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Identifying and Removing Barriers to Accessibility in Environmental Education and Outdoor Recreation

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Identifying and Removing Barriers to Accessibility in Environmental Education and Outdoor Recreation

by

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A capstone project submitted in partial fulfillment of the requirements for the degree of Master of Arts in Education: Natural Sciences and Environmental Education.

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Dedication:

For our son. We are breaking down barriers for you.

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CHAPTER ONE

Introduction

According to the Centers for Disease Control and Prevention [CDC] (2023), approximately 1 in 4 adults have a disability and "that about one in six, or about 17%, of children aged 3 through 17 years have one or more developmental disabilities" (CDC, 2022, para 1). Despite this information, cities often continue to build and expand their urban areas designed with the typical, able-bodied population in mind. Outdoor areas in particular tend to present significant challenges to the disability community.

When ruminating on what I wanted to achieve with this capstone project, I came up with several ideas related to curriculum, professional development, and online webinars. Ultimately I chose to develop a guide for nature centers to use for evaluating, developing, and modifying their organization's inclusive practices. Because I understand the value of connecting all people to the natural world, I wanted to explore the question: *How can environmental educators evaluate and modify their existing programs, practices, and policies to create a more inclusive and accessible outdoor experience for people with disabilities?*

In this introductory chapter, I share my personal experiences and professional background in an effort to demonstrate my rationale for creating the guidebook, *Nature Adapted: Guidebook for evaluating and modifying programs and practices to increase outdoor accessibility*. My strong connection to nature and the desire to find accessible outdoor spaces and programs has motivated me to perform further research on inclusive practices. Toward the end of the chapter, I also outline the goals I have chosen for this project.

Personal Background

My childhood memories are filled with adventures, whether actual adventures with my family or ones I read about in books. My family loved spending time outdoors playing softball, going fishing, camping under the stars, and building sand castles at the beach. When I was in high school, my sister, mother, and I joined my uncle's canoeing group on a sixty-mile paddling trip down the Pecos River. Canoeing the river took seven long days of navigating the river's twists and turns, bouncing through rapids, dragging our canoes through the low water spots, and taking swims to cool off from the blazing afternoon sun. When we were not paddling the river, we were setting up camp, breaking down camp, unloading and loading the canoes, or hiking up the canyon walls in search of caves covered in pictographs. Each day brought a new set of challenges, from scorpions wandering into our camps at night, to ranchers warning us about mountain lions roaming the area. There was even a brush fire that had whipped up along the river bank as we paddled downstream. By the end of the week our muscles were sore, our bodies tired, and our souls replenished from the time spent communing with nature. Disconnecting from technology and escaping the dramas of high school to encounter a world where we faced brush fires, mountain lions, and scorpions, left us feeling oddly at peace.

My mother's family keeps a small beach house in Crystal Beach, Texas, located on the Gulf Coast near Galveston Island. Countless weekends were spent there with cousins, friends, or just our family. My dad would wake up early and take drives down the beach to watch the sunrise while everyone else slept in, recovering from the previous day's beach adventures of collecting seashells, splashing in the water, and burying our feet in the sand until we fell over giggling. Every spring we joined our grandmother in

our annual blackberry picking. The vacant lot across the street from our beach house was one giant blackberry bramble with the juiciest berries I have ever tasted. The thorns would scratch up our hands and our fingers were dyed purple from the juices, but we did not stop until our buckets were topped off and our tummies were full from snacking. Later, the blackberries were made into jam, cobblers, and sprinkled on top of Blue Bell ice cream. All year long as we munched on breakfast toast covered in homemade blackberry jam, I would think about those sunny days spent surrounded by the women in my family picking the vine-ripened blackberries.

My husband grew up with a similar childhood of time spent outdoors with his brothers. Our married life has since included family camping trips, fishing in local ponds, kayaking in alligator-filled lakes, hiking through Garden of the Gods Visitor & Nature Center in Colorado, sunset walks at the neighborhood park, and biking along the trails of Houston's bayous. Time spent relaxing was better around a campfire eating s'mores or wandering through forests than being indoors. Six years ago we adopted our son and could not wait to share our love of the outdoors with him. Plans quickly changed, however, when he was diagnosed with several severe medical conditions including a traumatic brain injury, epilepsy, and cerebral palsy. At just eight months old, we realized the dreams we had for our family's future would be drastically changed. Would we be able to carry our son and his wheelchair up the tall staircase of the beach house or push it through the sand? How could we go biking, kayaking, or hiking with someone who had full-body mobility issues? Could we find a way to still enjoy the outdoors without overwhelming him? Like most children, our son loves being outside. He turns his face towards the sun to feel its warmth, he giggles when we dash through rain, and he hollers

with delight on our strolls through parks. You can see him looking around when he hears a bird calling and shrieking with joy when a butterfly flits right in front of him. The outdoors provides a wonderful sensory experience for him. The problem is that it is difficult to find greenspaces that are wheelchair accessible. We live in one of the largest cities in the United States with countless city, county, and neighborhood parks, yet very few of them are accessible for people with disabilities. Reconnaissance became a vital part of any outdoor excursion to ensure it was a place that had trails, playgrounds, or buildings that were accessible. What we discovered was there were more barriers to the outdoors than access. Additionally, as we attended educational programs at the parks or nature centers, it became clear that most of the people leading the classes were uncertain of how to interact with a child with intellectual disabilities, or did not know how to modify their activities to accommodate his physical disabilities. Now that our son is six years old, he can no longer attend preschool-aged programs at nature centers for which he is developmentally suited for, and visiting programs for children in his own physical age group was often more difficult as he could not keep up with the other children. So where does this leave us and other families like ours?

Professional Background

The path I took to become an informal environmental educator was not a straight line but rather veered in many directions before ending up where it did. Originally my major was physical therapy, followed by psychology, before I ended up in teaching. The jobs I had along the way have been instrumental in molding my personal and professional philosophy and provided me with the experiences that have helped me to understand the needs of the disability community. Ultimately, this knowledge has helped me navigate

systematic barriers our family encounters. For two and half years I worked as an Office Manager at a psychology office who helped people with a variety of mental disabilities including anxiety, attention deficit disorder, bipolar disorder, depression, and dementia, as well as offering couples and family therapy. Witnessing the empathic care from the doctors showed me how to interact with and provide support for patients with mental health disorders. The patience, compassion, and understanding stemming from working with neurodivergent patients have helped me in both my personal life as a mom and in my professional life as a teacher. My undergraduate courses in physical therapy, along with my own physical therapy treatments from injuries over the years, gave me a foundation of basic human anatomy, rehabilitation, and how the body moves and recovers from injuries. As a certified early childhood educator, I am trained in working with children of all abilities and have studied child development.

Working as a teacher in informal education was never a career path I had imagined for myself but now it seems like such a natural choice. My love for the outdoors started when I was a baby on the beach covered in sand, exploring the salty waves of water that rolled in and out from my feet. It makes sense now that my career choice would be related to the environmental field. While I love teaching, the rigid school schedules, pressures of grades and tests, and dealing with an unyielding administration and parents of the formal school systems were of no interest to me. When I started volunteering at the Houston Arboretum & Nature Center in 2013, I realized there was another option; one where I could still teach but in a relaxed, natural setting. Currently, I manage the preschool, children, and family programming, and also help with camps, open house events, and special events. Our nonprofit organization sees about 600,000

visitors each year from all corners of the world and from many different backgrounds, cultures, and abilities. This past year, I was invited to join the Accessibility Advisory Committee for Texas Parks and Wildlife Department (TPWD). TPWD has spent the past two years evaluating all of their 89 state parks to determine their level of accessibility for public visitors and to make recommendations for upgrades to physical sites, modifications to programming, and changes to policies and procedures regarding other departments like marketing, technology, and guest services. As a member of the Accessibility Advisory Committee, I provided feedback to the consultants throughout the process and assisted in developing methods for the public input process. Being on this committee really introduced me to a broad range of outdoor accessibility options I previously had not considered.

The Houston Arboretum & Nature Center just completed its five-year Master Plan that included improvements to existing trail systems, renovating the Nature Center, adding new Conservation and Administrative buildings, designing a brand new nature-based Playscape for children, improving our Nature Discovery Room, and installing Field Stations in each of our ecosystems as a place for visitors to rest and learn more about the habitat they are exploring. Despite best efforts, there are several areas in which the Arboretum lacks accessibility in its programming, on its physical site, and in the staff and volunteer departments. One of my goals is to take the information I learn and apply it at the Arboretum and at other nearby nature centers with the ultimate goal of creating several accessible areas for people with disabilities to enjoy.

