INSPIRING ‘CIVIC HERPETOLOGY’: EXPLORING MOTIVATIONS FOR URBAN HERPETOFAUNAL CONSERVATION VOLUNTEERING

by

MICAH MILES

(Under the Direction of Kyle Maurice Woosnam)

ABSTRACT

In this era of urbanization, conservation of globally declining wildlife, such as reptiles and amphibians, hinges upon human behaviors that support or otherwise protect these imperiled species. For residents of urban areas, this requires that individuals be willing and motivated to take action to preserve species that they encounter infrequently, if at all, in their day-to-day lives. This research poses the questions: “How have earlier life experiences motivated urban residents to volunteer in herpetofauna conservation?” and “What role do environmental education programs or initiatives play in motivating urban residents to volunteer in herpetofauna conservation?” Employing qualitative methodology, this research seeks to explore the role of significant life experiences and environmental education programs in motivating residents of urban areas to volunteer for reptile or amphibian-focused conservation programs. Semi-structured interviews were the primary method employed in this study, although a web-based survey was used to identify eligible respondents. Data were analyzed using qualitative coding, analytic memos, and thematic analysis to systematically identify, organize, and infer motivating and experiential patterns occurring within the data corpus. Qualitative coding and thematic analysis suggest significant overlap between the motivating experiences of study participants and

those described in the significant lived experience literature of environmental education research. Analysis also revealed four key themes underlying participant experiences and motivations; specifically, supportive communities, embodied interactions, empowering growth and civic belonging. These results hold several implications for the practice and implementation of urban herpetofaunal conservation and the importance of combining environmental education, stewardship, multimedia engagement and empathy-driven approaches to achieving socially-derived urban conservation goals.

INDEX WORDS: qualitative research methodology; urban wildlife conservation; herpetofauna; environmental education (EE); significant life experiences; motivations; empathy; environmental education

INSPIRING ‘CIVIC HERPETOLOGY’: EXPLORING MOTIVATIONS FOR URBAN HERPETOFAUNAL CONSERVATION VOLUNTEERING

by

MICAH MILES

BS, University of Maryland, 2014

MS, University of Georgia, 2019

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2021

INSPIRING CIVIC HERPETOLOGY: EXPLORING MOTIVATIONS FOR URBAN HERPETOFAUNAL CONSERVATION VOLUNTEERING

by

MICAH MILES

Major Professor:	Kyle Maurice Woosnam
Committee:	Milton Newberry III
	John Maerz
	Charles Nilon
	Nicholas Fuhrman

Electronic Version Approved:

Ron Walcott
Vice Provost for Graduate Education and Dean of the Graduate School
The University of Georgia
May 2021

DEDICATION

for my Ancestors.

carrying all the gifts you gave,

may I continue to be,

the dream and the hope of the slave

(Inspired by M. Angelou's *Still I Rise*)

ACKNOWLEDGEMENTS

My postgraduate journey has been a long, arduous, and surprisingly rich journey. I want so desperately to do justice by all those who claimed me as part of their village and nurtured my growth as their own. That love is powerful and enduring; but for the sake of brevity, I'll keep it Black and keep it brief:

First, I thank my parents, Frank Miles, and Madonna "Brownie" Brown-Miles, for the decades of love, support and encouragement that they've given tirelessly. I also thank my Godmother and extended family or 'framily' members; Aunts, Uncles, Cousins, and others who remained deeply connected to me and never let me question my value in their lives. I thank my colleagues at UGA, my co-creators in the Biota Project, Dr. Marvette Lacy and my fellow QualScholars in the Finish Your Dissertation Writing group, my copy editor and frienditor Dr. Margaret Sebastian and all my committee members and academic mentors.

Finally, funding for this research was provided by a National Science Foundation Graduate Research Fellowship and the University of Georgia. However, the views expressed in this piece are solely those of the author.

