THE SOCIAL IMPACTS OF A NATURE CENTER: PERSPECTIVES OF NATURE CENTER LEADERS AND STAFF

A Thesis

Presented to the Faculty of the Graduate School

of Cornell University

In Partial Fulfillment of the Requirements for the Degree of

Master of Science

by

Mi Yan

December 2022

Abstract

Since the mid-twentieth century, nature centers have offered environmental education programs for surrounding communities. They play a significant role in nonformal and informal environmental education, with audiences from children to seniors. They also generate social impacts on communities. This research used qualitative and quantitative methods to investigate nature centers' social impacts from the perspectives of nature center leaders and staff. Findings showed that leaders and staff recognized three categories of social impacts: impacts on "human," impacts on "human-society," and impacts on "human-nature." The social impact on human includes health, human development, and personal achievement. The social impact on human-society includes sense of community and facilitating community building and solidarity among people of different races, ethnicities, and social-economic backgrounds. The social impacts on human-nature includes connectedness to nature, sense of place, and catalyzing environment stewardship. Among these three categories, nature center leaders and staff prioritized human-nature over human and human-society. This study begins to fill the gap in nature centers' social impact analysis.

Biographical Sketch

I was born and raised in Beijing. I was very interested in science when I was a little kid. The course Nature taught in my elementary school was my favorite. When I was in high school, I was recommended by my high school to join the "future scientist" program funded by Beijing municipal government. With this opportunity, I researched developing environmentally friendly pesticides for Root-knot nematodes from fungi extract in the Institute of Plant Protection at Beijing Academy of Agriculture and Forestry Sciences.

In 2008, I entered Xi'an Jiaotong University for my undergraduate study. My major was material science and engineering. I started to learn what sustainability is from the lens of engineering. My first internship when I was a freshman was in Joint US-China Clean Energy Collaborative. Working with graduate students from Yale and MIT broadened my horizons and intrigued my interest in studying abroad. The advocacy work in this NGO also made me excited. In my second year, I founded a clean energy club at my university. The Copenhagen COP raised a big wave of environmental campaigns around the world. I was also ignited and thrilled and wanted to be part of this global movement. Due to the financial constraints and complex process of going abroad as a college student, I gave up this idea and came up with the plan of China Energy Trip, which organized international students to come to China to learn about China's environment and energy industry. China Energy Trips were very successful. We organized the China Energy Trip four times in four summers and attracted over

110 students from 20 countries from 2010 to 2014. The program also received attention from the EU embassy. A diplomat from EU Delegation to China focusing on energy and sustainable urbanization contacted me and offered me an internship. With this opportunity, I spent six months interning in the embassy and another six months interning EU-China Clean Energy Center at Tsinghua University School of the Environment in 2012. In 2013 summer, I participated in a green business competition and became a top 5 winner, letting me start my social enterprise, Youth Lead.

When running Youth Lead, we organized winter and summer field trips, weekend activities, and workshops on environment and sustainability topics. With my work on environmental education, I was fortunately awarded EU-China NGO Twinning Fellowship and Cornell Alliance for Science Global Leaders Fellowship to study and work in Brussels, Belgium, and Ithaca, the US, for three months, respectively. I was also honored as a youth representative of the Ministry of Ecology and Environment of China and attended several international governmental conferences.

The fellowship at Cornell University led me to the Civic Ecology Lab. I officially became an MS student supervised by Dr. Marianne Krasny in the fall of 2018. As an entrepreneur, I am interested in business and organization studies. Cornell provides so many opportunities for me to explore. In the past four years, I took 50 courses at Cornell with 91 credits, participated in two business competitions and two startup accelerating programs, TAed 3 courses in 6 semesters, and won 3 hackathons and 2

startup grants. I was fortunate to marry another Civic Ecology Lab member, Dr. Yue Li, in 2018, under the witness of Civic Ecology Lab members at Dr. Marianne Krasny's house. We celebrated my daughter Lia's born in 2021.

Acknowledgements

I am indebted to my advisor, Dr. Marianne Krasny, who has supported me in exploring different things and ideas. I would also like to thank Dr. Mark Milstein, my committee member. His Finance and Sustainable Global Enterprise Colloquium class allowed me to know organizations' social impacts. The MBA Impact Investing Network & Training (MIINT) program I participated in gave me a first-hand experience in evaluating the impacts of a business.

I would also like to thank Jen Levy, the executive director of the Association of Nature Center Administrators (ANCA), for helping in my data collection. I feel fortunate to have great support from nature centers across North America. I also want to thank my Civic Ecology Lab members for providing thoughtful comments on my research.

The last but not least, I want to thank my family. My wife, Dr. Yue Li, supports me throughout my non-traditional graduate student life at Cornell. My mom Qin Ge, who has spent over eight months helping take care of my daughter and doing housework during the pandemic, gave me time to focus on my writing. The support and help from my dad and parents-in-law before and during the pandemic makes our living in Ithaca easier. To my daughter Lia, your smile and hug always enlighten my day. Thank you for being a part of my life!

Table of Contents

List of Figures

List of Table

Introduction

A nature center is an organization with an interpretive center or visitor center and an area of undeveloped land in an urban or rural area designed to educate people about nature and the environment (Shomon, 1969). It brings the natural environment to people to experience and to help them develop relationships with the natural world under the guidance of trained professionals (Byrd, 1998). Nature centers are important and common places for people of different ages to connect with nature. In the US, more than 1800 nature centers hold enormous roles to serve as learning and connecting hubs for people with nature and wider society (Browning et al., 2018).

Community members and nature center leaders recognize the importance of nature centers' work. Browning et al. (2017) found community members attributed to nature centers multiple values for the community including leisure provision, civic engagement, community resilience, and environmental connection. In 2014, the Association of Nature Center Administrators (ANCA) commissioned the Blue Ribbon Report, which explores how nature center leaders view the future of nature centers from societal and economic perspectives. Among the twenty nature center leaders interviewed, 75%, highlighted the increasingly important relation between nature centers and local communities. All the interviewees agreed their nature center needed to be a more "relevant part of the dialogue and fabric of the community" and exert bigger impact locally (Revelle, 2015).

The growing field of social impact may provide insight into how nature centers might expand their local impacts. The impact of an organization can be cultural, economic, political, environmental, or social. Here I use the definition given by University of Michigan Ross School Center for Social Impact, which is "A significant, positive change that addresses a pressing social challenge" (Moudgil, 2014). The values that nature centers bring to their community provide evidence of their social impacts. But we still know little about what those impacts are.

Throughout history, social impacts have been considered in different contexts. The genealogy of social impact can be formally traced back to legislation of the National Environmental Policy Act of 1969 (NEPA). However, researchers such as Burdge and Vanclay (1996) have argued that social impacts existed long before NEPA. Examples include the discussion of railroad dieselization (Cottrell, 1951), cultural collapse in Australian aboriginal Yir Yoront group following introduction of steel axes (Sharp, 1952), and international tourism (Forster, 1964). Nevertheless, NEPA-like legislation formalized social impact assessment and spread the thinking around the globe (Esteves et al., 2012). Under NEPA, before a federal agency is allowed to take actions "significantly affecting the quality of the human environment," it must prepare an environmental impact statement (EIS) to demonstrate the action's likely impacts or consequences. Social impact assessment (SIA) as part of normal project planning in an EIS is formalized in terms of legal requirement (Esteves et al., 2012).

Although project approval is still the primary form of SIA, organizations and companies also use SIA to document their social impact as a part of ongoing management tool (Esteves et al., 2012). With the advent of social enterprises, research on social impact expanded. Different from for-profit organizations in their overall mission and aims, social enterprises aim to creating social value for a broader community, not exclusively towards financial and economic value. Social impact also becomes important when measuring the impacts of non-governmental organizations (NGOs), social ventures, and social programs as more and more funders want to demonstrate the effectiveness of their funding. But social impact is very difficult to measure because it requires "the consideration of a variety of purposes and results" (Maas & Liket, 2011). Moreover, social organizations are diverse and serve in different sectors, spanning financial, health, education, and social services (Arena et al., 2015). It is urgent to develop methods and tools to measure social impact to help actors achieve a bigger impact.

Organizations with social impact differ in form, size, geographic scope, sector, degree of formality, stakeholders, rationale for operation, and so on. It is difficult to design a standardized accountability system. To understand the social impact of a specific sector, research on this sector is needed.

In this study I address the gap in the literature on social impact of nature centers. My specific research question is: What social impacts do nature center directors and staff think that a nature center should have?

The purpose of this research is to understand the perspectives of nature center directors and staff on the social impact of their nature centers, which helps us understand their goals for achieving social impact. The results of this research can be used to develop social impact measurement metrics to evaluate nature centers.

Literature Review

Below I review literature on nature centers, social impacts, outcomes, impacts, roles, and values of nature centers, and impact of non-formal education facilities.

Nature Centers

The nature center movement in the US began obscurely after World War II concurrently with the environment movement. It has roots in the 1930s conservation education and 1950s outdoor education movements. Conservation education aimed to awaken Americans to the significance of conserving various natural resources. Churches and agencies sponsored camps to promote people's understanding of nature (Athman & Monroe, 2001). Outdoor education gave youth, especially urban youth, opportunities for direct contact with the natural environment outside the school building (Athman & Monroe, 2001).

In 1962, *Silent Spring*, written by Rachel Carson, dramatically warned of the long-term dangers of pesticide use. People started to pay attention to environmental degradation and ecological relationships within nature. The public concerns with the rapid disappearance of open land in and around urban areas and the increase of all forms of pollution drove the need for access to nature and environmental protection. The 1960s witnessed the resurgence of older environmental organizations and the birth of new ones and set the stage for environmental education.

