions for families. There are literally hundreds of books and websites that contain easy to implement and inspiring ways to reconnect children (and their parents) to nature.

Parents are also in a powerful position to put pressure on schools and school districts to create school gardens and outdoor classrooms, as well as provide healthy school lunch programs from such gardens. The Parent Advisory Committee (PAC) could create a subcommittee dedicated to working on nature initiatives.

In today's highly scheduled style of living and parenting, it is vital to frequently schedule time for free play within nature. Another recommendation for families would be to make a list of all parks in the community and keep it on the fridge, with pictures if possible. Children learn by example; it would be highly beneficial for parents to plant their own gardens; no matter what the size is. Adults can also easily check their local municipality's parks and recreation departments for availability of community garden plots. The power of social media, such as Facebook, could easily be harnessed by a passionate community member creating a Facebook page dedicated to backyard gardens and neighbor garden exchanges. This initiative would ideally involve the children as much as possible, perhaps utilizing the skills they had learned at their school garden and transferring that knowledge to their home garden.

School Counselors:

Like teachers, school counselors are in an optimal position to bring children and nature closer together. As this paper has mentioned, research is increasingly demonstrating the importance of nature for overall health as well as learning. (Louv, 2008, Taylor & Kuo, 2004). This knowledge, in combination with the growing number of children diagnosed with emotional problems like ADHD and anxiety, makes it vital that school counselors consider integrating nature into their school counseling programs. ((Flom, Johnson, Hubbard & Reidt, 2011). In chapter 2, the area of Nature Therapy was

mentioned; school counselors could employ some of these therapeutic strategies quite easily into their repertoire (Berger, 2008). In a Canadian middle school, a nature-based approach called “Walk and Talk” is being used successfully by school counselors (Flom et al., 2011). In this approach, the counselor and each referred student meet weekly for a walk in the outdoors; this seemingly simple strategy proved highly effective in improving students’ academic and social progress (p. 122). Therefore, the recommendation here would be for school counselors to employ the “Walk and Talk” strategy, as well as nature-based strategies and share their findings with colleagues. School counselors could also work towards prevention of emotional problems for students by teaching staff about nature-based programs (i.e. school gardens), strategies and knowledge related to NDD at staff meetings. School counselors could also employ mindfulness strategies outside, as well as art and horticultural therapy. Overall, if school counselors were to become informed and passionate advocates about this topic, the potential for increasing the bond between children and nature is great.

In summary, the aforementioned recommendations seek to alleviate the symptoms associated with NDD through knowledge and practical strategies. The first step is in growing awareness about the potential that nature holds in being both a teacher and a healer. The school ideally can serve as a bridge that connects teachers, administrators and school counselors with parents and community members. The result being that all adults in a child’s life are working towards the common goal of increasing time spent in nature (Figure 2). Teachers are in a pivotal role to deliver nature-based curriculum, create a school garden and advocate for outdoor classrooms. They can also educate and inspire parents and the community. Administrators and school districts can serve as

supporters of teachers in their efforts as well as dedicate funding towards nature initiatives, such as hiring ‘Nature’ helping teachers. Teacher and School Counselor training programs are recommended to develop and include coursework that educates students about the importance of nature for overall health and wellbeing. Parents and community members can strive to create more time for unstructured play in the wilderness, as well as working together in PAC towards school nature initiatives. Finally, it is recommended that school counselors consider integrating nature into their programs, via the use of nature/horticulture therapy techniques, “Walk and Talk” strategy and collaboration with school staff towards using nature as a preventative measure in alleviating the symptoms of NDD.

"The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulties, and we must rise with the occasion. As our case is new, so we must think anew and act anew." -Abraham Lincoln, 1862