IN MEMORIAM

Dr. Juanita Lewis (4/06/1937 – 11/27/2020)

Lucifer "Lu" Miles (5/2014 – 9/2020)

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

> *The study of urban ecology can serve conservation ... by helping to develop a more ecologically informed public. Providing a well-informed public could be the most important application of urban ecology, as a means of promoting effective conservation of native species* (McKinney, 2002, p. 884)

Urbanization is an anthropogenic development phenomenon that has expanded in recent years to include more than half of the global population (United Nations, 2014). In 2010, it was estimated that urban areas constituted less than 3% of the global land area (Liu et al., 2014); however, 82% of North Americans currently live in urban areas (United Nations, 2019). The process of urbanization contributes to many direct and indirect changes in wildlife behavior (Kwiatowski et al., 2008) and fitness that translate to shifts in population density, community composition and species interactions (Gallagher et al., 2014). The recognition that urbanization will continue to be a major force reshaping biodiversity globally motivates efforts to conserve biodiversity within urbanizing landscapes (Barrett & Price, 2014).

Developing a "well-informed public," as recommended in McKinney's review of urbanization and conservation, is a social endeavor echoed by many researchers of urban ecology (see Chawla and Cushing, 2007; Dunn et al., 2016; Fraser et al., 2014). As relatively new disciplines, urban wildlife ecology and biodiversity conservation straddle multiple disciplinary boundaries including the demarcation between natural and social sciences (McEntyre, 2000). Urban ecology is implicitly concerned with the impacts of society and human development on

native ecosystems in addition to the role of humans as participants in the natural world (Parlange, 1998). Moreover, conservation of biodiversity is an inherently human-led pursuit intended to modify human actions to achieve the socially desired goals of species and habitat persistence (Mascia et al., 2003).

Evidence suggests that experiences and emotions play important roles in motivating people to act on behalf of nature and the biophysical environment (Carmi et al., 2015; Tanner, 1998; Taufik et al., 2018). However, wildlife conservation studies infrequently utilize qualitative research methods which are best suited to studying underlying personal meanings, feelings and experiences that motivate individuals to act in preservation and protection of biodiversity (Drury et al., 2011). Thus a clear need exists for novel conservation approaches that account for the multiplicity of perspectives surrounding conservation problems and provide starting points for cross-disciplinary dialogue and collaboration towards mitigating these problems (Hirsch and Brosius, 2013). In pursuit of integrative solutions to modern conservation concerns, this research proposes an epistemologically non-traditional approach to understanding why people perform specific environmentally responsible behaviors.

Statement of the Problem

Conservation interventions require human behavioral changes to succeed and are therefore dependent on the performance of environmentally responsible behaviors by individuals and communities (Mascia et al., 2003; Riley et al., 2002; Schultz, 2011). There is no consensus as to why people intend to perform responsible environmental behaviors, though research suggests an amalgam of contributing factors (Kollmuss & Agyeman, 2002). A seminal article in human ecology identifies two primary approaches to encouraging conservation behavior:

targeting specific actions with social marketing tools and cultivating general environmental literacy through education practices (Monroe, 2003).

With regards to the latter approach to encouraging conservation behaviors, evidence suggests that both direct and vicarious experiences with nature can influence peoples' willingness to conserve species (Soga et al., 2016). However, people in urban areas are often removed from direct experiences with nature by cultural and socioeconomic processes (Turner et al., 2004) that may also constrain their awareness of conservation issues. Urbanization is associated with a drastic reduction in native species abundance (Crooks et al., 2004) and some species adapt cryptic behaviors to avoid detection by humans and other predators (Ditchkoff et al., 2006), reducing the likelihood of regular encounters with urban fauna. From an urbanized or metropolitan perspective, uncharismatic fauna such as invertebrates and reptiles are uniquely disadvantaged by historical and social stigmas which engender negative attitudes (Ceríaco, 2012) and can reduce the societal willingness to conserve them (Liordos et al., 2018)

Though they are less commonly encountered within the urban landscape, reptiles and amphibians are sensitive to urbanization (Barrett, 2009). Amphibians contribute to nutrient cycling in between terrestrial and aquatic environments and are central part of many food webs, serving as both predators and prey (West, 2018). Similarly, within the tropical or subtropical environments where they are most abundant, reptiles are important to ecological processes underlying functions such as nutrient cycling, gene dispersal and trophic action (Miranda, 2017). However, reptile and amphibian communities are currently threatened by habitat loss, fragmentation and degradation of habitat quality (Gibbons et al., 2000; Hamer and McDonnell, 2008). The conflict between their ecological importance and their distinct lack of charisma creates an especially polarizing scenario for urban residents in engaging in conservation

behaviors (Pinheiro et al., 2016). Moreover, volunteers in herpetofaunal conservation represent a special segment of urban biodiversity conservationists with unique motives and experiences that may inform conservation practices. Thus, improving our understanding of the motivations that drive this form of conservation volunteerism is a pivotal step to cultivating the urban stewardship necessary to conserve threatened wildlife.