In 1961, the National Audubon Society launched the Nature Center Planning Division to simulate interest in community nature centers. It helped over 100 different communities in more than 25 states plan nature centers in less than a decade after the launch (Shomon, 1969). It also published articles and books to introduce the steps of nature center establishment and directories of nature centers across North America. The first directory published in 1967 included 356 nature centers and related environmental education facilities in the US and Canada. The number jumped to 459 in 1971 in the second directory (National Audubon Society, Nature Center Planning Division, 1971). One motivation behind this growth of nature centers was the passage of the Environmental Education Act in 1970. This act paved the way for the beginning of environmental education programs in public schools and communities. It stated:

> It is the purpose of this Act… to provide for the planning of outdoor ecological study centers; to provide for community education programs on preserving and enhancing environmental quality and maintaining ecological balance (Environmental Education Act, 1970).

In Stockholm, Sweden, 1972, the United Nations Conference on Human Environment suggested the formation of environmental education programs across the globe. The Belgrade Charter was adopted at this conference, setting a widely accepted goal statement for environmental education (Adkins, 2002). The first intergovernmental

conference on environmental education was held in 1977 in Tbilisi. Built on the Belgrade Charter, the official statement on environmental education –- the Tbilisi Declaration -- proclaimed “the important role of environmental education in the preservation and improvement of the world’s environment, as well as in the sound and balanced development of the world’s communities” (Engleson & Yockers, 1994)

The US 1990 National Environmental Education Act reaffirmed the purpose of the 1970 act. Although it focused on schools as the place for effective environmental education, the act recognized the importance of non-formal settings for educating different audiences (Athman & Monroe, 2001). The establishment of environmental education domestically and internationally laid a solid foundation for the development of nature centers. By 2016, in the US, more than 1800 nature centers had been serving as hubs to connect people with nature and wider society (Browning et al., 2018)

A nature center is an area of undeveloped land in an urban or rural area with the facilities and services to conduct community outdoor programs in natural sciences, nature appreciation, and conservation education (Shomon, 1969). Byron Ashbaugh from the Nature Centers Division of the National Audubon Society stressed the three basic elements of a nature center: land, buildings and educational facilities, and environmental education programs based on the land (Ashbaugh, 1963).

The ownership of the nature center’s land, whether private individual, organization, or government agency, determines the type of nature center. The Nature Centers

Division of the National Audubon Society categorized nature centers into three types. Type 1: privately financed, owned, and operated nature center. Type 2: quasi-public center partially government tax supported but privately owned and operated. Type 3: government-owned and operated nature center (Ashbaugh, 1963). In addition to land, a nature center usually has buildings, educational facilities and natural resources spanning from demonstration and nature trails to ponds and farms, which are used to help explain nature concepts (National Park Service & Facilities Labs Inc., 1972).

Environmental education programs are the major product of nature centers. It is what the community or visitor is "buying". Disinger & Monroe (1994) state "the goal of environmental education is to instill in learners' knowledge about the environment, positive attitudes toward the environment, competency in citizen action skills, and a sense of empowerment". Effective environmental education programs that fulfill this goal are "relevant to the mission of the agency or organization, to the educational objectives of the audience, and to the everyday lives of the individual learners" (Athman & Monroe, 2001). A nature center usually provides school and community programs, serving a broad audience from pre-school children to senior citizens. The environmental education programs should be developed according to the audience and the learning objectives. The "Guidelines for Excellence: Environmental Education Program Development," published by the North American Association for Environmental Education (NAAEE) in 2022, pointed out six key characteristics of high-quality environmental education programs: Gather information and assess

priorities and resources; design instruction; design program structure and delivery; develop an evaluation plan; deliver program; and implement evaluation plan, analyze, adapt and share (Simmons et al., 2022). The goal of quality environmental education programs is to "help develop an environmentally literate citizenry that can compete in our global economy; has the skills, knowledge, and inclinations to make well-informed choices; and exercises the rights and responsibilities of members of a community." (Simmons, n.d.)

Social Impact

The term "social impact" has multiple definitions. Variations can be found in different academic fields such as social sciences, accounting, and management (Maas & Liket, 2011).

In the international development and evaluation literature, researchers often use social impact to refer to "significant or lasting changes in people's lives, brought about by a given action or series of actions" (Ebrahim & Rangan, 2014). Others use social impact to refer to the net effect of an activity on individuals or communities (Clark et al., 2004). The difference between outcomes and impacts is in the scope of changes. Outcomes mean lasting changes in the individuals' lives, whereas impacts are lasting results at a community or societal level (Ebrahim & Rangan, 2014).

Assessing social impact can demonstrate that the organization's work is essential to the community (in particular, demonstrating impact to stakeholders). It can also enable organizations to learn what is valuable about their programs and how to streamline them. Organizations need to know where best to allocate limited resources to maximize the good that they can do, and they need to incorporate information on impacts into management decisions (Bagnoli & Megali, 2011; Ebrahim, 2010). Social impact assessment (SIA) refers to "assessing (as in measuring or summarizing) a broad range of impacts that are likely to be experienced by an equally broad range of social groups as a result of some course of action" (Freudenburg, 1986). SIA emerged during the 1970s as a response to NEPA. But at first, it was only a part of an environmental impact statement, or EIS. Under NEPA, before a federal agency is allowed to take actions "significantly affecting the quality of the human environment," it must prepare "a balanced, interdisciplinary, and publicly available assessment of the action's likely impacts or consequences" (Freudenburg, 1986). Freudenburg (1986) summarized how social impacts were included in this law:

> "Section 101 of NEPA notes that the purpose of the act is not only to maintain environmental quality but also to 'fulfill the social, economic, and other requirements' of US citizens. Section 102(2)(A) of the act requires federal agencies to make 'integrated use of the natural *and social* sciences… in decision-making which may have an impact on man's environment' (emphasis added). Section 102(2)(C) requires that EISs -- including 'integrated use' of the social

sciences -- be prepared for all ‘major federal actions significantly affecting the quality of the human environment.”

The first case presenting the social impact issue envisioned in the US Council on Environmental Quality’s regulations occurred in May 1985, more than 15 years after the Act was passed. In the case, Northern Cheyenne Tribe v. Hodel, No. CV 82-116-BLG (D. Mont. May 28, 1985), the EIS prepared by the Department of the Interior did not include the discussion of the federal coal lease sale’s likely social, cultural, or economic impacts on the affected area, Northern Cheyenne Tribal lands in the Northern Powder River Basin of Wyoming and Montana. The Northern Cheyenne won the suit to have the EIS overturned. Judge James F. Batten revoked the EIS, in a strongly worded decision, voided the sale of over 350 million tons of federal coal with a market value of over $4 billion, and reproached the Department of Interior for failing to turn its “ostensible concern” with socioeconomic impacts into “any meaningful analysis of the extent of such impacts on certain groups of residents within the affected area, particularly the Northern Cheyenne Tribe” (Freudenburg & Keating, 1985).

In addition to the US, SIA is widely used internationally in the regulatory approval process for resource extraction and infrastructure projects. In Queensland, Australia, a social impact management plan must be submitted as part of an EIS for resource projects. South Africa has required social and labor plans for mining projects since

2004. A similar system is used in the Philippines for mining projects (Esteves et al., 2012).

While project approvals are still the uppermost form of SIA, the drivers and focus for SIA changed when organizations and companies started to use ongoing processes – assessment, management, and monitoring – to improve the identification of the social impacts (Esteves et al., 2012). This view of SIA recognizes the significance of social issues as drivers of business risks when community relations and stakeholder-related risks become essentail factors in determining the projects' success, timeliness, and cost (Ruggie, 2011). Esteves et al. (2012) summarized the business benefits of improved process for assessing and managing social impacts:

> 1. greater certainty for project investments and increased chance of project success; 2. avoidance and reduction of social and environmental risks and conflicts faced by industry and communities; 3. improved ability to identify issues early on, and therefore to reduce costs and to incorporate unavoidable costs into feasibility assessments and project planning; 4. improved planning for social and physical infrastructure; 5. a process to inform and involve internal and external stakeholders and to assist in building trust and mutually beneficial futures; 6. improved quality of life for employees and improved attraction and retention of skilled workers; 7. a positive legacy beyond the life of the project; 8. increased competitive advantage through enhanced social performance and corporate reputation.

In addition to its application in EIS in infrastructure and resource extraction projects, social impact has become a powerful mantra in philanthropy, nonprofit organizations, and social enterprise. Since the 1990s, funders, taxpayers, and concerned citizens have demanded that nonprofit organizations be more transparent about their financials and management, how they raise and spend money, and what they have achieved with the resources entrusted to them (Ebrahim & Rangan, 2014). By accessing the impact, funders can know if their funding is making a difference or may be better spent elsewhere.

Measuring the social impact of an organization is not easy for several reasons. First, what is to be measured? An organization can have impacts in different dimensions. An environmental organization's social impact on the local community from their environmental education programs can be increasing the social capital of the community or promoting their pro-environment actions. Different stakeholders also may have different opinions on social impact measurement. The impact also varies depending on the organization's purpose. An animal shelter's social impact can be totally different than that of a cancer support group. Second, how to measure? The qualitative nature of social impact makes it hard to measure and quantify. Attaching an objective value to the impact and to sum the various qualitative expressions of impact is also difficult (Maas & Liket, 2011). Some standardized metrics are criticized for their intent to attribute financial value to items that cannot be expressed

in terms of money and the subjectivity that requires the participation of stakeholders in the impact evaluation process (Arena et al., 2015). Third, what is the purpose of measurement? The measurement standards can vary depending on the purpose of measurement. For example, measuring an individual program of an NGO to see if its impact is bigger compared with last year for internal analysis may be different from measuring the overall organization for fundraising.

Since the 1990s, many methods have been developed to measure social impact, but none solves the question of finding the most appropriate measurement or set of measurements (Table 1). Some methods were developed for nonprofit or governmental organizations, for example SROI (Social Return on Investment), OASIS (Ongoing Assessment of Social Impacts), SCBA (Social Costs-Benefit Analysis); and some were designed and used by for-profit corporations, for example, SRA (Social Return Assessment), ACAFI (AtKisson Compass Assessment for Investors) and BACO (Best Available Charitable Option). There is a need for a wide range of methods to measure social impacts tailored to the requirements of different types of organizations based on their objectives, activities, the aspects of impacts they want to measure, and the needs of various stakeholders (Maas & Liket, 2011). It is unrealistic to develop a “gold standard” to capture the social impact of all organizations universally.