Nature-Based Education Background

Over the past ten years that I have worked as a Naturalist at the Houston Arboretum & Nature Center, I have continued to increase my level of environmental literacy. Conferences from organizations like the North American Association for Environmental Educators, Texas Association for Environmental Education, the Natural Start Alliance, Texas Master Naturalists, and the Science Teacher's Association of Texas have not only provided me with a broader understanding of our native ecosystems, but also given me the opportunity to network with other nature-based organizations who have since become invaluable resources for me. Additionally, I have completed two certificate courses from Cornell University's Civic Ecology Lab, attended TPWD's Project WILD and Aquatic WILD workshops, became a facilitator for an environmental program called Project Learning Tree, and participated in countless other workshops, webinars, and classes. Recently, I have shifted the focus of my continuing education coursework from curriculum development to accessibility issues related to people with disabilities and nature. Two of the books I am currently reading, *Naturally Inclusive: Engaging Children of All Abilities Outdoors* by Dr. Ruth Wilson (2022) and *Demystifying Disabilities: What to Know, What to Say, and How to be an Ally* by Emily Ladau (2021), are discussed further in Chapter Two.

Rationale for Project Topic

Seeing the barriers my child faces when trying to explore the outdoors has motivated me to advocate for a change in how nature centers, arboretums, forest schools, local parks, and other green space organizations interact and accommodate people with disabilities. As a parent of a disabled child, I feel like I am constantly fighting for equal

access. There are a myriad of families like ours out there who may not be able to or know how to advocate for their right to enjoy the outdoors and attend environmental programming. This is one reason why I chose this topic for my capstone project. At a recent networking event for Houston-area environmental educators, I had the opportunity to speak with several people from local nature centers and outdoor recreation programs about their current level of inclusion and accessibility. These organizations are non-profits that focus on environmental education and outdoor recreation in urban settings in and around the Houston area. From just these informal discussions, I learned that most local natural spaces do not have accessible trails, do not modify or provide accommodations, and/or do not have inclusive policies in place for staff, volunteers, or guests. Some of the reasons discussed were lack of knowledge on the topic of disabilities, lack of time or resources to adapt their programs or practices to be more inclusive, and uncertainty in where to begin the process of identifying and removing barriers to accessibility. Additional research on the lack of accessibility in outdoor recreation, explained in more detail in chapter two, shows people with disabilities are less likely to be able to participate in outdoor recreational activities than their able-bodied counterparts (Cordell et all., 2004). A survey of disabled participants listed numerous constraints that limited their access to nature, including requiring adaptations, attempting to meet social expectations, concerns for personal safety, social fears, and inadequate facilities, to name a few (Cordell et al., 2004). This motivated me to do further research on the topic and develop a guidebook for current and future nature centers to use to help them identify accessibility barriers within their organizations and learn how to overcome them to be an outdoor area that welcomes all people of varying abilities.

Project Goals

The goals for this capstone project are to identify barriers people with disabilities might encounter when visiting outdoor spaces like nature centers, understand the importance of providing a safe environment for them to explore the outdoors, and create a guidebook that helps organizations evaluate their policies and suggests ways they can modify or incorporate new programs in an effort to be more inclusive.

Summary

I believe that all people have the right to explore and enjoy the natural environment. Studies have shown that being outdoors has positive effects on a person's physical, mental, and emotional well-being (Avitt, 2021). People who can benefit the most from being in nature are often the ones that encounter the most barriers. My son is an example of someone with physical and intellectual disabilities who struggles with access to green spaces. This is why I am examining: *How can environmental educators evaluate and modify their existing programs, practices, and policies to create a more inclusive and accessible outdoor experience for people with disabilities?* In chapter two, I discuss the research behind inclusion and accessibility in the outdoors. I also review different types of disabilities, examine the current best management practices for developing inclusive organizational policies, review outdoor accessibility guidelines at the federal level, and compare the benefits and barriers people with disabilities experience when attending outdoor educational programming. Later in chapter three, I outline the methodology used for this project and describe the different details of each section of the accessibility guidebook I created titled *Nature Adapted: Guidebook for evaluating and modifying programs and practices to increase outdoor accessibility*.

Finally, chapter four combines the information described in the previous chapters with the results of the implementation of the guidebook, and studies them to determine the outcomes, explain what I learned, discuss the implications and limitations of this research project, and make recommendations for further research and literature in this field of study.

CHAPTER TWO

Literature Review

Introduction

The previous chapter set the foundation for this project to begin to answer the question of: *How can environmental educators evaluate and modify their existing programs, practices, and policies to create a more inclusive and accessible outdoor experience for people with disabilities?* For this chapter, a review of literature was performed to continue to build on that foundation of knowledge relating to accessibility in the outdoors. Literature focusing on understanding types of disabilities was examined first to gain an understanding of terminology and concepts of what constitutes a disability. In the next section, the importance of spending time outdoors was explored, and specifically, how it benefited people with disabilities. Following that is a section on literature pertaining to barriers and challenges people with disabilities faced when accessing outdoor areas or environmental programming is reviewed. And lastly, the common policies, practices, and guidelines set forth by leading green organizations or government agencies were reviewed to determine what the best management practices were for creating, maintaining and improving the accessibility of outdoor environments and their programming.

Understanding Disabilities

The term disability is often used to describe a person with a physical disability. In actuality, the term disability refers to a group of people with a wide range of varying medical conditions and special needs. According to the Americans with Disabilities Act (ADA) (n.d.), a person with a disability is described as someone who:

- has a physical or mental impairment that substantially limits one or more major life activities,
- has a history or record of such an impairment (such as cancer that is in remission), or
- is perceived by others as having such an impairment (such as a person who has scars from a severe burn). (para 2)

A major life activity is an activity a person performs daily like sleeping, eating, working, and communicating. It could also include motor functions like bending, walking, and lifting, speech or communication activities like deafness or stuttering, sensory activities such as seeing and hearing, as well as cognitive activities related to thinking and concentrating. Approximately 27% of adults in America are living with some form of disability, 12.1% of which are mobility-related (CDC, 2023). A few examples of physical disabilities include missing or impaired limbs, vision impairment, hearing loss, spinal cord injury, cerebral palsy, traumatic brain injury, and epilepsy. Disabilities can also include neurodevelopmental disorders like Autism spectrum disorder (ASD) and Attention-deficit hyperactivity disorder (ADHD), intellectual disorders, communication disorders, and mental health disorders such as anxiety and sensory processing disorder (CDC, 2023; NDS, n.d.).

While there are a myriad of disabilities, illnesses, and disorders that can present with similar symptoms, it is worth noting the grouping of disabilities does not mean everyone with that particular diagnosis will have the same experiences and challenges (Ladau, 2021). Each person's disability is unique to their own health conditions, personal experiences, environmental factors, lifestyle restrictions, and limitations to activities

(National Disability Services, n.d.). Thus, the accommodations and level of accessibility required will vary depending on the specific needs of the individual at any given time.

Understanding Accessibility

Accommodations and accessibility play an important role when it comes to modifying current practices and curriculum to make them more inclusive for people with disabilities. According to the United Nations Geneva's *Disability-Inclusive language guidelines: Annex II* (2020, April):

> Accessibility refers to the design of products, devices, services or environments so as to be usable by persons with or without disabilities, and includes information and communications. Physical accessibility, for example, involves the creation of a barrier-free environment where persons with disabilities can move freely. (Access vs accessibility section, para 2)