Purpose of the Study

Encouraging conservation behaviors by cultivating environmental literacy is a difficult task that is often complicated by the disconnect between environmental knowledge and action (Kollmuss & Agyeman, 2002). Studies suggest that the mediating role of emotions is key to understanding and potentially predicting the performance of environmentally responsible behaviors (Carmi et al., 2015). From a social standpoint, conservation behaviors may be less attractive to members of the public because they are inconvenient, more expensive, or potentially go against widespread social programming (Monroe, 2003). Moreover, one's willingness to preserve imperiled species may be affected by societal aversions to uncharismatic or otherwise unattractive fauna (Gunnthorsdottir, 2001). And in urban areas, where anthropogenic structures and sociocultural factors further isolate residents from 'direct experiences with nature,' people feel less connected to the natural world and may be less concerned with conserving biodiversity (Schultz, 2002).

To surmount these challenges, conservation initiatives and environmental education programs must employ the appropriate strategies to achieve their desired outcomes (Monroe et al., 2007). Wildlife conservation research is predominated by the positivist quantitative methods common to a natural sciences approach, despite the innate anthropogenic origins of conservation issues (Mascia et al., 2003). Current conservation research and practices fail to explain or

address the social and behavioral antecedents of species decline (Schultz, 2011). Fortunately, the qualitative research methodologies common to social science research are particularly well suited to investigating the personal, emotional, and interpretive elements of human behavior, such as attitudes and motivations (Drury et al., 2011; Rust et al., 2017).

There is a clear need for additional qualitative studies to better understand why people voluntarily choose to perform responsible environmental behaviors to conserve imperiled species. Reptiles and amphibians are globally threatened and comprise a socially uncharismatic taxon for which humans may have adapted a latent aversion (Baynes-Rock, 2017; Ceríaco et al., 2012; Gibbon et al., 2000; Houlahan et al., 2000). Whether this aversion is evolutionarily driven or socially mediated (Isbell, 2006), volunteers of herpetofaunal conservation represent a unique community of voluntary conservation behavior performers. Furthermore, in urban areas, where individuals may be further distanced from nature and less likely to encounter native herpetofauna, residents that volunteer for conservation projects may be motivated to do so for novel reasons, nonpareil to rural volunteers (Asah & Blahna, 2012; Liarakou et al., 2011; Turner et al., 2014). Thus, there is significant cause to examine the experiences of urban residents who volunteer for herpetofaunal conservation and identify the significant lived experiences motivating their actions.

This study leverages qualitative methodology to explore the lived experiences motivating herpetofaunal conservation volunteerism among urban residents. Qualitative methods are particularly well-suited to study the emotional aspects of the human experience such as exploring the critical events and factors associated with an individual's knowledge and behavioral development. Specifically, this study employs narrative inquiry in a constructivist research paradigm to collect and interpret narrative data from urban herpetofaunal conservation

volunteers. Research findings can inform herpetofauna-centered educational program development and the implementation practices touted by urban wildlife conservation initiatives seeking to foster similar outcomes.

Research questions

Overarching Question: Why do urban residents choose to volunteer in herpetofaunal conservation?

1. What are the lived experiences of urban residents who volunteer in herpetofaunal conservation programs?
    a. Objective: Explore the lived experiences of urban herpetofaunal conservation volunteers
2. How have significant life experiences motivated urban residents to volunteer in herpetofaunal conservation?
    a. Objective: Identify the significant life experiences motivating herpetofaunal conservation volunteerism

Delimitations

The research seeks to explore the lived experiences motivating herpetofaunal conservation volunteerism among urban residents. Herpetofaunal conservation volunteers are individuals who voluntarily choose to engage in conservation behaviors for the benefit of reptiles and amphibians. All herpetofauna volunteers are not necessarily affiliated with a larger conservation organization. Some may restore habitat in isolation or begin their own initiatives to bring outreach specimens to local environmental festivals. However, to qualify for this study, all volunteers were formally affiliated with a larger organization within the previous three years. This excludes individuals who volunteer by themselves but offers an added level of consistency and verifiability to the participating sample. As an isolated study of herpetofaunal conservation volunteers within the Atlanta metropolitan region, it is important to note that this research is not generalizable to all volunteers of similar programs and activities. Nevertheless, findings

emerging from this research may inform behavioral modification practices for a selection of environmental education programs in urban areas.