Table 1. Some Social Impact Measurement Methods

Method	Primary Application	
	For Profit	Non-profit
Social return on Investment (SROI)		√
Ongoing Assessment of Social Impacts (OASIS)		√
Social Costs-Benefit Analysis (SCBA)		√
Social return Assessment (SRA)	√	
AtKisson Compass Assessment for Investors (ACAFI)	√	
Best Available Charitable Option (BACO)	√	

Outcomes, impacts, roles, and values of nature centers

Although we are not aware of other studies on nature center leaders' and staff's perspectives on social impacts of nature centers, related bodies of literature on outcomes, roles, and values of nature centers offer insight. These terms are interlinked and sometimes interchangeable in certain settings. However, the differences and nuances of these terms are rarely discussed and possibly poorly understood by researchers and practitioners.

Outcome refers to the consequence, visible or practical result, or effect of an event or activity (Poll, 2003). Outcomes are "the short-term and intermediate changes that occur in learners, program participants, visitors, etc. as a direct result of the environmental education (EE) activity, program, or experience" (Zint, n.d.). The

outcomes of nature centers' environmental education programs can include: increased knowledge, more positive environmental attitudes and behavior, and improved academic motivation and performance (Ardoin et al., 2018). In comparison, impacts are "the broader changes that occur within the community, organization, society, or environment as a result of program outcomes" (Zint, n.d.) .

In sociology, role means "a position containing a set of socially defined attributes and expectations that determine appropriate behavior for an individual or group based on their status in relation to other people or groups (Bell, 2013)." Price (2010) conducted a case study at Ijams Nature Center (INC) about the nature center stakeholders' perspectives on nature and both the stakeholders' and visitors' perceptions on bioeconomics and biophilia. She also interviewed 8 directors of exemplar nature centers besides INC and revealed their perceptions of the roles of their nature centers in three categories: education, advocacy, and immediacy (Table 2).

Table 2. NC Directors' Perceptions of the Role of Nature Centers

Education Category—Representative Comments

Explore, discover, learn
Come as a child and repeat that visit
Leader in environmental education and nature education
Resource for experience and information
Teaching kids about nature

Advocacy Category—Representative Comments

Reduce human impact on the land by preserving the land
Leads people to understand their connection to nature
Reconnect with nature
Involved in community planning–planning for green spaces
Allows for nature not to be taken for granted
Resource for information about environmental issues
Networking and partnership necessary to get kids out of doors and environmental education
Caring for the property about which the center is organized

Immediacy Category—Representative Comments

Place for urban and suburban dwellers to literally get out into nature
Enjoy nature and feel safe
Presence and knowledge of staff
Reassures visitors and answers questions about natural space
Connection to city or state park offers complimentary activities
Enhance overall benefit of the park
Place providing nature venue to get physically fit

Note. From Price, C. J. (2010). Bioeconomic and Biophilic Intersect in Nature Centers-A Case Study of One Nature Center.

Revelle (2015) conducted an ANCA Blue Ribbon study about nature center leaders' views on societal and economic future of nature centers in the US over the next 25 years, the results of which reflected the role of nature centers. The study showed:

> The leaders in the profession emphasized that nature centers must continue to be relevant in an increasingly nature disconnected society. They also foresee

> changes to fundraising, an evolution of programming, increasing professionalism, and a strengthening of nature center properties.

Among the five themes in this quote, executive directors saw building upon "relevancy" with the natural world and with communities as the primary role of nature centers, to keep pace with merging environmental issues and to serve, engage and be part of the local community. They were aware of tremendous changes emerging in the environment and the need to position their centers to act by emphasizing conservation and restoration ethics and actions. Nature center directors were also clear that over the next 25 years, they must continue to build their relevancy in their communities by more creatively communicating and promoting their value to diverse audiences. "The leaders in the profession will be seeking the input of multi-cultural audiences to help shape their centers in the future" (Revelle, 2015). Under this theme, the leaders also mentioned expecting to use more technology and face more climate change challenges. The attitudes on "whether nature centers should go beyond education to become advocates" were various depending on how the organization perceived themselves (Revelle, 2015).

Value means the importance of something, the perception of actual or potential benefit (Poll, 2003). A discussion of value has to start with the question "of value to whom" (Jacobsen, 2016). A nature center cannot set its own value, but it can measure indicators of its value to its audiences, supporters, and community. Browning et al.

(2017) studied the values that community members hold toward local nature centers. They conducted survey research in the communities around 16 centers in the US and identified 4 distinct value sets: environmental connection, leisure provision, community resilience, and civic engagement (Table 3).

Table 3. Values that community members hold toward local nature centers

Values	Content
Environmental Connection	Promoting environmental awareness and behaviors, protecting wildlife habitats and natural areas with ecosystem services, and providing places to learn
Leisure Provision	Physical exercise, safe outdoor recreation, retreat, restoration, and relaxation
Community Resilience	Beautifying the local community, contributing to the local economy, and developing a sense of pride in the local community
Civic Engagement	Bringing together people from different races and ethnicities and linking people to political action

Note. The information is from Browning, M. H., Stern, M. J., Ardoin, N. M., Heimlich, J. E., Petty, R., & Charles, C. (2017). Investigating the sets of values that community members hold toward local nature centers. *Environmental education research*, *23*(9), 1291-1306.

The results showed their survey respondents believed it was important for nature centers to provide all the services falling into the four value categories. Among the four, environmental connection was the rated the most important.

Impact of non-formal education facilities

Literature on other non-formal education settings provides additional information on the potential impact of nature centers. In the book *Measuring Museum Impact and*

Performance: Theory and Practice, Jacobsen (2016) provided both the theoretical groundwork and the practical pragmatics of measuring museums' intentional impact and performance. The White Oak Institute that he was leading developed an aggregated database (MIIP 1.0) with 1,025 museum indicators of impact and performance drawn from 51 expert sources. From the 1,025 indicators, they identified 14 categories of potential museum impacts (Table 4).

Table 4. Categories of potential museum impacts

		# of MIIP indicators
Public Impacts		
A	Broadening participation	85
B	Preserving heritage	47
C	Strengthening social capital	76
D	Enhancing public knowledge	43
E	Serving education	56
F	Advancing social change	40
G	Communicating public identity & image	27
Private Impacts		
H	Contributing to the economy	85
I	Delivering corporate community services	9
Personal Impacts		
J	Enabling personal growth	147
K	Offering personal respite	4
L	Welcoming personal leisure	11
Institutional Impacts		
M	Helping museum operations	308
N	Building museum capital	87
Total indicators in the MIIP 1.0 database		1,025

Note. From Jacobsen, J. W. (2016). Measuring museum impact and performance: theory and practice. Rowman & Littlefield.

Jacobsen's book provides a comprehensive and useful framework adaptable by any museum, including nature centers according to their definition of museum. The

database of indicators can be used for evaluating and enhancing the impact and performance of museums when managers know and select the right impact measures.

Methods

To understand the perspectives of nature center directors and staff on social impact, I conducted semi-structured interviews with the leaders of nature centers in the US and Canada. Based on the result from the interviews, I developed a survey to collect the opinions of nature center leaders who are members of the Association of Nature Center Administrators (ANCA).

The study used exploratory sequential mixed methods. Mixed methods research involves qualitative and quantitative data collection and analysis approaches within the same study (Creswell & Creswell, 2017). An exploratory sequential design is a mixed methods study design, where the quantitative phase of data collection and analysis is after the qualitative phase of data collection and analysis (Fetters et al., 2013). In my study, I first collected data from open-ended interviews, analyzed the results, and developed and administered a survey to a sample population, a professional group of nature center directors in North America. Figure 1 illustrates how the different phases of the exploratory sequential design were carried out.

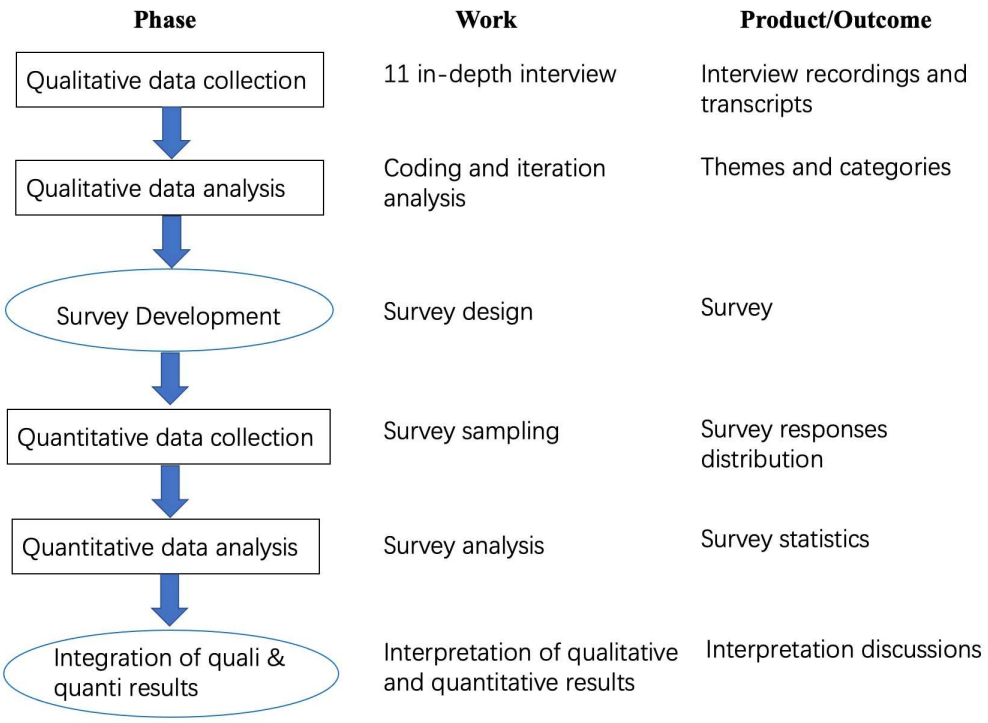

Figure 1. Exploratory Sequential Design

Data collection procedures

Qualitative data

Due to the difficulties of observing the social impacts of nature centers and lacking relevant documents, I used qualitative interviews of nature center directors and staff to understand their perspectives on nature centers' social impacts. The open-ended questions used in the qualitative interviews provide an opportunity for respondents to share their points of view. Conducting interviews before designing the survey helps identify timely and interesting observations, hypotheses, and possible hidden connections that researchers can quantify in surveys (Whorton, 2016).