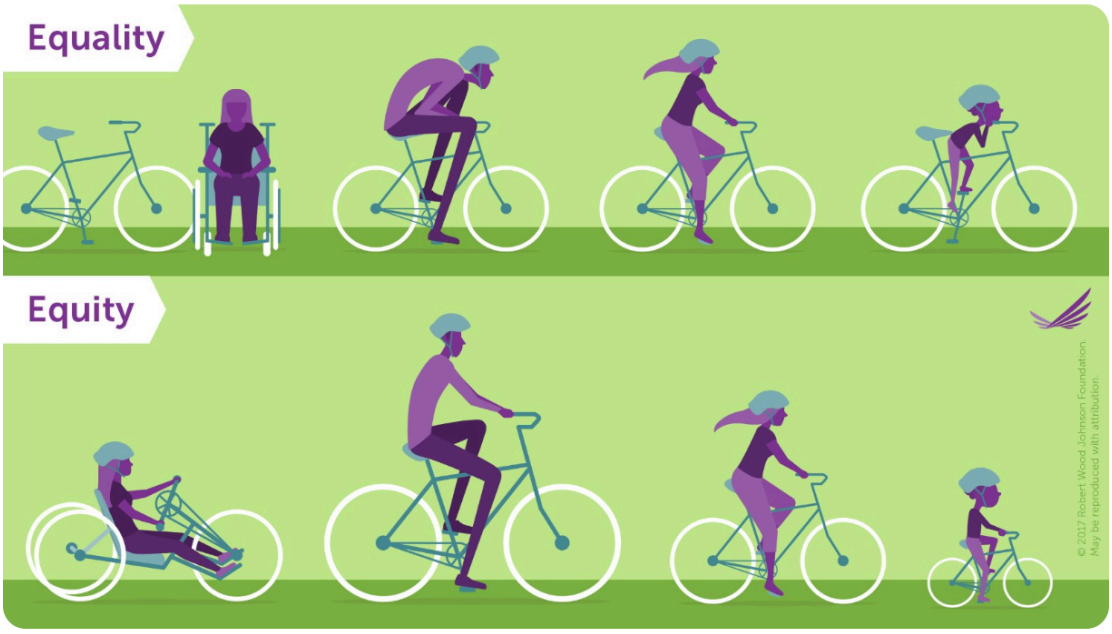
Essentially, the goal of accessibility is to provide the participants with the tools, resources, and environments necessary to engage equally and effectively in programs and to be able to enjoy the same opportunities as non-disabled people (National Center on Accessible Educational Materials, n.d.). Accessibility concepts are dynamic and complicated in practice. The Accessibility Educational Materials Center (AEM) understood that accessibility is not the same for every person but rather is "shaped by what we need to do, our interactions with the environment, and our personal preferences" (National Center on AEM, n.d., para. 1). To achieve this objective, AEM asked additional questions beyond determining if something was simply accessible. When creating materials or technologies, AEM wanted to know who would this be accessible for, under what conditions would it be used, and for which tasks is it accessible. Once that

information was gathered, AEM could then proceed with the development of their educational materials.

Equity versus Equality

To further expand on the parameters of accessibility, it is crucial to define the differences between equality and equity. Equality refers to each person receiving the exact same resources in an effort to reach the same goal. By comparison, equity means each person receives what they specifically need to help them reach their goal (Robison, & Schahfer, n.d.). The *Accessibility Toolkit for Land Managers* offers an example of equality versus equity. Look at Figure 1 from their website below. In the top section labeled "Equality", each person is given the exact same bike, regardless of height, size, or physical ability. In the bottom section labeled "Equity", each person also receives a bike, but it is modified to their own specific needs.

Figure 1
Equality versus equity



(*Accessibility Toolkit for Land Managers*, p. 3)

The size of the bike meets the height requirements of each person, and the person with a physical disability has a handcycle bike versus a standard bike. Understanding the difference between providing a one-size-fits all environmental education (EE) program and an accessible EE program that was modified to meet the needs of the participants was a crucial part of this project.

Environmental Education Versus Outdoor Recreation

As the type of environment was essential when ascertaining what accessibility needs would be required, it was important to define the overall concepts of environmental education (EE) and outdoor recreation (OR). “Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment” (United States Environmental Protection Agency, 2023, para. 1). EE programs focus on increasing environmental literacy through awareness, knowledge building, increasing concern for the health of the environment, providing people with the skills needed to identify and resolve issues, and opportunity to participate in outdoor activities (United States Environmental Protection Agency, 2023).

Whereas EE is centered around more intentional programming, outdoor recreation is defined as “any leisure time activity conducted outdoors” (Florida Department of Environmental Protection, n.d.). Types of leisure activities included, but not limited to, bicycling, hiking, camping, canoeing, hunting, horseback riding, picnicking, and aquatic recreation such as boating, fishing, skiing, and swimming.

Importance of Accessibility in the Outdoors

Activities performed in natural settings promote healthy lifestyles and provide numerous health benefits for people of all abilities. In general, active lifestyles can

improve sleep quality, expand life expectancy, and reduce one's risks of health issues like cardiovascular disease and cancer. In *The Wellness Benefits of the Great Outdoors* (2021), Avitt outlined the advantages associated with time spent in nature. Physical wellness, mental wellness, and the wellness of the community are bolstered when people are engaged in nature-related activities. Avitt (2021) stated: "Studies also show that being outside in nature is relaxing, reducing our stress, cortisol levels, muscle tension and heart rates - all of which are risk factors for cardio-vascular disease" (para 6). Mental health benefits include lower risks of depression, increased focus and attention, faster stress recovery, and a decrease in negative brain activities like rumination. (Avitt, 2021; Penbrooke, 2020). In regards to the benefits of children spending time outdoors, the Natural Learning Initiative (2023) through North Carolina State University reported nature had a positive effect on every major aspect of a child's development, including intellectually, emotionally, socially, spiritually, and physically. Specifically, the studies they reviewed showed increased creativity and problem solving, enhanced cognitive functions, improved academic performance, increased physical activity, improved nutrition, improved eyesight, and reduction of stress. Inner city youth who had regular, unstructured play time outdoors were also reported to have more self-discipline, self-control, and improved social relationships.

Mental Health Benefits

During the recent COVID-19 outbreak, doctors noticed a rise in the number of patients diagnosed with stress-related issues. Elevated levels of stress and anxiety affected countless people worldwide due to the fear of losing loved ones, worrying about one's health and the health of the family, and the uncertainty of how the pandemic would

continue to affect their lives in unforeseen ways. This prompted health organizations and the medical community to review studies of stress and the role it plays on one's mental and physical health. Elevated levels of stress can manifest in several ways including trouble sleeping, decreased appetite, higher cortisol levels, trouble concentrating, and worsening of chronic health conditions. To combat these symptoms while still keeping COVID-19 safety protocols in place, the CDC encouraged people to visit their local parks for exercise and a mental health boost (Penbrooke, 2020). Green spaces provided a place for people to be outside with their community and reap the benefits of being immersed in nature. Robert Zarr, M.D., founder of DC Park Rx, as cited in "6 Reasons Why Parks Matter for Our Health", stated "there's good evidence that sitting or eating outdoors, even just touching a tree, has a measurable impact on your psychological health" (Mozur, 2016, para 15). However, in an article on National Recreation and Park Association's blog, Penbrook (2020) cautioned that not all outdoor spaces are helpful. Poorly planned parks or parks in unsafe neighborhoods with high crime rates or drug usage can have the opposite desired outcome of worsening one's mental health (para. 6).

Nature Health Benefits for People with Disabilities

The study of the health gains noted above is typically in reference to the general public, usually healthy, able-bodied persons. Narrowing the focus to specifically concentrate on people with disabilities, does being in a natural setting have a greater effect on the health and well-being of people with medical conditions? A systematic review of studies performed by Zhang et al. (2017) evaluated the advantages of nature-related activities for people with disabilities, specifically elderly people with mobility-related disabilities, and determined whether the participants benefited

physically, mentally, and/or socially from interacting with nature. The activities they researched ranged from passive interactions like sitting in nature or observing nature to more robust activities like walking, gardening, canoeing, and skiing. Rehabilitative activities, such as those associated with improving physical symptoms related to Parkinson's disease, were also explored to determine if utilizing outdoor areas for therapy would have a greater impact on a person's overall health and rehabilitation progress. The review noted several studies showed marked improvements in participant's overall physical, mental, and social health. Specifically, there were noted increases in positive self-identity when participants were able to exceed their expectations of their limited abilities while performing physical tasks. The review of studies also revealed the benefits to social health were higher for people with disabilities than those of their able-bodied counterparts. Some of these gains include increased social interaction, improved social engagement, being more comfortable meeting new people, and a better tolerance for others (Zhang et al., 2017)

The article "How People with Special Needs Benefit From Nature", written by Beckworth and Co (2021), agreed with the above research regarding the increased health benefits people, particularly those with special needs, receive from being in nature. The article also points out that people with disabilities taking part in nature-based activities tend to experience less stress and anxiety and are more balanced and calm. It can contribute to an overall positive mood and increase feelings of vitality and meaningfulness. Nature also provides a sensory-rich environment full of smells, sights, and sounds. As their article stated:

> Sensory play is a vital part of early childhood development because it builds nerve connections that act as pathways of communication in the brain, refines sensory thresholds, and improves physical, cognitive, social-emotional, and language development. (para 3)

Outdoor sensory play can help children of all ages and abilities explore in a new way by heightening senses, increasing body awareness, and providing the flexibility to play in ways unachievable in classroom or indoor settings (Wilson, 2022). Nature also makes for a good learning space. Many children with special needs struggle with focus and concentration, and can often learn better through visual or active learning styles. Moving classroom time outdoors provides an experiential learning opportunity and allows children the chance to learn about environmental topics first hand. In addition to the health benefits mentioned above, website Beckworth & Co (2021) identified additional physical benefits of increased coordination, flexibility, muscle strength, body awareness, balance, and motor skills. The last section of the article describes the social-emotional skills gained when special needs children are able to spend more time outdoors. Many children diagnosed with disabilities experience low self-esteem often due to how they are viewed by their able-bodied peers. They are frequently judged by their disabilities rather than their abilities. Nature play is less structured and allows for a more level playing field which can boost one's self-esteem, increase confidence, and provide the opportunity for successful playtime.