The population for this study is constrained to those who reside within the Atlanta Metropolitan Statistical Area (Ratcliffe et al., 2016). The North American southeast is a hotspot of amphibians (Walls, 2014) and metro Atlanta is home to well over half of the population for the state of Georgia (Metro Atlanta Chamber, 2020). This study was primarily conducted during the 2020 pandemic by a single researcher. To complete the data collection and analysis procedures necessary for a robust research study, the study population was spatially limited and entirely virtual to reduce the risk of COVID19 exposure among participants and the researcher.

Additionally, research suggests that self-reports of pro-environmental behavior can be biased and potentially invalidate inferences from subject-reported data (Chao & Lam, 2011). As an initial tactic to elicit honest responses regarding volunteer behavior, the research design employs an activity checklist within the online recruitment survey for participants to self-report their volunteering. This is then coupled with qualitative methods and rigorous verification strategies to broadly explore the motivations and experiences of volunteer herpetofaunal conservationists. The selected interview questions (aimed at eliciting responses that will answer the abovementioned research questions) examine lived experiences, the meanings participants attach to these experiences, and their roles in motivating stewardship behaviors. The depth of their responses and descriptions of past experiences serves as a secondary verification of their volunteering experiences.

Basic Assumptions

As a study of urban residents who volunteer for reptile or amphibian conservation, this research assumed that participants were urban residents who voluntarily choose to participate in

herpetofaunal conservation. People from both urban and rural communities demonstrate environmental concern, yet these beliefs do not directly translate to environmental behaviors, especially among urban residents (Berengeur et al., 2005). Thus, this research assumes that participants are urban or suburban residents and uses residents' zip codes to ensure this criterion is met.

Additionally, this research assumes that participants respond honestly and truthfully to direct questions and prompts regarding their experiences and understandings. Questions probing behavioral motivations may be sensitive to respondents and contribute to self-reporting biases that skew resultant findings (Chao & Lam, 2011). However, this research is designed within a constructivist paradigm, such that there is no universal, interpretive, or objective truth (Moon & Blackman, 2014). Participants were encouraged to respond honestly about their experiences and motivations, so their responses could be analyzed as representations of their subjective reality (Lee, 2012). As a research instrument for participant observation, the researcher leveraged her background (see Positionality Statement), personality, and training to collect data from participants and foster a comfortable atmosphere during formal interviews.

Significance of Study

As highlighted by McKinney (2002), the ecological literacy and stewardship behaviors of urban residents hold significant potential for advancing conservation goals. The preservation and conservation of wildlife requires successful social strategies (Mascia et al., 2003); however, research has not bridged the gap between acquiring environmental knowledge and performing environmentally responsible behavior (Kollmuss & Agyeman, 2002). Empirical evidence in the study of significant life experiences suggests that a similar suite of lived experiences contributes to the founding and development of environmental interests among environmental activists and

stewards (Cachelin et al., 2009; Chawla, 1999; Hsu, 2009; Tanner, 1980). Thus, environmental education practitioners should understand and attempt to replicate those experiences that successfully motivated current environmental stewards. In spite of the recognized role that environmental emotions play in the performance of environmental behaviors (Taufik & Venhoeven, 2018), qualitative social inquiry methodology has been under-utilized in application to this quandary and may reveal insights into the experiences and motivations of volunteers. .

People residing in urban areas are further removed from nature and may be less likely to learn about, directly experience, and act to improve their local ecosystem (Schuttler et al., 2019; Turner et al, 2004). Understanding how individuals in urban areas develop the intention to perform conservation-behaviors, perhaps in response to educational or outreach initiatives, can provide successful strategies and techniques for encouraging conservation behaviors among the urban public. To this end, the findings of this research offer insight into the development of integrative environmental education, outreach, and communication tools to promote urban stewardship behaviors. Conservation organizations, social marketing campaigners and science educators in conservation and environmental sciences may identify successful strategies and techniques from this research and reproduce that success in their own work. Indeed, the findings of this research can augment our current understanding of the intersections between contextually relevant environmental education and motivations for wildlife conservation among residents of modernized urban areas.