I used convenience sampling to identify interviewees by posting interviewee recruiting information on ANCA's Google group. By this technique, the researcher may prove to be effective during the exploration stage of the research. It is also efficient when conducting pilot data collection to identify and address shortcomings associated with questionnaire design (Dudovskiy, 2021). In this research, I identified 11 nature centers that are members of ANCA in the US and Canada (Table 5).

Table 5. Information about interviewees

Pseudonym	Professional Title	Organization Type
Mary	Executive Director	Suburban nature center and wildlife hospital, NGO
Jack	President	Suburban arboretum & nature center, NGO
Lia	Executive Director	Urban nature center, NGO
Ami	Recreational Supervisor	Urban Governmental nature center
Amanda	Director	Urban Governmental nature center
Jane	Manager	Suburban Governmental nature center
Vivian	Superintendent	Urban Governmental nature center
Camille	Education Director	Suburban nature center, NGO
Barbara	Senior Director of Education and strategic planning	Urban nature center, NGO
George	CEO	Suburban nature center & conservation area, NGO
Paula	Office Manager	Suburban nature center, NGO

The interview guideline was built on Swidler's Professional Interview Guide (Swidler, 2013). I prepared 15 main questions in three categories: Organization, Programs and Social Impact. All 15 questions were asked during the 45-minute interview but not in a continuous order. Several probes were used during the interviews. The interviews were conducted via ZOOM in spring 2020 during the rapid spread of COVID-19.

The interviews followed the tree-and-branch model, where the trunk is the core topic, and the branches are the main questions. The interview questions are designed to explore each branch with more or less the same degree of depth (Rubin & Rubin, 2011). The interviewer follows up on the answers to each main question looking for depth and detail. The goal is to learn about the individual branches but still obtain depth and detail (Rubin & Rubin, 2011). The interview questions are listed in Appendix 1.

I used qualitative data analysis procedures to process the data. I used ZOOM to automatically transcribe the record of the interviews to text. Then, I used Word to carefully read the interview transcripts and entered initial codes and reflections that emerged from the interview text (Charmaz & Belgrave, 2012). When the transcription was unclear, I went back to watch the recorded interview videos to correct the text. This close reading combined with the verbatim transcription proofread against the recordings enhanced the descriptive validity of the research (Maxwell, 2012).

I used iteration analysis. Starting from the full set of codes, I reorganized the codes into a selected list of categories, and then condensed the codes further into the study's central themes or concepts (Saldaña, 2021). Eight sub-categories emerged when I generated initial codes and grouped them under different categories. I used either interviewees' language or my understanding to summarize the content and generate the sub-categories. I then condensed the sub-categories into 3 main categories. In the second phase of coding (Saldaña, 2021), I used NVivo to recode the interviews based on the initial codes to verify my groupings of categories, codes and quotations.

To enhance credibility and trustworthiness, I viewed the nature center websites of interviewees to understand the programs they organized and the audience and communities they served. This exercise enabled me to better understand their organizations and interpret their answers and comments more reliably.

Quantitative data

My quantitative research is based on the previous qualitative research with the goal to better understand perspectives of nature center leaders and staff and verify my findings from the qualitative research. The quotes, codes and themes in the qualitative data analysis were used in the development of the survey. The questionnaire is in computer-assisted, self-administered style. The respondents answered the questions

by themselves with computers or other digital devices. The survey is designed on Qualtrics, and it includes Likert-scale, checkbox, and open-ended questions.

I distributed the surveys using a convenience sampling technique. I sent the survey link to ANCA's Google group which had 1059 individual members from nature centers in the US and Canada. In addition to the Google group, I also sent the survey to the participant list of the 2020 ANCA Virtual Summit with 147 participants. To increase the number of responses, I sent five reminders in the Google group spaced 1 week apart. The ANCA executive director also helped me repost my survey twice in the group and encouraged members to fill in the survey. For the non-respondents from the virtual summit, I followed up with individual emails twice spaced 1 week apart.

The survey included four parts: (1) background information about nature center including location and visitor demographics, (2) respondents' ideas on nature center's social impacts in an ideal situation, (3) actual social impacts of respondent's nature center, and (4). COVID pandemic's influence on nature centers. Part 4 of the survey was initiated by ANCA but because it is not related to my research goals, I did not include the results in this study.

Likert-scale questions were designed to understand: 1. how much do respondents agree or disagree with the findings on social impacts from the qualitative research; 2. how important respondents think particular social impacts are for their organizations;

and 3. how much do respondents agree or disagree with a statement about nature centers during the COVID-19 pandemic. I used a five-point Likert scale from not at all important to extremely important for items about nature center social impacts derived from the literature and my interviews, and from none to a great deal for items about the impacts that respondents' nature center actually had, and from strongly disagree to strongly agree for items about the COVID-19 pandemic. The survey questions are included in Appendix II.

I received 81 completed surveys, of which 80 were valid. Among them, 36 were from the ANCA 2020 Virtual Summit list and 44 from the Google group. The response rate of ANCA 2020 Virtual Summit participants was 24%. Respondents were from 70 different nature centers in 28 states in the US and one province in Canada (Figure 2).

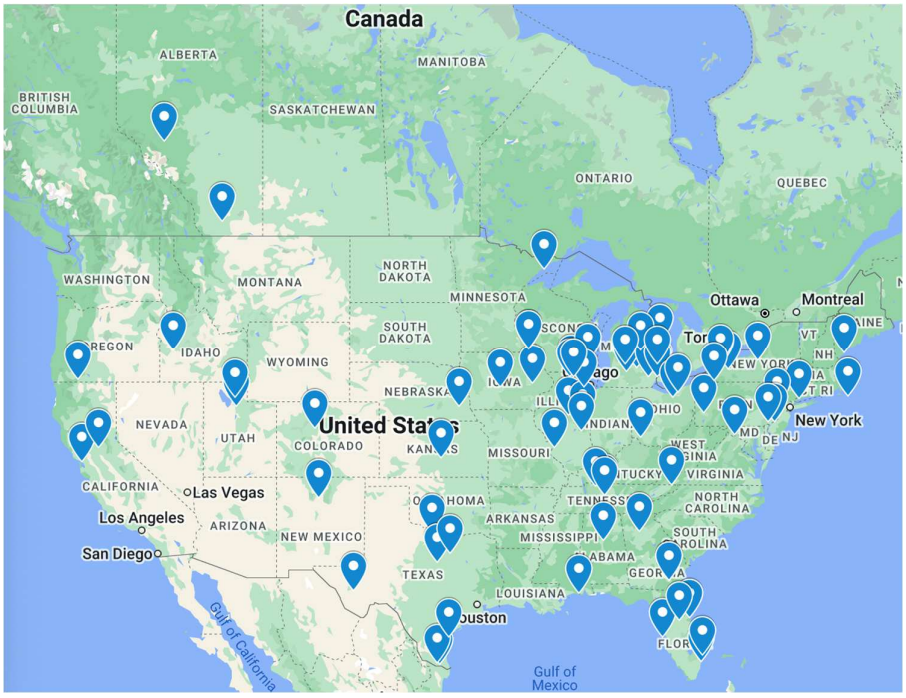

Figure 2. Distribution of nature centers which filled in the survey

The respondents include 40 nature center leaders. They were directors, executive directors, CEOs, or board members, accounting for 50% of the sample. Fourteen respondents (17.5%) were department directors, such as the education director, learning experience director, and network development and strategy director. Twenty-two respondents (27.5%) were managers, such as preserve managers, project managers, program coordinators, and grants managers. Four were educators (5%). Seventeen respondents were from nature centers in large urban areas, 24 from centers in small towns or small cities, 15 from suburbs, and 24 are from nature centers in rural or agricultural areas.

The integration of interview and survey data enhances the validity of the study. On the one hand, the survey can confirm my findings from the interviews. On the other hand, I reached out to more people from nature centers and understood their perspectives from the survey. A larger sample size also enhances the validity.

Findings

Based on the qualitative research, I developed a list of nature centers' social impact in the view of nature center leaders and staff. Interviewees spoke about three major social impacts: impacts on human, impacts on human-society, and impacts on human-nature, each of which included several sub-categories (Table 6). Survey results from nature center leaders and staff suggested that all these impacts are important, but human-nature was more important than human-society and human. The respondents rated their nature centers as having more social impact on human-nature than human, which in turn ranked higher than human-society.

Table 6. Nature centers' social impacts according to nature center leaders and staff

Social Impact Categories	Contents
Human	Health (physical health & mental health)
	Human development and personal achievement (knowledge and skills, experience, career inspirations)
Human-society	Sense of community
	Facilitate community building and solidarity among people of different races, ethnicities, and social-economic background
Human-nature	Nature connectedness
	Sense of place
	Environment stewardship

Human

Nature center leaders discussed the importance of both physical and mental health benefits. Visiting nature centers itself is a healthy activity because people can take a

walk and breath fresh air. The nature experience can also reduce the stress. George, a suburban nature center executive director said:

> One of the reasons why we are we have tripled the number of visitors we usually have (during the pandemic) is people just want to get outside. It's safe. They can breathe clean air and have a good feeling about themselves, I think that helps save people's mental health by having that opportunity.

The value of nature centers on reducing visitors' stress became essential during the pandemic. Vivian, who is a recreational supervisor at a government nature center, stated:

> (We provide our community) the sense of peace in a time when there's not much peace and people filled with anxiety and stress and also a place where folks can feel safe and can come and have a positive memorable experience, whether that's with their family or their partner or just individually. When there're very few options for that, I think during this pandemic that's been the main impact of the [name of the nature center] on the community is just being that resource and that place that they can go to escape, a place of refuge for visitors.