Autism, Children, and Nature

There has been significant research in the area of the importance of children accessing nature, including children with disabilities. Research focusing on children with

Autism, however, is more limited. A study published in the *Journal of Outdoor and Environmental Education* by Galbraith and Lancaster (2020) concentrated on the effects wild nature has on children diagnosed with Autism. Children five to ten years of age and their caregivers were asked to take photos of themselves interacting in nature. Their study utilized a program called Photovoice as a means of communicating with the children and parents in the study. Photovoice is a way for people to creatively express themselves and document facts via pictures. Using photographs allows people of different cultures, languages, and abilities to be able to communicate with one another, despite language or cultural barriers (Photovoice, 2023). In this case, it allows children with Autism who may find it challenging to communicate what they are experiencing to be able to share their perspectives more clearly.

The goal of this study was to determine what effects wild nature, or natural settings, have on children with Autism, as well as identify challenges or barriers they face. As part of this research, children and their parents were asked to document their adventures in the outdoors. Afterward, the photographs were examined and the children and parents were interviewed to further discuss the images. What the researchers discovered was the children in the study did benefit in several ways from time spent in nature. Some of the benefits included engaging in movement activities like balance and coordination, freedom to move about in a less-structured environment, allowing the child the opportunity to explore in their own time and space, encouraging children to be more flexible and adaptive in new environments, presents opportunities for imaginative play, and creates a place for calm and quietness which can increase one’s focus and attention.

The parents identified barriers associated with outdoor time, which will be discussed in the next section (Galbraith & Lancaster, 2020).

Similarly, a study by Dr. Frances Kuo and Dr. Andrea Faber Taylor (2004) was performed in an effort to determine the impact of natural settings on symptoms associated with Attention Deficit Hyperactivity Disorder (ADHD), namely inattention and impulsivity. Their study revealed that regular 20 minute walks were successful in reducing ADHD symptoms and decreasing the overall attention fatigue associated with those symptoms (Kuo & Taylor, 2004).

Benefits to Businesses and Organizations

In addition to the benefits to oneself and their community, having an inclusive policy can also have a positive impact for outdoor businesses and organizations. As previously stated in Chapter 1, approximately 27% of people in the United States (CDC, 2023) are living with a disability, which is a significant number of people who are being denied access to outdoor spaces like state parks, neighborhood parks, and other local greenspaces. By excluding roughly one-quarter of the population and potentially their families or friends, businesses and organizations are losing a considerable amount of revenue, as well as the recognition and respectability of being inclusive to all people. (National Ability Center, n.d.).

Summary of Importance of Accessibility in the Outdoors

A review of studies has shown there are considerable benefits to a person's physical, mental, and social health that come from being outdoors. During COVID-19, the CDC encouraged people to go outside to help combat the increase in stress-related illnesses associated with the pandemic. People with disabilities specifically have been

shown to benefit from both passive and active nature-related activities, as long as the parks are safe and properly planned. Outdoor businesses that provide access to green spaces and have inclusive practices in place benefit both financially and from positive public relations. Modifying policies and incorporating practices of inclusion can increase the number of people who can visit natural spaces and further benefit business and green organizations. While there are plenty of positive aspects to spending time immersed in nature, people with disabilities often experience less access to the outdoors. In the next section, the barriers and challenges they face are examined.

Barriers to Environmental Education and Outdoor Recreation

In the previous section, the positive benefits associated with people spending time in outdoor environments was discussed. Next, the barriers and challenges people with disabilities face when exploring nature is reviewed. The World Health Organization (2023) stated, “Inaccessible environments create barriers that often hinder the full and effective participation of persons with disabilities in society on an equal basis with others” (para 3).

Nature often presents additional challenges such as physical barriers, attitudinal barriers, social barriers, communication barriers, policy barriers, and lack of consistent resources for people with physical disabilities, making it more difficult to find the motivation to venture into the outdoors (Knott, 2023; Zhang et al., 2017). When people with disabilities were able to meet or overcome these challenges, they experienced an increase in self-esteem, improved confidence, and gained a better understanding of their physical abilities and limitations. It is worth noting the studies showed people with disabilities valued the aesthetic of natural settings and stated a preference for keeping the

outdoor spaces as undeveloped as possible while still providing accessibility. The desired goal wasn't to concrete all of nature but rather add features to natural areas in an effort to make specific areas easier to access.

Physical Barriers

The most commonly mentioned challenges to accessibility in natural spaces were physical barriers (Aguilar-Carrasco et al. 2023; Knott, 2023; Robison & Schahfer, n.d.; Sieck, 2006). Many of the outdoor spaces that exist today were not designed with accessibility in mind. A lack of access to basic facilities such as bathrooms, parking, buildings, and campgrounds was listed as a concern (National Park Service, 2014). Trails with steep descents, eroded sections of trails, rocky spots, and inaccessible trail surfaces such as dirt or mud can wreak havoc on a wheelchair or be a hazard for people with mobility issues or stability concerns. Narrow footpaths and trail sections with sand or shallow streams were also problematic for wheelchair users, as were ditches, riprap, steps, and narrow pass-throughs. Trails with tread obstacles like debris, roots, rocks, or deep ruts were noted to be impassable or difficult to transverse (National Park Service, 2012; Sieck 2006). The *Accessibility Toolkit for Land Managers* (Robison & Schahfer, n.d.) also stated loose-packed ground surfaces like sand, grass, dirt, or large rocks are difficult to maneuver through for people with lower body mobility issues. Wheelchair users have been left stuck in the mud, stranded, or forced to turn back when encountering these issues. Additional physical site barriers included railings at eye-level that block line of sight, incomplete signage, steps, trail drop-offs, trail erosion or degradation, slopes, trail hazards, ballards, and obstacles that fully or partially blocked access such as roots, limbs, and rocks. (Robison & Schahfer, n.d.)

Attitudinal Barriers

Attitudinal barriers refer to the perceptions placed on people with disabilities by able-bodied persons. Disabilities have often been viewed as a character flaw, a deficit, or a shortcoming (Knott, 2023). People with disabilities have frequently dealt with comments from others congratulating them for being there or complimenting their participation in outdoor activities when they were simply continuing to live their lives in a way they prefer (Borisoff, et al., 2021). Unwelcome comments, either explicit or implicit, created an unintended barrier for those who wished to be outdoors undisturbed (Robison & Schahfer, n.d.). People with disabilities reported to have changed their schedule to attend parks during less busier times purposely to avoid said commenters (Borisoff, et al., 2021).

Additional Barriers

In *Outdoor Recreation Among Wheeled Mobility Users: Perceived Barriers and Facilitators* (Borisoff, et al., 2021), several other important factors were identified as barriers to access. The financial burden of purchasing specialized equipment to accommodate their disabilities was a major roadblock in participating in outdoor recreational activities. People interviewed also mentioned the hassle of finding transportation to and from the parks. Not all people with disabilities were able to drive which required them to be dependent on someone else and their schedule for their transportation needs. The lack of the ability to be spontaneous due to the amount of planning and timing it took to coordinate, plan, and take a trip was also listed as a barrier, as was needing assistance for transfers and loading and unloading equipment and supplies. Lack of storage for the specialized, expensive equipment was another issue

mentioned. Interestingly, weather conditions were discussed as a barrier. For people with mobility issues, grounds that were wet, muddy, icy, or covered in snow create an unsafe surface which made it difficult to traverse (Borisoff, et al., 2021) Social issues such as not being invited to attend outings and accessible sections being isolated from other parts of the park typically left disabled visitors feeling unwelcome. Lack of representation in media sources featuring people with disabilities in recreational settings also evoked similar feelings of unimportance. (Robison & Schahfer, n.d.)