Definition of Terms

Constructivism – a research paradigm rooted in subjectivist epistemology and a relativist ontology, which asserts that people construct their own knowledge and understanding through their experiences with the world (Guba, 1990)

Herpetofauna – non-avian reptiles and amphibians; paraphyletic taxa of ectothermic tetrapods (Gibbon et al., 2000)

Herpetofaunal conservation volunteers – a taxa-specific form of environmental volunteering, whereby individuals undertake specific helping behaviors to benefit and thereby ensure the persistence of reptile and/or amphibian species

Motivation - an antecedent to human behavior that describes the wants or needs which direct behavior towards a goal; a psycho-social construct describing the reasons for initiating, sustaining, and discontinuing actions (Weiss et al., 2012)

Significant life experiences – a theoretic framework for investigating the complex relationships between lived experiences and the performance of stewardship behavior; research suggests that a similar suite of lived experiences contributed to the founding and development of environmental interests among leaders of citizen conservation organizations (Tanner, 1980)

Qualitative research approach – an approach to social inquiry that includes the intensive analysis of textual data from a small sample of subjects to foster greater depth in produced insights (Merriam, 2009)

CHAPTER 2

LITERATURE REVIEW

The purpose of the following chapter is to summarize the published research on what motivates herpetofaunal conservation volunteerism among urban residents. The chapter begins by discussing urbanization, its impacts on local biodiversity, and species conservation approaches within the natural and social science disciplines. The chapter goes on to introduce volunteering as a general human behavior, and environmental volunteerism as a unique form of responsible environmental behavior. Finally, this chapter will consider society's attitudes and perceptions of reptiles and amphibians to present human attitudes and personalized experiences with these taxa as a potential avenue for encouraging conservation behavior.

Urbanization and Declining Biodiversity

More than half of the world's human population currently lives in urban areas and forecasts suggest that as much as 68% of the global population will be urbanites by the year 2050 (United Nations, 2019). As society shifts from agrarian to primarily urban lifestyles, global citizens are becoming further distanced from the ecological impacts of everyday life (Turner et al., 2004). The enduring legacies of colonization, the industrial revolution, and technologically mediated globalization continue to manifest across pre-existing ecosystems and landscapes. Urbanization and human development fractures pre-existing habitats and contributes to the decline of native communities (McKinney, 2006). However, it may the social rather than the ecological changes associated with urbanization that engender potentially novel avenues for biodiversity conservation.

Urbanization impacts behaviors (Montenegro, 2017), distributions (Ordeñana et al., 2010), and interspecific relationships (Prange & Gehrt, 2004) of native wildlife and plant life. Generally speaking, urbanization tends to increase biotic homogenization; a process that selects habitat generalists at the expense of native species' richness (Devictor et al., 2007; McKinney, 2006). In a recent meta-analysis of urban ecology studies in the United States and Europe, research highlighted that urbanization was associated with decreased overall species abundance (Saari et al., 2016). These species' declines can aggregate across spatial scales to influence wildlife population dynamics such as extinction and colonization (Padilla & Rodewald, 2015). Further development consumes and fragments pre-existing habitats; driving native species closer towards extinction (Jackson & Sax, 2010).

Amphibian populations are declining globally and have been since the – at least – the late 1950s (Houlahan et al., 2000). In urban areas, amphibian decline has been linked to anthropogenic factors such as the presence of invasive nonnative plants and animals (Martin & Murray, 2011; Riley et al., 2005) and habitat fragmentation (Ficetola & De Bernardi, 2014). Moreover, the loss of local species can lag behind human development and environmental disturbances for as long as multiple decades (Semlitsch et al., 2017) before resulting in local or regional extinction. Global reptile decline is taxonomically distinct from amphibian decline, but both are vulnerable to a similar suite of anthropogenic threats such as habitat loss, habitat fragmentation and degradation of habitat quality (Gibbons et al., 2000; Hamer and McDonnell, 2008).