The green space of nature centers provides a comfortable environment for visitors to enjoy, bringing physical and mental benefits. Pam, an office manager at a suburban nature center, said:

> We're in the urban neighborhoods, so we get a lot of people that just walk through the park. Because we have many trees compared to other parts, it's cooler in here in the summer because we have a lot more shade, and people notice that a distinct temperature difference when the city gets pretty hot, so people enjoy that.

As an important part of environmental education, nature centers actively engage with non-formal and informal education. They work with local school districts to provide

classes for schools to enrich students' hands-on experience and support the schools' curricula. The nature centers' various programs accommodate the needs of students of different ages. Ami, a recreational supervisor of an urban governmental nature center said:

> We offer nature preschool, for example, there's nowhere else within like a 20-mile radius even probably more than that offers any kind of nature preschool experience for their little ones. So, our programs fill up immediately because of that. We're definitely meeting that demand having that impact on our youngest community members. And I hope that, as they grow up and go through different phases in life that we have something for them during each phase, that nature is important to them, and they want to continue to protect the natural world and care about it. We're really starting from a very early age and trying to be there for them throughout every phase of life.

The programs offered by nature centers during the pandemic when most indoor activities were shut down were spoken of highly by parents. Camille, the education director of a suburban nature center, said:

> The other thing that's happening is that the parents of the kids coming to the after-school programs are so grateful that we're giving the kids something to do because these kids have nothing to do but sit inside when everything's been canceled. We've given their kids an opportunity to get outside and experience real-life during the pandemic and feel like everything's a little more normal. So we've gotten a lot of gratitude from families as well.

Participating in nature center activities, especially the school programs, help the students to gain knowledge and skills, gain experience, and achieve career inspiration. Barbara, a senior director of education and strategic planning of an urban nature center, commented on their school program.

> We align our course offerings with the Next Generation Science Standards with the what's happening in the schools. We also have two programs. One is called naturalist choice. This is like we (the teachers) just need to get (students) outside, get some fresh air and whatever do you (nature center) want to teach us. You'll teach us right and it's science based. We also align with a literacy standard because we do a fair amount of writing and journaling during our programs, we aligned with both of those. The other one is to create a program…We align our curriculum. We give them [the curricula] out to the teachers. (If) our curriculum isn't lining up with where you are right now in the school year, (we) will do something that does lineup… So we go we pick up the kids whenever the teachers tell us they're ready, which is important because we want to maximize amount of time outside…

Nature centers can also act as venues to host educational programs alone or with other organizations. Jack, the CEO of a suburban nature center, introduced their programs with community partners. Some of these programs either are career oriented or will inspire participants' future careers.

> We had one group of kids, in their 20s. This group of kids is going through a green job training program. So they're actually learning how to retrofit buildings with installation and add solar panels, all kinds of cool new infrastructure stuff and they're all from tough backgrounds, several of them are have been in prison…We had a state graphic design program and they were out on the property, learning how to make pigments out of different plants and natural elements.

Lia, a president of an association with three nature centers in different locations in her state, said:

> Part of the renewed program involves trail ambassadors. Trail ambassadors is a youth development and career development program that includes environmental and nature education, engaging high school students from our county in learning about the habitats and parks and trails in their own community… That program will continue. It's been really successful in its pilot year and will double in size next year, so it's an employment program as well as a training program. And next year will involve eight high school youth.

Various topics and skills can be incorporated into nature centers' programs, which are beneficial for human development and personal achievement. Paula, a manager of a suburban nature center, stated how they include personal improvement with their organization's mission.

> Our mission is to instill lifelong curiosity and respect for nature through education, and then we have a bunch of subsidiary goals for that and they're like teaching critical thinking, creativity, collaboration to try and make it lifelong. Try to reach everybody.

Human-society

As an organization serving local communities, nature centers connect people with their local nature as well as the neighborhood, thus enhancing people's sense of community. They create opportunities for community members to enjoy, explore and understand nature as well as contribute to improving the environment.

Ami, a recreational supervisor of a government-run urban nature center, described the nature center as "a community gathering place so a place where you can bring the community together and give them a positive memorable experience".

Camille, a director of education at a nature center, shared her experience of bringing a sense of community to their volunteers:

> I think the biggest impact is that we're now using as many volunteers, as we usually involve and most of those volunteers were seniors and very, very dedicated to working at the Nature Center…For a lot of those people, we were

> their main source of community…I feel that in some ways the Zoom Master Naturalist program on Zoom is actually building social community better than I thought it would and I think that these folks are actually bonding pretty well online. My next step is to see if they want to get involved with any sort of community action if they want to start doing environmental issues investigations, for instance, or getting together in special interest groups to talk about how they might impact their communities. So I'm trying to empower environmental leadership from these people who have started to bond online together.

George, a director of a nature center in a suburb of a Canadian city, said their organization can also help new immigrants gain the sense of belonging to the country since outdoor activities are a big part of Canadian culture.

> We have a lot of people that come from other countries, they're new arrivals to Canada and they're afraid of the outdoors are afraid that they'll walk outside, and a bear will get them. It's new to them. They're typically from an urban setting they come from, whether it's from North Africa or Asia or Eastern Europe… And one of the reasons why we are we have tripled the number of visitors we usually have is people just want to get outside. It's safe, …People you know, thank us for making the opportunity for them to come out and have an outdoor experience so that's a that's a big part of it.

Some nature centers also have the function of forging solidarity of people of different races/ethnicities and social-economic status. They serve as a platform to bring different people with diverse background together to increase interaction and mutual understanding and support. Barbara, a senior director of education and strategic planning of an urban nature center, said:

> We are on the edge of a primarily white neighborhood and a primarily black neighborhood. So, it's been a really interesting place during this social unrest for people to come together. We've had vigils with related to people who have particularly black people who've been killed. In our park and we've been able to participate in that and support that. And then the first one (nature center) that we open is probably a little bit more on the white side but there's also a university. So, we will have more kind of international things happening there and then we have a wide variety of income levels coming through our doors.

> So, it's interesting from the perspective of working in a segregated city and what brings people together you know and nature. Nature has the capacity.

Jack, a nature center CEO, described how inclusion and diversity are part of their organizational strategy.

> We had a good line in our strategic plan. We call it the unity and diversity of life. Diverse but together. I think that's important. I also think you know that we're going through this racial reconciling and dialogue as a nation right now and that I'm sure will have reverberations around the world. And I really think this this racial reconciliation work that we do which we started before George Floyd and Breonna Taylor and all of this came up, we were doing this work already. And I think it's kind of interesting because it's not a nature center thing, but I think nature should be a safe space and a something that's for everyone. And so, we were really clear in the beginning. When we went into our last strategic planning cycle, and we have it written in there that we're going to benchmark diversity and understand who's using the property and who's not and really focus in on trying to make that more equitable and inclusive. So, I think that's a big deal.

Equity issues related to providing access to green spaces and nature center programs for different races/ethnicities and social economic status were also emphasized by nature center leaders. Vivian, a superintendent of a government-run urban nature center, said:

> Some impacts of helping marginalized communities to make those connections (with green spaces in their community) are really valuable. Sometimes we assume that people from different cultures may value nature differently and but being in a place where everybody feels like they can come and make those connections and simply just enjoy being outdoors I think is really important.

Paula, an office manager at a suburban nature center, said they are trying to provide quality programs to underserved neighborhoods which lack funding for students to visit the nature center:

> The other way we try to measure things is how many Title 1 schools in underprivileged and underserved neighborhoods we actually outreach to or have them come here. That's a very big important one. We want to make sure that we're not serving just the neighborhood but that we're able to touch and make contact with underserved neighborhoods. And again, I'm trying to figure out a way to do that because the biggest hurdle in doing that is transportation. Those schools have no way to get here for they can't afford the bus.

Human-nature

Improving visitors' environmental literacy and encouraging pro-environmental actions are among the most important goals of environmental education programs. The interviews showed nature centers aim to promote the relationship between humans and nature, more specifically related to nature connectedness, sense of place and environment stewardship.

Nature connectedness is a feeling of being connected and belonging to the natural community (Mayer & Frantz, 2004). Building connection between humans and nature is the mission of most of the organizations interviewed. We can see the directors regard this important in considering their social impact.

> I think it [nature center name] is about helping people connect to nature and learn about the environment, get outside. (Barbara)

> I think we do a good job of reconnecting. We use that word reconnect because I think most people around here at least used to spend time outside and maybe did as a kid, you know, explored in the backyard. People just tend to forget about nature. In my neighborhood, a lot of times they're driving into a garage and getting out into their homes, and they may not actually spend more than a couple minutes a day outside. And so, primarily our success metric is if we

> can get people to get interested in nature and spend a little more time outside. That's a big part of what we do. (Jack)

> Nature centers are a place where people can go and connect and there are places where people who can take those first steps towards other sorts of outdoor recreation.（Vivian）

This nature connectedness became essential during the pandemic when most indoor places were closed. The connectedness to nature leads the connectedness to the community and place. The connectedness to the community is a part of sense of community which is a sub-category of human-society.

Ami emphasized the impact of nature centers in building nature connectedness.

> I think that the nature center is a place, especially during this pandemic, for not just students from hybrid learning or remote learning, but folks in general, at any age any background, to really feel that connectedness. That's what really prided ourselves on that we are providing a space to be connected whether that's to nature or each other and a space to find peace, you know space to be at peace with what's around you.

Nature center activities can help visitors to gain knowledge and experience the local environment, wildlife, geology, history and even culture as benefits of human described in the first category of social impact. These exposures can strengthen the participants' sense of place.

> A number of different kinds of birds of prey that are with us, primarily because they have been impacted by the human world, and so our educational focus is to try to prevent some of the preventable human caused injuries and to just increase appreciation of the role of predators, and so the intricate interrelationship among the natural world so that people might see themselves as part of that, rather than apart…..The goal of our program is to increase appreciation and respect and understanding of wildlife, and in hopes that these people will want to protect it.

Jack described how children from an urban area developed a sense of place over time.