Chapter 4

Conclusion

The term nature deficit disorder, coined by Richard Louv, is not meant to be a medical diagnosis, but rather a way to describe the growing gap between children and nature, with possible implications for health (Louv, 2011). He argues that our culture's limitless faith in "technological immersion has no limits, and we drift ever deeper into a sea of circuitry" (p.42). This is not to say that being technologically literate is not important, but perhaps the conversation needs to become more about how important we have let it become, and at what cost. There are only so many hours in every day, and the amount of time spent in front of technology and screens surely takes away from time that could be spent in nature (McCurdy et al., 2010). Research reviewed in this paper revealed that television, video games and other modes of technology are associated with negative health factors in children including: obesity, ADHD, diabetes, high blood pressure, vitamin D deficiency and myopia (Louv, 2008 & McCurdy et al., 2010). Studies indicate that nature holds powerful educative and curative powers, from relieving symptoms related to ADHD to raising levels of calmness and happiness, as well as academic performance (Kuo & Faber Taylor, 2004). These findings are not only compelling, but also disturbing as the question naturally arises: what are going to do about it? In his book, 'The Nature Principle,' Richard Louv goes on to write that "in an

age of rapid environmental, economic, and social transformation, the future will belong to the nature-smart--those individuals, families, businesses and political leaders who develop a deeper understanding of nature, and who balance the virtual with the real” (p. 42). It seems that the wisest course of action for our children would be to assist them in developing this understanding of nature and to show them how to balance the virtual with the real.

The literature review sought to display research on the area of nature and it’s abilities to teach and heal children. Rather than viewing nature through a deficit, or disordered perspective, an attempt was made to showcase the positive effects that nature can have. Evidence is mounting that nature has a multitude of benefits for children and adolescents, both psychologically and physically. A strong body of research directly links health to physical activity, with additional evidence that children are simply more active when outside (McCurdy et al., 2010, p. 102). Children who spend time outside have lower levels of: obesity, myopia, type 2 diabetes, vitamin D deficiency, high blood pressure and asthma.

An additional finding with regards to outdoor time was that children who play in natural environments (such as wooded areas, meadows and ponds), as opposed to modern, plastic, ‘safe’ playgrounds showed greater fine and gross motor skills, had less conflict with peers and displayed more creative and imaginative play (Fjortoft, 2001). In Freiburg, Germany, the parks department has stopped installing the “sterile playgrounds with tubular steel, primary-coloured plastic and expensive rubber surfacing, and instead has been creating ‘nature playgrounds’ with the results being diverse spaces with ditches,

logs, trees, rocks, bushes, dirt and hills (Gill, 2005, p. 40). Interestingly, these playgrounds meet European safety standards.

Children diagnosed with ADHD, anxiety and depression show significant reduction in those symptoms when provided with natural play in wooded areas (Kuo & Taylor, 2004). Pharmaceutical treatments for ADHD, anxiety and depression in children are on the rise, despite evidence that shows these types of treatments are short-lived and rife with potentially harmful side effects (Louv, 2008). Conversely, the treatment of “green” time spent in nature indicates “that exposure to natural settings in the course of common after-school and weekend activities may be widely effective in reducing attention deficit symptoms in children” with these findings being consistent across a wide range of individual, residential and case types (Kuo & Taylor, 2004, p. 1584).

Overall, it can be said with fair certainty that nature is good for children and adolescents. The aforementioned benefits fell into one of the following themes: living near green spaces and spending time in nature is associated with greater physical activity, being in nature leads to improvements in mental and emotional wellbeing, both for children diagnosed with ADHD and children as a whole, children who participate in school gardens improve academically (especially in the area of science) and have healthier eating habits, time in nature is associated with greater environmental knowledge and appreciation (which is, in turn associated with environmental stewardship) and lastly, learning that takes place in an outdoor classroom or forest school environment is beneficial for students with behavioral problems (Constable, 2011, Gill, 2014, Kuo & Taylor, 2004, Louv, 2008).

Next, a practical set of recommendations for alleviating the symptoms of NDD was provided. Research has indicated a multitude of educative and healing effects that nature has –and the next step is *advocacy* for nature-- *and action*. It is imperative that individuals concerned with the health and wellbeing of children become aware of this topic and gain the knowledge that is now widely available. The recommendations provided were separated into the categories of teachers, administrators, teacher and school counselor training programs, parents and school counselors. Teachers are in a vital role to bring nature and children closer together, be it through nature-based curriculum, outdoor classrooms, school gardens, advocacy for nature and communication with parents: “with teacher support, nature-filled outdoor spaces become safe places where children can express positive emotions, begin to manage negative emotions, learn courage and confidence, and explore the wonders of nature with others (Wirth & Rosenow, 2012, p. 43). Districts are also in a powerful and influential position to make decisions that would shrink the gap between nature and children; the allocation of funding for a ‘Nature Initiative’ teacher would be extremely beneficial for bringing awareness to this topic. Recommendations for parents were also given, and they are abundantly available. Organizations such as the David Suzuki Foundation have a wealth of resources and suggestions online, and forming a collaborative ‘Nature’ team with the school’s PAC would be a positive step. Most importantly, it was recommended that parents make time for nature in their busy family schedules.