Wildlife Conservation Efforts

Historically, natural resource management disciplines contributed to the origins of conservation biology as a field (Kessler & Thomas, 2006). One of the seven principles reported

in the North American model of wildlife conservation is a commitment to science as the basis of all wildlife conservation (Organ et al., 2012). As such, the legacy of natural science inquiry permeates the practice of species conservation. While many issues of conservation concern are inherently social (i.e., overconsumption of resources, habitat degradation, etc.), much of the attention for biodiversity conservation efforts continues to be dominated by research and practices endemic to the natural or biophysical sciences (Schultz, 2011).

Natural Science Approaches

A long-standing debate within conservation science concerns the prioritization of conservation research on an individual focal species versus the entire habitat or ecosystem (Lindenmayer et al., 2007). The two approaches complement one another; both support efforts to monitor and respond to changing dynamics of individual species and select habitats. Both approaches are also advanced by biophysical research methods such as inventorying, monitoring, captive rearing, and reintroductions, despite being directed towards different ecological scales.

Conservation strategies focused on a single species often employ the concepts and methods of wildlife population biology. Species conservation and management are applied outcomes of population biology. Current practices are informed by deductive field techniques to measure biophysical features and infer knowledge about the focal species (Mills, 2009). Population biology tools appear frequently in conservation research. Examples include: wildlife trapping for capture and marking (Schmidt, 2004; Ward et al., 2017), collaring individuals for telemetry or GPS tracking (Murray & St. Clair, 2015; Riley et al., 2014), and species reintroductions (Gibbs et al., 2008; Seddon et al., 2007) and relocations (Germano & Bishop, 2009).

In the United States, the flagship legislation to support species conservation is the Endangered Species Act. First accepted into law in 1973, many consider the act to be the "strongest piece of environmental legislation in history" (Evans et al., 2017). The Endangered Species Act describes a linear path to species recovery that begins by identifying imperiled species and assessing its conservation status. If warranted, the species is added to an official list of federally endangered and threatened species and conservation measures implemented to mitigate threats and protect the listed species. The primary aim is to 'delist' the imperiled species when populations have been restored to a threshold that no longer necessitates federal protection (Evans et al., 2017). Although many species respond well to federal protections (i.e. American alligator (Alligator mississippiensis), and kangaroos (Macropus spp.); very few listed species are ever removed from the federal registry. Moreover, current implementation fails to meet the conservation needs of imperiled species (Doremus & Pagel, 2001; Schwartz, 2008). A recent study estimated that, as of 2009, abundance objectives for delisting 68–91% percent of listed species fell below published thresholds for the minimum numbers of individuals. Additionally, as many as 144 species could be considered recovered with even fewer populations than at the time they were originally listed (Neel et al., 2012).

The Endangered Species Act also includes stipulations for the protection and conservation of critical habitats that are associated with a federally listed imperiled species. Critical areas may be designated at the same time as a focal species is listed, or up to a year following the official designation of a threatened or endangered species. However, these areas are not established refuges or sanctuaries, but a tool to guide federal recovery efforts (U.S. Fish and Wildlife Service, 2017). Along the same vein as the population biology roots of species-specific conservation practices, habitat-level conservation is primarily facilitated by management

strategies conducted through either a coarse-, meso-, or fine-filter approach. These management filters are designed to 'catch' imperiled species and minimize the loss of species to local extinction (McComb, 2008). Given the rarity and ecological needs of the suite of focal species; conservation practitioners measure key ecosystem indicators that support or inhibit ecosystem processes. Analyzing these indicators as they relate to the historical range of variability for imperiled species allows conservationists and managers to design management protocols towards conservation goals based around the range of conditions in which the focal species persisted in the past. Field techniques to achieve these conservation goals may include silviculture, implementation of riparian forest buffers, and restoration of habitat fragments; however appropriate techniques are specific to the imperiled taxa or region.

Herpetofaunal conservation.

Conservation strategies to preserve reptile and amphibian species are similarly rooted in the population biology and management approaches of the natural sciences. Herpetofauna are ecologically important taxa in global decline (Adams et al., 2013; Gibbon et al., 2000; Houlahan et al., 2000; Tingley et al., 2016). Amphibians contribute to nutrient cycling in between terrestrial and aquatic environments and are central part of many food webs, serving as both predators and prey (West, 2018). Moreover, within the tropical or subtropical environments where they are most abundant, reptiles are important to ecological processes underlying functions such as nutrient cycling, gene dispersal and trophic action (Miranda, 2017). A literature review of published studies on the ecological functions of neotropical herpetofauna, revealed that studied species contributed to at least five categories of ecological function, including bioturbation, pollination, and energy flow through ecosystems (Cortez-Gomez et al.,

2015). The ecological importance of this taxa is further underscored by the ecosystem services associated with these functions, such as biological pest control, seed dispersal, and water quality.