Efforts to Assess and Address Barriers

In 2014, the National Park Service (NPS) created a Task Force with the purpose of evaluating their current parks to determine their level of accessibility and used that information to create a plan for incorporating strategies in an effort to make their programs more accessible. Of the 400 parks they evaluated, several of them did not have proper access to basic amenities like bathrooms or water fountains, pathways connecting parking lots to buildings or program areas were not accessible for people who are mobility impaired, only a handful of parks offered printed materials or alternate format options for people with hearing or vision disabilities, exhibits lacked inclusive features like tactile maps, and some had audio elements that were not operable. These issues limited the opportunity for people with physical, sensory, and/or intellectual disabilities to fully experience the NPS programs and sites. Additionally, staff and volunteers were found to be improperly trained on how to work with people with disabilities which led to issues like denial of services and access to grounds and programming, particularly when it pertained to policies regarding right of access for service animals. (National Park Service, 2014). The study also recognized the challenges their organization themselves

encountered as they began to outline their strategic plan for park accessibility improvements, namely cost factors and lack of available staff. To address the park areas that required upgrades in facilities, specifically buildings, trails, and campgrounds, the estimated cost exceeded $120 million. It is important to note this number did not include the additional costs of interpretive programming upgrades such as tactile experiences for exhibits, audio descriptions for videos and websites, sign language interpreters, and large print materials. A limited budget and small staff size were significant obstacles they knew would need to overcome as part of their strategic plan. (National Park Service, 2014). It was also important to point out that many of their parks systems, facilities, and programs were developed prior to the establishment of ADA laws and Outdoor Recreation Accessibility Guidelines, thus meeting the building requirements of that decade but not necessarily today's stricter requirements.

Person-Specific Barriers

Barriers to the outdoors were also discovered to be person-specific, as identified by Galbraith and Lancaster (2020) in their study of children with Autism in the outdoors previously mentioned. Sensory issues were listed as a complex and challenging issue that needed to be considered. Each person responded differently to new sensory experiences, especially those with autism or other sensory disorders. Some children with autism became overloaded with all of the competing sights and sounds, while others avoided specific types of sensory altogether. Other barriers identified by the parents not stated above dealt with personal scheduling and siblings. It is common for people with disabilities to have a higher number of appointments than their able-bodied counterparts. This tends to leave less free time to spend on recreational activities like exploring

outdoors. Parents in this study also conveyed the difficulties that arose when having to accommodate siblings of varying abilities when outdoors. Children with autism frequently go at their own speed, wander off, or get hyper-fixated on a particular item and not want to continue hiking. This caused frustrations in siblings who wanted to explore wilderness areas in a more traditional way and at a more natural speed for them. (Galbraith & Lancaster, 2020) Another personal barrier Borisoff et al. (2021) discovered in their research of wheeled mobility users stated a few of their interviewees gave up outdoor activities due to health concerns and problems that arose from aging. Participating in activities tends to get harder as you get older and people who already had disabilities to contend with expressed a desire to protect their bodies from additional damage brought on by physical activity.

Difficulties in Park Designs

Park designers also face many challenges as they work to develop a park or trail system that has the potential to affect the overall development of a park, nature center, or natural space. While this may not seem like a direct barrier to accessibility, it is an important first step that needs to be acknowledged. As Lewkowicz (2006) pointed out in *Opening the Door to Nature for People with Disabilities,* parks and trails are not one-size-fits-all. There are countless types of symptoms related to disabilities and each person has their own varying level of abilities. Attempting to plan for all possible disabilities is daunting. Similarly, each natural area also has its own characteristics to consider with different natural resources that could potentially have been impacted by visitorship. People who are not trained in accessible design or programming may not understand the accessibility options beyond the required ADA minimums for facilities

(Lewkowicz, 2006). Varying costs of infrastructure were also listed as a challenge that had to be factored into the budgets and plans. Greenspace designers worked to find the balance between protecting the natural environment, honoring the cultural and historical resources of the area, and creating an area that was accessible to everyone (Lewkowicz, 2006).

Website Transparency

The majority of the studies researched were located in the United States, but accessibility, or lack thereof, is a worldwide issue. A study completed in Canada and Spain (Aguilar-Carrasco et al., 2023) highlighted the systematic barriers to wilderness areas in their national parks for people with mobility disabilities. In addition to physical barriers similar to the ones mentioned previously, the study identified communication technologies to be an important factor when determining whether to visit a natural space. Having a website with up-to-date information regarding the accessibility of the grounds and programming was a valuable tool for people researching the walkability or wheelability of a park. Websites offered information about the accessibility of the park including items like parking or public transportation. Organizations who did not offer transparent information on their website or internet spaces that were viewed as too challenging made the participants less likely to visit (Aguilar-Carrasco et al., 2023).

Barriers Summary

There are numerous factors that contributed to the barriers and challenges people with disabilities face when attempting to participate in outdoor activities. Physical barriers such as uneven ground surfaces, erosion, steps, slopes, and tread obstacles were most commonly cited. Attitudinal and social barriers created feelings of unwelcomeness

and isolation from able-bodied people. A further review of the studies identified challenges related to weather, lack of time in scheduling, prohibitive cost of buying and storing adaptive gear, issues with website accessibility, transportation issues, and lack of accessible materials for programming. However, park staff and designers also faced challenges when developing new outdoor recreational spaces or when making necessary upgrades to existing park facilities and programs. Rising cost of infrastructure materials, additional planning and research on disability-related accommodations, limited staff available to assist with upgrades, older buildings that were developed under outdated ADA laws, and lack of knowledge of types of disabilities and specialized needs were cited as reasons for not having more accessible environments. An honest and complete listing of barriers and challenges an organization faces can help to create a more thorough plan for overcoming these barriers and becoming a more equitable natural resource for people with disabilities. In the next section, policies and guidelines regarding accessibility requirements for outdoor business are explored.

Current Policies, Practices, and Guidelines

The Forest Service and the U.S. The Department of Agriculture (USDA, 2012) established best management practices for the creation and maintenance of accessibility in outdoor recreation areas, while the Americans with Disabilities Act dealt with the accessibility requirements of government buildings and businesses open to the public (Forest Service, 2012). A literature review of the policies and practices of accessibility in outdoor recreation areas provided information relating to what accessibility options were offered, common practices at greenspaces like the national park systems, and identified goals and strategies for adopting more inclusive practices at national parks. Businesses

were found to have created their own set of policies and principles to define, clarify, and promote their inclusive-related values and goals (Harvard, 2023). Resources for outdoor educational programming were also reviewed.

To begin, it is important to learn the history of laws requiring accessibility for all people. In 1968, the Architectural Barriers Act was passed into law that stated all buildings designed for or on behalf of a Federal agency must be accessible for people with disabilities. Later in 1987, the Rehabilitation Act became law and specified that all programs and activities performed by a Federal agency or an entity related to a Federal agency must provide the opportunity for people with disabilities to be able to participate as independently as possible (Forest Service, 2012). However, these laws only applied to Federal land and programs. The American Disabilities Act which required state and local governments, businesses open to the public, and public accommodations such as hotels to be accessible was not passed into law until 1990 (Forest Service, 2012). These are considered the key laws typically referenced for this field, however, the *Accessibility Guidebook for Outdoor Recreation and Trails* (2012) provided a more in-depth timeline and descriptions of additional laws surrounding the rights of equity and accessibility not mentioned here.

The main resource reviewed for accessibility in the outdoors regarding physical sites is the *Accessibility Guidebook for Outdoor Recreation and Trails* (2012) which was written in conjunction with the United States Department of Agriculture (USDA), the Forest Service, and the U.S. Department of Transportation. It combined previous guidelines created by the Forest Service and US Access Board to make a comprehensive, unified set of guidelines and practices for accessibility in outdoor recreation areas (Forest

Service, 2012). It is important to note that these guidelines were only enforceable on National Forest System lands but were offered to other organizations to assist in the implementation of accessible features in their outdoor spaces. The goal of the Forest Service's guidelines was to maximize accessibility while protecting the natural and historical resources of the area (Forest Service, 2012).

The *Accessibility Guidebook for Outdoor Recreation and Trails* (2012) provided a history of accessibility laws, examined current Forest Service guidelines, and gave tips on maintenance, budget, design, construction, and terminology. It also gave detailed descriptions of guidelines for different areas of park systems like campgrounds, picnicking areas, and trails. Examples of such information included specifications for trail widths to allow wheelchair accessibility, how to determine the number of accessible parking spots needed, dimensions of picnic tables that were wheelchair accessible, and the minimum ground space and maximum slope level needed for tent platforms. A section related to outdoor spaces located at beach areas was also explained (Forest Service 2012).