School counselors can also harness the healing effects of nature for their students through the use of nature therapy strategies (Flom et al., 2011). Integrating their counseling modalities with nature is a positive way to alleviate the symptoms of NDD,

while increasing emotional wellbeing. At the core of all of these recommendations is the importance of collaboration, being committed to a common goal and staying informed and inspired. Perhaps if this vision can be realized, the future will be a healthy and happy place:

Generous future historians may someday write that our generation finally met the environmental challenges of our time—not only the climate change, but also the change of climate in the human heart, our society’s nature-deficit disorder—and that, because of these challenges, we purposefully entered one of the most creative periods in human history; that we did more than survive or sustain, that we laid the foundation for a new civilization; and that nature came to our workplaces, our neighbourhoods, our homes, and our families (Louv, 2011, p. 45).

In conclusion, I would like to add ‘our schools’ to the above quote, because that is my vision, and what I believe to be a necessary step in bringing nature and children closer together. Schools hold an enormous responsibility and privilege in educating children on what is important; if schools make nature a priority, children will benefit. We must view children from a holistic perspective when it comes to their overall wellbeing. Surely a child who is experiencing physical or emotional distress will be unable to reach their full academic potential within the school system, and later, self-actualization as an adult. Overall, nature is a preventative and safe treatment for overall health and wellbeing for children and adolescents. We are meant to be in a relationship with nature and when we realize the importance of this connection, we will know without a doubt that nature is undeniably both a healer, and a teacher.

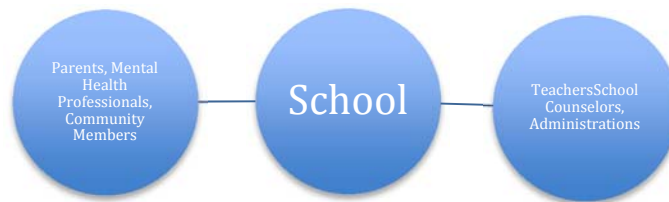


Figure 1: School as a Bridge: This figure illustrates that a school can serve as the bridge or connector, bringing together parents and community with teachers, school counselors and administrators.

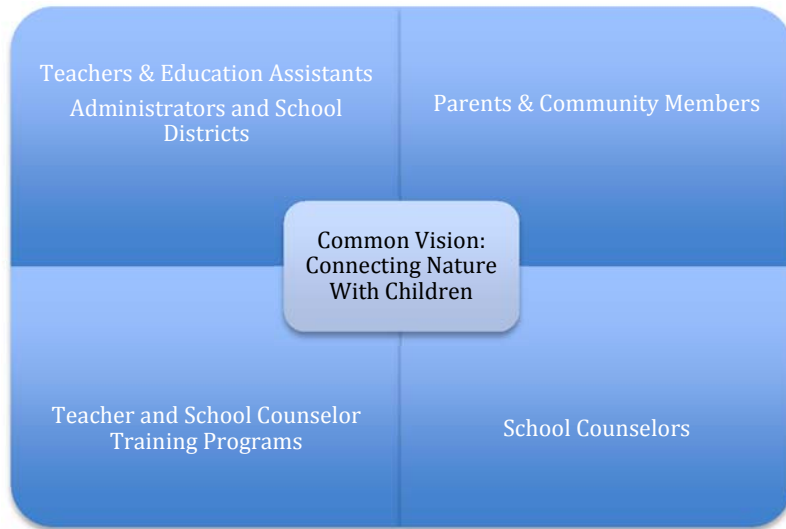


Figure 2: Common Vision: Connecting Nature with Children. This figure illustrates that various members of children's lives can work together towards the common vision of alleviating NDD.

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