Current conservation research focuses on detecting populations in decline, elucidating the mechanisms underlying species loss, and advancing conservation and management capacities (Storfer, 2003). Herpetofauna preservation strategies include increasing habitat connectivity in protected areas, laboratory-based reproductive practices like cryopreservation, and reintroductions of locally extinct species (Ananjeva et al., 2015). Habitat loss and fragmentation are significant drivers of amphibian loss, though additional research is needed to mechanistically describe the impact of restoring habitat connectivity on population dynamics (Cushman, 2006). Conservation breeding programs utilize gene banking and other reproductive technologies to perpetuate genetic variation among extant populations by reintroducing captive-reared populations into the wild (Browne et al., 2011). Finally, translocations of wild or captive-reared herpetofauna have become more successful in recent years and present encouraging potential for conservation practice (Germano & Bishop, 2009).

That said, herpetofauna is especially vulnerable to a decline in urban areas due to a variety of connecting abiotic and biotic factors stemming from habitat loss, fragmentation, isolation, and degradation common to cities and suburbs (Hamer & McDonnell, 2008). Urbanization can dramatically alter herpetofaunal assemblages in and around aquatic areas (Barrett, 2009), and increased road mortality from urban development can significantly impact population structure for terrestrial species (Deaton et al., 2014). Evidence suggests that herpetofaunal conservation in urban areas hinges upon maintaining structural complexity in remnant habitat and implementing strategic policies and management actions to protect suitable habitat (Hamer & McDonnell, 2009). However, current efforts to conserve reptile and amphibian

diversity fail to actively confront the social behaviors driving habitat degradation in human-dominated landscapes (Storfer, 2003). The development, use, and maintenance of infrastructure play a significant role in environmental changes and habitat destruction (Doyle & Havlick, 2009). Emerging research has sought to situate these changes within human modification frameworks by integrating the social and ecological sciences in areas such as the urban fringe (Feldpausch-Parker, 2019; Theobold, 2004).

Urban Biodiversity Conservation.

Efforts to conserve biodiversity in urban areas are motivated by a variety of social and biological imperatives including the preservation of local biodiversity, fulfillment of ethical obligations, and connection of people with nature through environmental education (Dearborn & Kark, 2010). Conservation practitioners in urban settings are informed by principles of urban ecology, which utilizes perspectives, practices, and models from a diversity of disciplines across the biophysical and social sciences (Pickett & Cadenasso, 2006). Urban wildlife ecology focuses on the ecology of wildlife as it relates to people and other features of the urban landscape (McCleery et al., 2014). Urban systems are uniquely driven by the activities of humans and conservation in urban landscapes can be especially challenging due to the high density of people representing diverse backgrounds inherent to urban locales. Moreover, evidence from a study of five metropolitan areas suggests that the majority of urban residents are concentrated in areas decreased biodiversity, especially as it relates to native species (Turner et al., 2004). Thus, the interplay of social and biotic factors within urban areas presents an interdisciplinary challenge for conservationists seeking to deliver "co-benefits to human and non-human components of biodiversity" (Shwartz et al., 2014, p.1).

To mitigate these challenges, conservation approaches in urban areas must be distinct from those practiced in sparsely populated rural spaces (McCleery et al., 2014). As such, promoting urban wildlife conservation may require awareness of how the diversity of identities represented in urban communities can influence relationships between urban residents and their surrounding biophysical environment. Though humanity is inextricably linked to changes in the biophysical environment, people residing in urban areas, especially children, tend to mentally separate themselves from their impact on the natural world and vice versa (Louv, 2008). Research in the social sciences suggests that this separation may be culturally specific, such that people in urban areas tend to relate to their natural environment along internal pathways that are distinct from those preferred by people of traditionally agrarian or otherwise rural backgrounds (Berenguer et al., 2005).