> Somebody comes in for the first time. Maybe they're a little bit afraid in the beginning, and then they run into these things and their mind is open into this whole other world. And then they get comfortable with it and maybe start asking us questions and then the second time the third time, the fourth time they're on the property they start to get to know it. They're comfortable with it and they feel like it's their place, and just watching that progression, I think, is really a cool thing.

Ami also mentioned the sense of place that a nature center brings to the visitors.

> In my perspective, when I explained nature center to folks, it's definitely a place where we connect our visitors with the natural world and give them a sense of place so connect them with.

Another important impact that nature centers aspire to for their visitors is pro-environmental behaviors and environmental stewardship. A nature center in a southern state partnered with city government to plant 1000 trees in neighborhoods that had been impacted by a tornado. The project was funded by the Department of Water Quality. Half of the funding was used to purchase trees and the other half was for education and outreach to engage citizens in tree planting. Jack said:

> We went to those neighborhoods and actively tried to recruit people to plant trees because there are all other benefits. So that helps with water quality, but trees also increase property values. And then of course they introduce shade and shade, especially in the south where we are. It gets really hot. So, there are all these co-morbidities if you have the urban heat island. It's uncomfortable to walk around your neighborhood. So people don't walk around the neighborhood so that they're less active and then, they're just all these kind of compounding effects of not having an inviting and beautiful place to live. So hopefully we make, you know, it's just the beginning. But hopefully made a tiny bit of impact in those neighborhoods this year.

Interview Results Summary

To summarize, three categories of social impacts of nature centers emerged from the interviews with nature center directors and leaders: human, human-society, and human-nature. Nature centers can bring both physical and mental health benefits to their visitors. Their various programs spanning from K-12 school programs to senior volunteer programs can foster human development and personal achievement. The social impacts of nature centers are also shown in connections between humans and society. Nature centers can act as a hub to bring people of different races, ethnicities, and social-economic background together. People spend quality time in safe and peaceful natural areas and make connections with local community, which could improve their sense of community. The impacts of nature centers on human-nature include promoting visitors' nature connectedness, sense of place, and environment stewardship.

Survey Results

The majority of respondents believed it was important for nature centers to have social impacts on 8 items under 3 categories. The mean value for all items combined was 4.23, with 4.0 being "very important" and 5 being "extremely important" (Table 7).

Table 7. Descriptive statistics of importance scores for nature center social impacts

(N= 80)

Items	Importance	
	Mean	Standard Deviation
Human	3.98	0.55
Physical health	3.70	0.81
Mental health	4.28	0.71
Human development and personal achievement	3.96	0.83
Human-society	4.04	0.67
Sense of community	4.13	0.80
Facilitate community building and solidarity among people of different races, ethnicities, and social-economic background	3.96	0.81
Human-nature	4.61	0.45
Sense of place	4.44	0.69
Connectedness to nature	4.81	0.45
Catalyze environment stewardship	4.59	0.61

To find if there were significant differences among the importance of human, human-society, and human-nature in the eyes of nature center leaders and staff, first, I used SPSS to run Shapiro-Wilk test for the mean of each group. The results showed none of the three group of data was normally distributed. The following Kruskal-Wallis test showed there was a significant difference among three mean score groups overall. In pairwise comparisons, there was a significant difference between Human-Nature and Human groups, and between Human-Nature and Human Society groups. There was no significant difference ($p > 0.05$) between Human and Human Society groups mean score (Table 8). The social impact of human-nature is significant higher ($p < 0.05$) than human and human-society.

Table 8. Descriptive statistics of Pairwise Comparisons of groups in Part 2

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Human-Human Society	-11.588	10.813	-1.072	0.284	0.852
Human Nature-Human	-75.544	10.813	-6.986	0.000	0.000
Human Nature-Human Society	-63.956	10.813	-5.915	0.000	0.000

In questions about to what degree does your nature center actually have positive impacts on visitors, the mean value for all items combined was 3.57 with 3.5 representing “a moderate amount” and 4.0 representing “a lot” (Table 9).

Table 9. Descriptive statistics of degree of social impacts of respondents’ nature centers (N=75)

Items	Importance	
	Mean	Standard Deviation
Human	3.40	0.68
physical health	3.16	0.94
mental health	3.59	0.84
human development and personal achievement	3.45	0.90
Human-society	3.11	0.67
sense of community	3.57	0.84
Facilitate community building and solidarity among people of different races, ethnicities, and social-economic background	2.65	0.80
Human-nature	4.04	0.58
Sense of place	3.93	0.83
connectedness to nature	4.38	0.75
catalyze environment stewardship	3.84	0.79

Shapiro-Wilk test showed the data in Human mean score group was a normal distribution. Meanwhile, Human-Society and Human-Nature mean score groups were

not. The Kruskal-Wallis test showed there was a statistically significant difference in the Human, Human-Society, and Human-Nature groups. In pairwise tests, each group was significantly different ($p < 0.05$) from the other two groups (Table 10).

Table 10. Descriptive statistics of Pairwise Comparisons of groups in Part 3

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Human- Human Society	25.427	10.558	2.408	0.016	0.048
Human Society-Human Nature	-81.833	10.558	-7.751	0.000	0.000
Human-Human Nature	-56.407	10.558	-5.343	0.000	0.000

The survey results revealed nature center leaders and staff rated nature centers' social impacts on Human-Nature significantly higher than Human-Society and Human, although all three social impacts are "very important" to nature centers. Their own nature centers had more social impacts on Human-Nature than Human. The survey respondents' nature centers had the least social impacts on Human-Society. The score of the item facilitate community building and solidarity among people of different races, ethnicities, and social-economic backgrounds was the lowest among all the social impacts.

Discussion

My research revealed the perceptions of nature center leaders and staff about their center's current and desired social impacts. The impacts fall under three broad categories: human, human-society, and human-nature. The human-nature impacts were significantly more important for nature centers than human or human-society. I close my discussion with a recommendation that nature centers devote greater effort to human-society impacts.

Reflection on social impacts and integrating them into an organization's strategy and theory of change will help nature centers drive their core business. Although nature centers can generate some revenue from organizing various programs and activities, their operation heavily relies on funds from government grants or charity donations. Meanwhile, there is increasing pressure on funders to reveal their projects' social impacts as grant-making and philanthropy are moving from a "fund it and forget it" (Leat, 2006) approach to seeing funding as an investment. Considering social impacts will also help nature centers think clearly about their mission, the benefits they bring to society, and how to align their mission with day-to-day activities and programs.

Social impacts involves addressing pressing social challenges through significant, positive changes (Moudgil, 2014). The social impacts that nature centers aim to achieve reflect the social challenges they seek to address. My research reveals that nature centers have human, human-society, and human-nature impacts. The social

challenges that nature centers' impacts can address include declining life satisfaction, health, social isolation, racism, climate change, and environmental degradation.

Social impacts on human, human-society, and human-nature

Nature centers value the impacts of their natural spaces on humans. Previous literature showed that the health benefits of nature experience include improving affect and cognition (Bratman et al., 2015) and reducing high blood pressure (Shanahan et al., 2016). Nature-based leisure fosters human development for people of different ages (Kleiber & McGuire, 2016). Environmental education programs in nature settings bring multiple benefits to participants, such as increasing interest in science, positive science attitudes, and self-efficacy (Barnett et al., 2006; Dale et al., 2020). Because of these benefits from the impacts on humans, people visit nature centers.

The impacts of nature centers on improving the relations between human and society were also emphasized by nature center leaders and staff in my research. Nature centers organize a variety of events at their locations for community members to gather. The outreach programs in communities and schools further engage with people who don’t have access to nature centers otherwise. Past research showed community conservation programs increased participants’ sense of community and addressed issues of political and neighborhood exclusion (Ohmer et al., 2009; Vergou

& Willison, 2016). Nature centers can have similar results by organizing similar programs.

Nature center leaders and staff regarded the social impacts on human-nature as the most important impacts. Nature centers use their natural landforms and environment as resources to develop and implement activities, create experiences for visitors, and create programs leading to environmental literacy. By doing so, they may improve participants' nature connectedness and sense of place and promote their environmental stewardship. Nature centers prioritizing of the social impacts on human-nature is also supported by previous research. Fraser et al. (2015) found practitioners prioritized the "fundamental coexistence" purpose of environmental education, i.e., supporting sustainable lifestyles for human and non-human nature, among their five perspectives on environmental education. Another study showed the value of environmental connection was ranked first among four underlying values that local community members hold for nature centers (Browning et al., 2017).

Impacts vs Outcomes and Values

Table 11. The potential outcomes of nature centers under different social impacts

	Outcomes	Nature Center Social Impact
Human	Improve affect and cognition (Bratman et al., 2015).	Physical and mental Health
	Reduction of population prevalence of high blood pressure (Shanahan et al., 2016)	
	Influence positive learning outcomes (Dale et al., 2020). Increase students' interests in science and science attitude (Barnett et al., 2006).	Human Development & Personal Achievement
Human-society	Community conservation program increased participants' sense of community (Ohmer et al., 2009)	Sense of community
	Civic ecology practices improve the inclusion of community and social capital. (Krasny & Tidball, 2015) Community plan conservation activity addressed issues of political and neighborhood exclusion (Vergou & Willison, 2016).	Facilitate community building and solidarity among people of different races, ethnicities, and social-economic background
Human-nature	Nurture sense of place (Kudryavtsev et al., 2012)	Sense of place
	Increase connectedness with nature robustly at short-term (Liefländer et al., 2013).	Nature Connectedness
	Improve students' environmental stewardship (Barnett et al., 2011)	Environmental stewardship

Although previous research discussed the outcomes and values (Browning et al., 2017) of programs at nature centers (Table 11), they did not specifically refer to those as social impacts. WK Kellogg Foundation (2004) defined outcomes as "the specific

changes in participants' behavior, knowledge, skills, status and level of functioning." In the context of environmental education, outcomes are "the short-term and intermediate changes that occur in learners, program participants, visitors, etc. as a direct result of the environmental education (EE) activity, program, or experience" (Zint, n.d.). In contrast, impacts are "the broader changes that occur within the community, organization, society, or environment as a result of program outcomes" (Zint, n.d.) . Impacts focus on the community level, whereas outcomes focus on an individual level (El Ebrashi, 2013). The hierarchy is demonstrated in the Program Logic Model (WK Kellogg Foundation (2004) (Figure 3).