Diversity Statements

In recent years, it has become more common for organizations to have policies or practices in place regarding a combination of the concepts of accessibility, inclusion, diversity, equity, belonging, and/or justice. These were often referred to as diversity statements (Harvard, 2023). DEI (diversity, equity, and inclusion) statements were used to demonstrate their commitment to the public and the community regarding their DEI-related goals and policies. They helped build trust between the organization and the community, set expectations for the community and its members, created a sense of

belonging, and helped to recruit a more diverse range of applicants (Harvard, 2023). In addition to diversity, equity, and inclusion, some businesses had expanded to include the concepts of accessibility, justice, and/or belonging to their commitment statements, depending on their community, culture, geographical area, and overall goals (Center for Scientific Collaboration and Community Engagement, 2021).

Tools and Resources Available

CAST, formerly the Center for Applied Science Technology, designed a framework for educators to utilize to maximize teaching to all students (Arndt, et. al., 2022). The guidelines, titled Universal Design for Learning (UDL), were divided into three main principles of multiple means of engagement, multiple means of representation, and multiple means of action and expression (Arndt et al., 2022; CAST 2023) The ultimate goal of the UDL guidelines was to act as a tool for educators, curriculum developers, and others to anticipate potential physical, cognitive, social, or emotional barriers, consider appropriate pedagogies that would met the needs and abilities of the learner, and provide an integrated, engaging, meaningful and inclusive learning environment (Arndt et. al., 2022). One of the important take-aways from the UDL guidelines was that learning should not be a one-size-fits-all situation because each learner has their own unique blend of knowledge, skills, experiences, abilities or disabilities (CAST, 2023).

Many universities have provided similar frameworks for their staff and students to utilize in the development of their work. For example, the University at Buffalo crafted a document for their community to use titled *Universal Design Principles* with the purpose of expanding usability to a wider audience. The subjects covered equitable use for a

variety of users, flexibility in use for people with differing abilities, making items intuitive and simple to understand regardless of one's knowledge and skill level, ensuring information is audibly perceptible, minimizing the potential for hazards, creating a design that is efficient and easy to use with minimum fatigue, and the appropriate size and spaces for the intended users (University at Buffalo, 2023).

Pedagogical Resources

The benefits of environmental educational programming at nature centers, parks, and other greenspaces were discussed previously in the *Importance of Accessibility in the Outdoors* section of this chapter. The importance of equity in education was emphasized in the United Nations Sustainable Development Goal 4 (Arndt et. al., 2022; United Nations, n.d.) which dealt with inclusivity in education. Specifically, Target 4.5 states "By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations" (Target 4.5). While there were numerous articles available on the topic of general environmental education or on accessibility in the outdoors, there was limited information regarding how to blend the two together. The lack of formal pedagogies or standardized best management practices dedicated specifically to working with people of varying disabilities in outdoor education settings demonstrated the need for additional research in this field. The North American Association for Environmental Educational (NAAEE) provided a wealth of resources in both inclusive practices and environmental education, but again, lacked the comprehensive how-to curriculum guide for informal educators to follow. The NAAEE website did have a section called eePRO with a subtopic of Equity and Inclusion

(NAAEE, n.d.). In this section, users are able to find articles and webinars to learn more about accessibility in the outdoors and the importance of nature-based play, and can connect with other environmental educators in the community (NAAEE, n.d.). The Seattle Children's Playgarden published a toolkit that featured inclusive lesson plans to teach throughout the year (Barnett-Dyer et al., n.d.). This guide was geared towards preschool-aged children and combined inclusive practices with outdoor play and environmental education in a playgarden setting. The guide contained sections on appropriate language and a glossary of terms related to disabilities along with the monthly scope and sequence to use throughout the year.

In 2013, Dominguez and Schilling penned an article based on a water-quality monitoring program for teens 16 to 26 years of age with a variety of disabilities. The goals of the program were to increase the student's knowledge of environmental issues and to demonstrate the impact their decisions had on community life (Dominguez & Schilling, 2013). Based on their work, Dominguez and Schilling developed a list of tips for educators to employ to create a safe and positive learning experience for students with disabilities while they explore the natural environment. The tips included developing a buddy system to help each other out, focusing on the process of the activity instead of the outcome, repeating the information more than you normally would, identify the student's strengths rather than their disability, encourage everyone to participate, and break larger instructions down into smaller steps. A couple of the tips also focused on adapting to the person's disability as needed. They instructed educators to take into account any physical impairments the participant may have needed accommodating, building in rest periods for those who fatigue easily, or incorporating tactile or brightly colored objects for

participants with vision impairments. Being aware of the participants' medical conditions and accommodations helped to create a more positive and fun learning environment (Dominguez & Schilling, 2013).

Inclusive Exhibits

As many parks and nature centers feature educational exhibits or informational signage to teach the public about the local environmental systems, a literature review for the design of inclusive and accessible exhibits was important to include. The Smithsonian (n.d.) assembled a set of guidelines for exhibition accessibility. These guidelines are "accessibility standards that must be met by every exhibition presented at or by the Smithsonian" (p. 4) and established requirements for topics such as content, lighting, circulation routes, label texts, furniture, and more. Examples of a few of the requirements included providing alternate forms of labels like Braille, audio, or large print, preventing overlapping sounds from interactive exhibits to help people with hearing disabilities or sensory impairments better understand the audio, provided listening assistance devices in all public programming areas, and ensuring fire alarms had both visual and audible options in case of an emergency (Smithsonian, n.d.). The guidelines also contained a section on designing inclusive spaces for designated children's areas to ensure the exhibits and furniture were the correct height to be eye-level for a child using a wheelchair (Smithsonian, n.d.).

Summary of Tools and Resources Available

The review of literature for guidelines practices related to the physical grounds of outdoor areas gave detailed information on how to design and maintain new trail systems and ways to upgrade existing trails systems to increase usability for a wider range of

visitors. The guidelines are only legally enforceable on National Forest Systems land, but they acted as a model of best management practices for all outdoor recreation and natural park areas. In addition to physical sites, a review of policies related to businesses was conducted and showed that many organizations utilize DEI statements of commitment to share their diversity and inclusive goals with the community. Universal design principles were also posted on business websites in an effort to maximize access and usability for everyone. The one area that had less available resources was accessibility in environmental education programming. A comprehensive guide detailing how to integrate inclusive practices into environmental curricula was not readily available. Several articles on accessibility in the outdoors and inclusion practices in general were found but not a full user guide for all ages and abilities.

Summary

Disability does not refer to one type of impairment, but rather to a wide and varying range of abilities, behaviors, and skill levels. Research concluded all people, especially those with physical, mental, or intellectual disabilities, were able to benefit from time spent outdoors although many people with disabilities have found it to be a difficult task. The research uncovered that despite the numerous benefits of participating in recreational activities, the challenges and barriers to access when visiting natural spaces made it difficult for people with disabilities to attend. As Lewkowicz (2006) shared:

> When someone loses vision, or hearing, or the use of their legs, they don't also lose their need or desire to enjoy nature. Nor do their experiences become less

> rich and rewarding than those of people who have all their senses and limbs. (para 4)

Organizations like the USDA and Forest Service worked to establish and implement accessibility trail guidelines and made them available to all organizations. Though more sparsely located, there was available information pertaining to curriculum or pedagogies for environmental educators on how to integrate inclusive practices into their existing programming. The literature reviewed provided a deeper insight into the world of outdoor accessibility and prepared a foundation of knowledge which will be used to further examine: *How can environmental educators evaluate and modify their existing programs, practices, and policies to create a more inclusive and accessible outdoor experience for people with disabilities?* Next, chapter three outlines a user guidebook titled *Nature Adapted* which educators and organizations can use to evaluate their programming and modify practices to work towards the goal of increased accessibility and inclusion.

CHAPTER THREE

Project Description

Introduction

Chapter two focused on a review of literature used to determine what information or research currently existed pertaining to accessibility in outdoor programming. Specifically, the research focused on answering the question: *How can environmental educators evaluate and modify their existing programs, practices, and policies to create a more inclusive and accessible outdoor experience for people with disabilities?* The foundational framework used in the production of a user guide for environmental educators interested in improving the accessibility of their Environmental Education (EE) programming as well as access to their Outdoor Recreation (OR) is outlined in this chapter.

Project Format

This project was a printable guidebook titled *Nature Adapted: Guidebook for evaluating and modifying programs and practices to increase outdoor accessibility*. Each section of the guidebook, listed in Table 1, includes: a self-assessment that allowed nature centers to review their current practices, gave information regarding inclusive policies, and ended with a place for the organization to list key points, reflect on ways to improve existing practices, and identify potential challenges they may face related to improving the accessibility of the topic area. Two nature centers were engaged to model the principles set forth in the guidebook. They followed the guidebook section by section and determined which practices were applicable to their organization, and shared the results of their experience. Discussions of these results are explained in chapter 4.

Along with an introduction of disabilities and accessibility, the guidebook was divided into the different sections of physical site review, educational programming, website transparency, and staff/volunteers roles and training. The guidebook's sections are listed in Table 1.

Table 1

Sections of Guidebook

Section 1	Defining Disabilities and Accessibility
Section 2	Physical Site Review
Section 3	Inclusive Educational Programming
Section 4	Creating an Accessible Workplace
Section 5	Website Transparency
Section 6	Identifying Barriers and Organizational Goals

The final section, "Identifying Barriers and Organizational Goals", asked them to create a timeline to work towards achieving their short-term and long-term goals. They were given a list of guiding questions to determine if they were able to successfully implement their changes, decide what worked or did not work, and what further action should be taken, if necessary.

Research

Several authors were studied and used in the design and implementation of this project's guidebook. *Nature-Based Preschool Professional Practice Guidebook* (2019) published by the NAAEE's Natural Start Alliance, *Naturally Inclusive* written by Dr. Ruth Wilson (2022), and the *Accessibility Toolkit for Land Managers* (Robion &

Schahfer, n.d.) were used as models for current best management practices in environmental education.

Wilson's book provided a comprehensive approach demonstrating how to engage children with disabilities in outdoor settings. Topics covered included working with younger children with special needs, providing supportive environments for children with autism, creating inclusive play spaces, and connecting to natural environments and elements. Some chapters featured program spotlights and research notes which allowed the reader to dive deeper into that particular subject. Perhaps just as important was the recurring theme of why connecting to nature is vital to one's overall physical, developmental, social, and emotional well-being (Wilson, 2022).

The concepts and individual sections of the guidebook were inspired by a review of the *Accessibility Toolkit for Land Managers* (Robion & Schahfer, n.d.). The toolkit began with a definition of terms and identifying what disabilities look like. A section featuring people who shared their disability, barriers they had encountered, and their favorite outdoor activity was included next. The proceeding section discussed physical and social barriers and provided suggestions on how to overcome those challenges. Lastly, the toolkit shared recommendations, quick tips, and additional resources for the readers to utilize (Robion & Schahfer, n.d.).

The University of Bath's *Creating a 'How to' Guide* (2023) also provided valuable tips for the physical design and layout of the guidebook. Some of these tips involved using clear and concise language, listing the steps in the order they needed to be completed, dividing content into sections using headings, and ensuring that credit for any

images used was properly stated. Additionally, any added visual media was to be used to supplement rather than substitute the information provided (University of Bath, 2023).

Audience and Setting

The guidebook was designed to be used by informal outdoor educators who were interested in expanding the inclusivity of their environmental programming. It was geared towards public visitors of all ages with varying degrees of abilities and disabilities. The educational programming sections focused on preschool, elementary age, family, and adult programs. The staff's and educator's backgrounds of the two nature centers engaged in the trial use of this guidebook included certified teachers, biology majors, and business management. None of the employees engaged in this project had received formal training in how to work with people with disabilities or engaging accessibility methods in OR settings. Because of this, education surrounding basic requirements of the Americans with Disabilities Act, identifying different disabilities, and explaining the way people with disabilities interact with the natural world was an essential addition to the guidebook.

The primary setting for this project was urban nature centers located in the Houston, Texas area. One nature center is a non-profit with a staff of about 28 full time employees and while the other was a government-run precinct park with a staff of typically 10 people. Both nature centers are open to the general public and also offer a variety of programming including family programs, preschool programs, and adult programming. Programming locations included indoor settings at the nature centers as well as outdoor classes on the trails or designated outdoor classroom areas. The trail systems at both locations included natural trails with dirt or rocky ground surfaces along

with accessible trails that had accessible paved or decomposed granite surfaces. Neither nature center had inclusive practices in place for their environmental education programs and did confirm that people with observable physical disabilities attended their parks.

Timeline

The research and initial strategy for the project began in the Fall semester of 2023. Approximately eighty hours were spent on research and analysis of current accessibility in environmental education practices. The guidebook itself was developed during Spring of 2024, with the assessments and final product completed in May of 2024. It was designed to be self-paced and piecemeal which allowed the nature centers to focus on the specific aspects of the guide that pertained to their organizations and could implement their changes in steps, if needed. Many nature centers and other outdoor education programs tend to be government funded or had a non-profit status, which requires additional time to request the necessary funding, staff commitments, or approvals to precede with the improvements they were trying to achieve (National Park Service, 2014).

Assessment

A summative outcomes evaluation was performed to determine the effectiveness of the practices and suggestions set forth in the guidebook. According to My Environmental Education Evaluation Resource Assistant (n.d.), an outcome evaluation "investigates to what extent the program is achieving its outcomes" (What Type of Evaluation Should I Perform and When section). The evaluation performed included a review of changes in practices and policies implemented by the organizations in the short term, what goals were set for the long term, and an observation of the changes in

knowledge, attitudes, and behaviors of the staff and volunteers when interacting with people with disabilities. The staff at the nature centers could be surveyed to ensure they were able to understand the material, determine the usability of the guidebook, and identify the effectiveness in motivating a change in practices.

Summary

This chapter has provided a detailed description of the project's purpose, the supporting research, and a detailed look at the framework for the project. This review included a timeline of the project, the intended audience and setting, a description of the guidebook created, and how the assessment was performed. The final chapter summarizes the results of the project and provides insight for future resources needed in this field in an effort to determine: *How can environmental educators evaluate and modify their existing programs, practices, and policies to create a more inclusive and accessible outdoor experience for people with disabilities?*

CHAPTER FOUR

Conclusion

Introduction

This final chapter examines the results of the project and efforts made by the researcher to determine: *How can environmental educators evaluate and modify their existing programs, practices, and policies to create a more inclusive and accessible outdoor experience for people with disabilities?*

In the following sections, the findings of the implementation of the *Nature Adapted: Guidebook for evaluating and modifying programs and practices to increase outdoor accessibility* guidebook are examined, the implications and limitations of the project are explained, ways this project can benefit people in the environmental education profession are discussed, and insights for future projects are outlined.

Major Learnings

There are many factors to consider when attempting to become a more accessible organization. Inclusivity encompasses all aspects of an organization and that can be daunting for smaller businesses or nonprofits with limited resources. Below I examine three important things I learned during the development of this capstone project.

Desire to Do Better

When performing the literature review a strong desire among the outdoor industries to improve access to nature was evident. Many parks or outdoor places were designed prior to the Americans with Disabilities Act of 1990 being established, and there were no guidelines available for accessibility in outdoor areas until the U.S. Forest Service and the Department of Agriculture created the *Accessibility Guidebook for*

Outdoor Recreation and Trails in 2012. Most people who work in the outdoor industry know firsthand the benefits you receive from spending time outdoors and want to provide a place where everyone is welcome to participate. The enthusiasm for improving access and establishing better relationships with the disability community was apparent. They simply lack the knowledge, resources, and/or support needed to make these ideas come to fruition.

Misconceptions

There were several misconceptions I encountered when discussing potential accessibility options to nature centers. First, most people were unaware of the number of people living with disabilities in the United States, which is roughly 1 in 4 Americans (CDC, 2023). Along with the information regarding types of disabilities or symptoms of disabilities, the sheer amount of knowledge can be overwhelming for some people. Many people also assume that a person with disabilities is suffering, are unable to participate in physical activities, or have no desire to join outdoor programming. On the contrary, it is the shortage of accessibility and accommodations that prevent many people with disabilities from attending outdoor spaces.

Another misconception is that accessible trails meant concreted paths only. Fears that they would be asked to pave over natural trails or throw out existing programming, prevented parks from moving forward with ideas. However, the goal is not to rip out the current park systems and start from scratch but rather to see what modifications or accommodations could be provided going forward. There are different options for trail surfaces besides pavement which are considered to be accessible as well as mobility devices organizations can provide to visitors for trails that are inaccessible. Additionally,

giving accurate descriptions of trail surfaces and features, rather than just stating whether they think an area is accessible, allows the visitors to make informed decisions themselves. Not every person with a disability will have the same requirements for access. One way the guidebook was adjusted to manage feelings of uncertainty was to encourage readers to create a timeline for their goals. By stretching out the goals over several years, it allows the organization to take smaller, more manageable steps on their journey to being inclusive. This will also allow time to try a few smaller tasks first and make adjustments when needed before heading into larger goals.