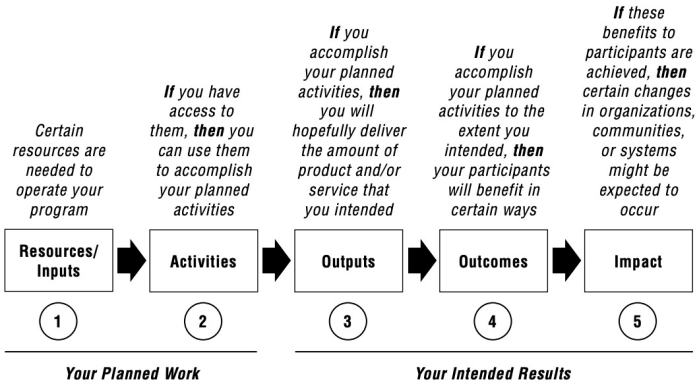

Figure 3. Program Logic Model developed by WK Kellogg Foundation (2004)

Values have some similarities with impacts, but they come from a different perspective. Impacts come from the eyes of organizations while values come from beneficiaries (Figure 4). Jacobsen (2016) defined impact as what the organization wants to accomplish, and values as benefits the communities, audiences, and supporters derive from the organization. An organization's value lies in its impacts. If

there is no intended impact of an organization to its audiences, the audiences can't perceive the values. Values that community members associate with nature centers include: environmental connection, leisure provision, community resilience, and civic engagement (Browning et al., 2017); underlying social impacts are human-nature, human, human-society, and human-society, respectively.

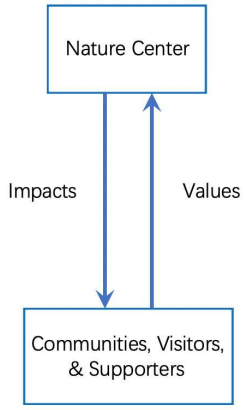

Figure 4. Impacts and values are viewed from different perspectives

During a time when social impacts attract more and more attention from grant agencies and donors, my research crystalized the meaning of social impacts for nature centers from the perspectives of directors and staff. Thoroughly understanding social impacts help nature centers' leaders see the big picture of the social challenges they are addressing, strengthen their purposes, and evaluate their jobs in terms of achieving the desired mission. This research also provides a new understanding of the values nature centers aim to generate for local communities.

Recommendations

Although nature center leaders rated their own nature centers as having significantly lower human-society impacts relative to other types of impacts, they all agreed the importance of their impacts on human-society. ANCA's Blue Ribbon Report also showed nature center directors expected their centers to be more "welcoming and accommodating to diverse audiences" (Revelle, 2015). The impact on human-society is critical because a more inclusive nature center means more visitation, especially from broader segments of communities, and greater impacts. Being more inclusive requires an organization to actively approach non-traditional audiences, which requires additional resources, for example, fundraising for bus rental to serve under-served communities and organizing community programs. To achieve desired human-society impacts, nature centers should allocate their resources better to "market" their services. They also need to adapt programs for larger human-society impacts. This may include seeking the input of multi-cultural and racially and ethnically diverse audiences (Revelle, 2015), increasing the diversity of environmental education professionals, considering inclusion and diversity in program design and implementation, and conducting community project evaluations.

Limitations

One limitation of this research is that a limited sample may hinder the results. The limited interviewees and survey respondents may not represent the opinions of more than 1,800 nature centers in the North America. The non-response bias may occur in my sampling strategy. I may only capture the perspectives of people who are

concerned about social impacts. Additional limitations come from using self-report questions rather than actual observation to examine people's true perspectives.

My research was conducted during the COVID-19 pandemic. The answers from interviewees and survey respondents reflected people's opinions on the current situation. When the pandemic fades in the future, the results may change.

In my research, I only studied nature centers in North America. The social impacts of nature centers may vary across regions. For example, unlike North America where the majority of nature centers are nongovernmental organizations, nature centers in Taiwan are governmental agencies under the administration of Taiwan Forestry Bureau (Lee et al., 2019). The forest policy may affect nature centers' social impacts. Finally, I did not study the indicators that nature centers can use to measure their social impacts. Future research can cover social impact measurement methods and different forms of social impacts across different regions.

Conclusion

Social impact has been attracting more and more attention in recent years while the study of social impact of environmental education organizations is limited. In this study, I used both qualitative and quantitative methods to understand nature center leaders' and staff's perspectives on social impacts of nature centers in the U.S. and Canada. I found that the social impacts of nature centers from their leaders' and staff's

perspectives can be categorized into three classes: impacts on human, impacts on human-society, and impacts on human-nature. Among these three categories, nature center leaders and staff pay significantly more attention to the positive social impacts of their organizations on human-nature, which include building visitors' connectedness to nature, catalyzing environment stewardship, and improving their sense of place. In terms of the current social impacts of respondents' nature centers, respondents felt that they have greater social impacts on human-nature than on human, and the least social impact on human-society. These results and the current national conversation on diversity, equity and inclusion suggest that nature centers need to spend more efforts on designing, implementing and evaluating community inclusion in their programs to achieve better desired social impacts. In the future, more research can be conducted on social impacts of nature centers and the development of a social impact measurement toolbox that is accessible and practical for practitioners.

References

Adkins, C. (2002). Outdoor, Experiential, and Environmental Education. *ERIC Clearıinghouse on Rural Education and Small Schools, AEL*, 3.

Ardoin, N. M., Bowers, A. W., Roth, N. W., & Holthuis, N. (2018). Environmental education and K-12 student outcomes: A review and analysis of research. *The Journal of Environmental Education*, *49*(1), 1–17.

Arena, M., Azzone, G., & Bengo, I. (2015). Performance measurement for social enterprises. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *26*(2), 649–672.

Ashbaugh, B. L. (1963). *Planning a nature center*. Nature Centers Division, National Audubon Society.

Athman, J. A., & Monroe, M. C. (2001). *Elements of Effective Environmental Education Programs*. 16.

Bagnoli, L., & Megali, C. (2011). Measuring performance in social enterprises. *Nonprofit and Voluntary Sector Quarterly*, *40*(1), 149–165.

Barnett, M., Lord, C., Strauss, E., Rosca, C., Langford, H., Chavez, D., & Deni, L. (2006). Using the urban environment to engage youths in urban ecology field studies. *The Journal of Environmental Education*, *37*(2), 3–11.

Barnett, M., Vaughn, M. H., Strauss, E., & Cotter, L. (2011). Urban environmental education: Leveraging technology and ecology to engage students in studying the environment. *International Research in Geographical and Environmental Education*, *20*(3), 199–214.

Bell, K. (Ed.). (2013). *Role*. Open Education Sociology Dictionary. https://sociologydictionary.org/role/

Bratman, G. N., Daily, G. C., Levy, B. J., & Gross, J. J. (2015). The benefits of nature experience: Improved affect and cognition. *Landscape and Urban Planning*, *138*, 41–50.

Browning, M. H., Stern, M. J., Ardoin, N. M., Heimlich, J. E., Petty, R., & Charles, C. (2017). Investigating the sets of values that community members hold toward local nature centers. *Environmental Education Research*, *23*(9), 1291–1306.

Browning, M., Stern, M. J., Ardoin, N. M., & Heimlich, J. E. (2018). Factors that contribute to community members' support of local nature centers. *Environmental Education Research*, *24*(3), 326–342. https://doi.org/10.1080/13504622.2016.1217397

Burdge, R. J., & Vanclay, F. (1996). Social impact assessment: A contribution to the state of the art series. *Impact Assessment*, *14*(1), 59–86.

Byrd, N. J. (1998). *The nature center handbook: A manual of best practices from the field*. Association of Nature Center Administrators.

Charmaz, K., & Belgrave, L. (2012). Qualitative interviewing and grounded theory analysis. *The SAGE Handbook of Interview Research: The Complexity of the Craft*, *2*, 347–365.
Clark, C., Rosenzweig, W., Long, D., & Olsen, S. (2004). *Double bottom line project report: Assessing social impact in double bottom line ventures*. https://escholarship.org/content/qt80n4f1mf/qt80n4f1mf.pdf
Cottrell, W. F. (1951). Death by dieselization: A case study in the reaction to technological change. *American Sociological Review*, *16*(3), 358–365.
Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
Dale, R. G., Powell, R. B., Stern, M. J., & Garst, B. A. (2020). Influence of the natural setting on environmental education outcomes. *Environmental Education Research*, *26*(5), 613–631.
Disinger, J. F., & Monroe, M. C. (1994). *Defining Environmental Education. Workshop Resource Manual.* ERIC.
Dudovskiy, J. (2021). *Convenience sampling*. https://research-methodology.net/sampling-in-primary-data-collection/convenience-sampling/
Ebrahim, A. (2010). The many faces of nonprofit accountability. *The Jossey-Bass Handbook of Nonprofit Leadership and Management*, *18*, 101–121.
Ebrahim, A., & Rangan, V. K. (2014). What impact? A framework for measuring the scale and scope of social performance. *California Management Review*, *56*(3), 118–141.
El Ebrashi, R. (2013). Social entrepreneurship theory and sustainable social impact. *Social Responsibility Journal*.
Engleson, D. C., & Yockers, D. H. (1994). *A Guide to Curriculum Planning in Environmental Education*. Wisconsin Department of Public Instruction. https://files.eric.ed.gov/fulltext/ED380306.pdf
Environmental Education Act, Pub. L. No. 91–516 (1970). https://www.govinfo.gov/content/pkg/STATUTE-84/pdf/STATUTE-84-Pg1312.pdf
Esteves, A. M., Franks, D., & Vanclay, F. (2012). Social impact assessment: The state of the art. *Impact Assessment and Project Appraisal*, *30*(1), 34–42.
Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—Principles and practices. *Health Services Research*, *48*(6pt2), 2134–2156.
Forster, J. (1964). The sociological consequences of tourism. *International Journal of Comparative Sociology*, *5*, 217.
Fraser, J., Gupta, R., & Krasny, M. E. (2015). Practitioners' perspectives on the purpose of environmental education. *Environmental Education Research*, *21*(5), 777–800.

Freudenburg, W. R. (1986). Social impact assessment. *Annual Review of Sociology*, *12*(1), 451–478.
Freudenburg, W. R., & Keating, K. M. (1985). Applying sociology to policy: Social science and the environmental impact statement. *Rural Sociology*, *50*(4), 578.
Jacobsen, J. W. (2016). *Measuring museum impact and performance: Theory and practice*. Rowman & Littlefield.
Kleiber, D. A., & McGuire, F. A. (2016). *Leisure and human development.* Sagamore Publishing.
Krasny, M. E., & Tidball, K. G. (2015). *Civic ecology: Adaptation and transformation from the ground up*.
Kudryavtsev, A., Krasny, M. E., & Stedman, R. C. (2012). The impact of environmental education on sense of place among urban youth. *Ecosphere*, *3*(4), 1–15.
Lee, C.-W., Li, C., & Liu, S.-T. (2019). Service effectiveness of the nature centers for sustainability of environmental education and forest policy implications. *Sustainability*, *11*(9), 2457.
Liefländer, A. K., Fröhlich, G., Bogner, F. X., & Schultz, P. W. (2013). Promoting connectedness with nature through environmental education. *Environmental Education Research*, *19*(3), 370–384.
Maas, K., & Liket, K. (2011). Social Impact Measurement: Classification of Methods. *Environmental Management Accounting and Supply Chain Management*, 171–202. https://doi.org/10.1007/978-94-007-1390-1_8
Maxwell, J. A. (2012). *Qualitative research design: An interactive approach*. Sage publications.
Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, *24*(4), 503–515.
Moudgil, R. (2014). *What Is Social Impact?* https://businessimpact.umich.edu/about/what-is-social-impact/
Ohmer, M. L., Meadowcroft, P., Freed, K., & Lewis, E. (2009). Community Gardening and Community Development: Individual, Social and Community Benefits of a Community Conservation Program. *Journal of Community Practice*, *17*(4), 377–399. https://doi.org/10.1080/10705420903299961
Poll, R. (2003). Measuring impact and outcome of libraries. *Performance Measurement and Metrics*.
Price, C. J. (2010). *Bioeconomic and Biophilic Intersect in Nature Centers-A Case Study of One Nature Center*.

Revelle, A. (2015). *The Future of Nature Centers: A View From The Profession* [University of Wisconsin-Stevens Point]. https://www.natctr.org/images/pdfs-doc/research/blueribbonresearchreport.pdf
Rubin, H. J., & Rubin, I. S. (2011). *Qualitative interviewing: The art of hearing data*. sage.
Ruggie, J. (2011). Report of the special representative of the secretary-general on the issue of human rights and transnational corporations and other business enterprises: Guiding principles on business and human rights: Implementing the united nations 'protect, respect and remedy'framework. *Netherlands Quarterly of Human Rights*, *29*(2), 224–253.
Saldaña, J. (2021). *The coding manual for qualitative researchers*. sage.
Shanahan, D. F., Bush, R., Gaston, K. J., Lin, B. B., Dean, J., Barber, E., & Fuller, R. A. (2016). Health benefits from nature experiences depend on dose. *Scientific Reports*, *6*(1), 1–10.
Sharp, L. (1952). Steel axes for stone-age Australians. *Human Organization*, *11*(2), 17–22.
Shomon, J. J. (1969). Nature Centers—One Approach to Urban Environmental Education. *Environmental Education*, *1*(2), 56–60.
Simmons, B. (n.d.). *Guidelines for Excellence: Best Practice in EE*. https://naaee.org/our-work/programs/guidelines-excellence
Simmons, B., Ayson, A., Bashor, E., & Bravo, A. W. (2022). *Environmental Education Programs: Guidelines for Excellence*. NAAEE. https://cdn.naaee.org/sites/default/files/guide_4.ee_programs.5.20.22.no_crops_compressed.pdf
Swidler, A. (2013). *Talk of love: How culture matters*. University of Chicago Press.
Vergou, A., & Willison, J. (2016). Relating social inclusion and environmental issues in botanic gardens. *Environmental Education Research*, *22*(1), 21–42.
Whorton, K. (2016, January 4). Qualitative Interview Pros and Cons. *Qualitative Interview Pros and Cons*. https://www.asaecenter.org/resources/articles/an_plus/2016/january/qualitative-interview-pros-and-cons/
WK Kellogg Foundation. (2004). *WK Kellogg Foundation logic model development guide*. WK Kellogg Foundation. https://www.naccho.org/uploads/downloadable-resources/Programs/Public-Health-Infrastructure/KelloggLogicModelGuide_161122_162808.pdf
Zint, M. (n.d.). *Outcomes and Impacts*. https://meera.snre.umich.edu/outcomes-and-impacts

Appendix 1: Semi-Structured Interview Questions

General Information

1. First, can you tell me a little about yourself? How long have you been working in this nature center?
2. In your perspective, what is a nature center?
3. Could you tell me what is your position in this organization and what are the major aspects of your job that you are doing now?
4. Could you tell me about your nature center? When was this nature center established? What are the goals of this nature center?
5. What is this nature center registered as? A government agency, an NGO, a social enterprise or a company?
6. Where does the funding of your nature center come from?
7. How many people work in your organization?

Programs

8. What kind of programs do you have in your organization on environmental education?
9. Who developed those programs?
10. How did the programs develop?
11. What is the difference between a nature center and other environmental education organizations?
12. Do you still organize the programs after the pandemic?

Impact

13. How do you think of the impact of a nature center?
14. What categories of impact do you think we need to include when we think of the impact of a nature center?
15. Do you use any indicators to measure the impact of your organization?
16. Do you have any requirement from inside or outside of the organization to do the impact analysis?
17. We all know the current pandemic change our sector a lot. Do you think the COVID19 crisis change your organization's attitude on social impact?

Appendix 2: Survey of Nature Center's Social Impacts

Thank you for answering this survey! My name is Mi Yan. I am a graduate student in the Civic Ecology Lab at Cornell University. I am working on my research on the social impact of nature centers. Your perspectives and insights are extremely helpful for my research. It should take you 10 minutes to finish the survey. I guarantee that your personal information is protected. I will share my results with the Association of Nature Center Administrators and post my final report on an open-access website for anyone to use. I will not share your information with other individuals or organizations without your permission. If you have any questions about my research, please let me know. My email address is ym424@cornell.edu

Part 1:

1. What is your position in your organization?

_____

2. Where is your nature center located? city/town, county, state

_____

3. My nature center is in

- ○ large urban area
- ○ small town/small city
- ○ suburbs
- ○ rural/agricultural area

4. Please indicate the percentage of each choice to the best your knowledge.

4.1 Approximately, what percentage of your visitors are

_____ a. Under 18 years
_____ b. 18-30 years
_____ c. 30-50 years
_____ d. Over 50 years

4.2 Approximately, what percentage of your visitors are

_____ a. White / Caucasian
_____ b. Asian
_____ c. Hispanic, Latino or Spanish origin
_____ d. Black or African American
_____ e. American Indian or Alaska Native
_____ f. Middle Eastern or North African
_____ g. Native Hawaiian or Other Pacific Islander
_____ h. Mixed race
_____ i. Other

4.3 Approximately, what percentage of your nature center visitors are

_____ a. families
_____ b. pre K-12 children and youth
_____ c. adult visitors without children

4.4 Approximately, what percentage of your visitors are from

_____ a. large urban area
_____ b. small town/small city
_____ c. suburbs
_____ d. rural/agricultural area

5. The name of your organization (optional)

_____

Part 2:

Social impact means a significant, positive change that addresses a pressing social challenge (Moudgil, 2014). In the next questions, I am interested in the **potential social impacts** of nature centers, not necessarily current impacts. Please rate how important you feel the following impacts are for a nature center.

6. How important is it for a nature center to have positive social impacts on visitors'

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
1. physical health	○	○	○	○	○
2. mental health	○	○	○	○	○
3. human development and personal achievement (knowledge, skills, experiences, career expirations)	○	○	○	○	○
4. sense of community	○	○	○	○	○
5. sense of place	○	○	○	○	○
6. connectedness to nature	○	○	○	○	○

7. How important is it for a nature center to

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
1. Facilitate community building and solidarity among people of different races, ethnicities, and social-economic background	○	○	○	○	○
2. Catalyze environment stewardship	○	○	○	○	○

8. Are there any other social impacts you think a nature center should have?

_____

_____

_____

_____

_____

Part 3:

9. In the following questions, I am interested in the impacts your nature center **actually has**. To what degree does your nature center have positive impacts on visitors'

	None	A little	A moderate amount	A lot	A great deal
1. physical health	○	○	○	○	○
2. mental health	○	○	○	○	○
3. human development and personal achievement (knowledge, skills, experiences, career expirations)	○	○	○	○	○
4. sense of community	○	○	○	○	○
5. sense of place	○	○	○	○	○
6. connectedness to nature	○	○	○	○	○

10. To what degree does your nature center

	None	A little	A moderate amount	A lot	A great deal
1. Facilitate community building and solidarity among people of different races, ethnicities, and social-economic background	○	○	○	○	○
2. Catalyze environment stewardship	○	○	○	○	○

11. Are there any other social impacts your nature center is having?

_____

_____

_____

_____

_____

Part 4:

12. To what degree do you agree or disagree with the following statement about nature centers during the COVID-19 pandemic?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
During the COVID-19 pandemic, visitation increased to my nature center.	○	○	○	○	○
During the COVID-19 pandemic, more community members recognized the physical and mental benefits of spending time outside.	○	○	○	○	○
My nature center served as a safe space for community members during the pandemic.	○	○	○	○	○
My nature center has a greater social impact during the pandemic than before.	○	○	○	○	○

13. Are there any other social impacts your nature center is having specifically during the COVID pandemic?

_____