Another common misconception was the organizations needed to be 100% inclusive to everyone at all times if they publicly declared themselves an accessible organization. The sheer number of accommodations and accessibility is overwhelming and impossible to meet. Instead of focusing on every possible accommodation, the guidebook asks them to set their own goals that relate specifically to their organization. For example, it does not suggest that every single place must have an audio tour available for all signage, but rather gives options of how to accommodate people with vision impairment aside from audio tours, such as larger print options, tactile features, or adding Braille to the signage.

Lack of Resources

One of the biggest issues to creating a more inclusive program was lack of resources. Those resources included the need for additional funding, training, support from their administration, and available staff for program assistance. These are common issues for non-profit organizations in general, and are usually the reasons stated for not committing to new programs.

In regards to lack of funding, there are a number of policies or practices that can be implemented that have little to no cost attached. For example, improving the descriptions on social media posts to include possible accommodations for programming or adding a section to their website outlining the accommodations on-site are items that may require staff time but not necessarily money. For more expensive items, looking for state or federal grants related to underserved populations or accessibility items would be helpful in reaching funding goals.

There are a number of organizations that provide free online training or information regarding interacting with people with disabilities or ways to improve their workplace's accessibility. For example, the DC Government has a short training video on YouTube.com that was created to promote disability awareness and acceptance from the general public. The video, titled *Disability Sensitivity Training Video* (dcgovernment, 2014), shows examples of how to, and how not to, interact with people with disabilities. Incorporating this free video into your workplace's onboard practices or required viewing is an inexpensive way to increase your staff's knowledge without allocating additional funds to do so.

Major Learnings Summary

While working on this guidebook, I have learned that outdoor organizations genuinely want to improve their inclusive practices and policies but are hindered by the overwhelming number of ways to be accommodating. While the need for increased accessibility is evident, there is also an apprehension associated with the fear of doing the wrong thing. Adding the goals list, identifying barriers, establishing a timeline and breaking it down into more manageable sections made following the guidebook an easier

process. Overcoming misconceptions and identifying areas where the organization may encounter issues was crucial in determining what steps they should or could take in the future.

Connection to Review of Literature

The articles, research studies, websites, media, and guidebooks used in chapter two were instrumental for laying a foundation of knowledge and served as a catalyst for the ideas and concepts used in the production of the *Nature Adapted* guidebook. Examining and analyzing existing information showed what is currently being offered in the field of outdoor accessibility as well as what areas are in need of additional study.

I relied heavily on several of the resources for the development of the pre-assessment questions and information for each section of the guidebook. Particularly, the information provided by the Smithsonian (n.d.), Galbraith and Lancaster (2020), Borisoff et al. (2021), and Dominguez and Schilling (2013) provided valuable insights for the "Physical Site Review" and "Inclusive Educational Programming" sections. The Americans with Disabilities Act (1990), National Park Service (2014), Ladua (2021), and the Forest Service and USDA (2012) were beneficial in the creation of the "Defining Disabilities and Accessibility" section.

Resources provided at the back of *Nature Adapted* guidebook included the Americans with Disabilities Act, the Smithsonian Guidelines for Accessible Exhibition Design, Accessibility Guidebook for Outdoor Recreation and Trails, Americans with Disabilities Act: Service Animals, Website Content Accessibility Guidelines, and Local Lending Libraries. Readers are encouraged to continue to expand their knowledge of outdoor accessibility by visiting these websites for further information.

Suggestions for Additional Literature

While there are numerous studies surrounding the importance of spending time outdoors to boost one's physical and social-emotional health, there is a limited amount of research on the effects of people with disabilities in the outdoors. The few studies that do exist, like Kuo and Taylor's (2004) *A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence from a National Study,* underlined the significance of the continued research in this field. Additionally, it would be beneficial to the environmental-related professions to see research that focuses less on the implications and more on the application of getting people with disabilities outdoors. Topics such as how to modify existing programs to meet the needs of people with cognitive disabilities or exploring different types of adaptive gear for outdoor recreation and how to use them would be helpful to organizations. A comprehensive guide for creating an inclusive organization, including hiring people with disabilities in outdoor settings, how to provide accommodations for your staff, training on how to interact with people with disabilities, and how to adapt volunteer positions to accommodate special needs is another important resource needed for organizations. One reason I concluded for the lack of materials in this field is due to the fact that it is still a fairly new concept. The federal guidelines for outdoor accessibility were only published 12 years ago, and it is only a requirement for federal lands (Forest Service, 2012). There has not been a large enough public push for this type of research, knowledge, or tools to be available in previous years.

Implications

With this capstone project, I hope to improve the overall accessibility for people with disabilities in environmental and outdoor recreational settings. By raising awareness

regarding the shortage of resources and accessibility to natural spaces available to people with disabilities, providing ways to be more inclusive, and offering resources to help get them started, organizations who follow *Nature Adapted* will be able to further expand their accessible options.

Limitations

The different sections provided a place for the reader to list out potential barriers to completing the goals they identified as they worked through the book. Some of the barriers included lack of funding, inability to turn existing trails into accessible trails, lack of support from administration or board of directors, concerns on maintaining equipment or accessible trails, lack of training on interacting with people with disabilities, uncertainty in the correct ways to adapt educational programming, and difficulty in knowing how to establish a relationship with the disability community.

Future Projects

During the research and development of this project, I realized a need for a more in-depth book regarding accessibility in the outdoors. The information gathered for this literature review has been invaluable but has also shown me that there is a lack of comprehension resources for nature centers who are looking for a model for organization-wide inclusive practices.

Currently, I have created a social media account using the same title as the guidebook, and am starting to contact additional individuals, businesses, nonprofits, and outdoor groups on social media to see how they are adapting their outdoor adventures and to learn new ways to be more inclusive for specific disabilities or recreation types. Additionally, this year I have been a guest speaker for several meetings and a statewide

conference discussing the importance of bettering the level of accessibility for people with disabilities in outdoor spaces. In July and October of 2024, I will be leading sessions at two more conferences and will be promoting this guidebook as a tool for people to utilize.

One potential project idea stemmed from one of the main barriers mentioned by people who wish to make the desired changes to their programs: cost. One suggestion for overcoming this obstacle is to utilize a lending library (AACcessbile, 2023). A lending library allows people to check out adaptive gear, similar to checking out a book. This allows multiple businesses and individuals to be able to share the gear when needed versus purchasing them individually. Having a lending library removes the challenge of each organization locating funding to buy, store, and maintain expensive equipment. The downside, however, is the library will still need to find the funding for the purchase of the gear, as well as creating the safety policies and procedures for rentals.

Benefits to the Profession

The world of environmental education and recreation is changing and improving to be a more inclusive community for anyone and everyone who wants to enjoy the outdoors. Increasing understanding of how people with disabilities interact with the natural world, improving physical accessibility at parks, demonstrating ways programming can be more inclusive, and raising awareness of the need for more accessible outdoor spaces are all ways to help improve an organization's diversity. The goal of *Nature Adapted* is to be a resource for those organizations who wish to make changes but aren't sure where to start. Allowing them to review their current practices,

learn additional information, identify potential barriers, and set attainable goals, the organization will have a greater chance of following through on their desired changes.

Communication of Results

For the purposes of my capstone project, the guidebook is offered in a downloaded Portable Document Folder (PDF). Going forward, I am hoping to offer the PDF either as a download from a website such as Amazon Kindle or sent out via email to interested parties. The project in its entirety will be available via Hamline University's Digital Commons for future reference.

Conclusion

This chapter focused on summarizing the main takeaways from the creation of this capstone paper and project. I identified the limitations and implications of the project, benefits to the environmental and outdoor recreational profession, and revisited the literature review. Finally, I provided ideas for further research in the field and for future projects.

The intention of designing this project is to be a catalyst for nature centers, parks, outdoor recreation centers, and other green organizations to take a deeper look at their policies and practices, make necessary changes to elevate their level of accessibility to all, and to answer the question: *How can environmental educators evaluate and modify their existing programs, practices, and policies to create a more inclusive and accessible outdoor experience for people with disabilities?* A thorough review of available and relevant literature, along with my own personal experiences, education, and background, have led to the design and production of the *Nature Adapted: Guidebook for evaluating and modifying programs and practices to increase outdoor accessibility.*

The effort put into the development of the capstone project has elevated my level of understanding of what it means to be truly inclusive in outdoor practices. The challenges I encountered and overcame during this past year has helped me grow as a student, a writer, a researcher, and as an environmental educator. Accessibility in the outdoors is a passion of mine and I have become a strong advocate for equal access to natural spaces for everyone. This project designates a new chapter in my professional career path, and I hope to continue to work towards making the outdoors accessible for all.

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