Overall, conservation practices in the natural sciences generally rely upon management and manipulation of the biophysical factors supporting species persistence. Conservationists recognize that most wildlife conservation issues are linked to human population growth and that managing wildlife populations depends upon managing anthropogenic factors contributing to species decline (Mills, 2007). Nevertheless, conservation in the natural sciences tends to bypass the social conditions that contribute to species decline in favor of developing protected areas and management practices that circumvent society's developmental imperative (Kelly, 2011).

This neoliberal approach to conservation is as an "amalgamation of ideology and techniques informed by the premise that nature can only be 'saved' through their submission to capital and its subsequent revaluation in capitalist terms" (Büscher et al., 2012, p. 4). Neoliberalized conservation is concerned with the re-regulation of nature through

commodification. This approach creates a new form of 'territorialization' which partitions resources and landscapes to control or even exclude local people (Igoe & Brockington, 2007).

Thus, the modern methods of neoliberal conservation fail to address social and economic inequalities of resource redistribution and instead rely on marketing mechanisms to incentivize conservation efforts (Fletcher, 2012). Critics assert that modern conservation practices and policies parallel primitive accumulation and colonization trends. These practices ultimately support the expansion of the same capitalist production and consumption behaviors that helped to create our current conservation concerns (Shirey & Lamberti, 2010). Moreover, despite management efforts from the natural sciences, research suggests that biodiversity continues to decline and that establishing protected areas in developing landscapes may further isolate imperiled species and delay extinction as opposed to reducing it outright (Carroll et al., 2004). Ultimately, successful conservation of imperiled species and ecosystems hinges upon social activities that can encourage values and behaviors which support biodiversity conservation.

Conservation practices in the social sciences

Conservation issues are almost always rooted in human activity, and as such, solutions to conservation issues must also begin with modifications to human behavior (Mascia et al., 2003; Schultz, 2011). Species conservation is as much a social imperative, as urbanization is a socio-spatial trend. And as such, meaningful efforts to conserve biodiversity, in any locale, urban or otherwise, hinge upon human actions to mitigate anthropogenic species decline (Bennet et al., 2017; Maynard et al., 2020). To encourage conservation behavior, the social sciencesseveral social science researchers recognize two key routes: social marketing and communication tools specific to changing a focal behavior, and environmental education to cultivate environmental literacy more generally (Monroe, 2003). Social marketing campaigns have become increasingly

prevalent in the United States and the United Kingdom over recent decades. Though the majority are designed for public health initiatives (Truong, 2014), campaigns have been successfully employed to foster sustainable behaviors such as composting and conserving water or electricity (McKenzie-Mohr, 2000). That said, in leveraging psychology principles, these programs are limited to encouraging a single action within the greater suite of potential conservation behaviors available to a targeted population (Smith, 2016).

Conversely, environmental education (hereafter, EE) programs are better suited to eliciting a variety of conservation behaviors through the cultivation of environmental literacy. Environmental literacy is described as "the extent to which a person is concerned about the environment, equipped to make informed decisions about it, and has the skills and motivation to take environmentally responsible actions" (Ardoin & Merrick, 2013, p. 3). As such, environmental literacy is not a dichotomy but a gradient defining an individual's understanding, awareness, and self-efficacy for the ecological systems around them. To this end, EE is concerned with bridging the gaps between society and the biophysical environment.

Recognizing that most conservation issues arise from anthropogenic actions and imperatives; conservation practitioners employing social science approaches seek to realign the attitudes and behaviors of people to preserve species and conserve natural resources (Margles et al., 2010; Mascia et al., 2003; Schultz, 2011). Conservation professionals promote generalized conservation attitudes and behaviors through the development of environmental literacy among target audiences (Monroe, 2003). However, there are numerous forms and outlets of responsible environmental behavior.

In developing a prominent theory of environmental behavior, Stern (2000) provides an especially coherent classification of environmentally significant behavior into four distinct

types. These include environmental activism (e.g., protesting, petitioning, lobbying, volunteering, etc.), public sphere environmentalism (e.g., volunteering for or donating money to conservation organizations), private sphere environmentalism (e.g., 'green consumerism, reducing consumption, and adopting sustainable waste disposal techniques) and organizational actions (i.e., collective actions taken as part of a larger institution or organization). Each of the aforementioned types of environmental behavior can be achieved through a form of environmental volunteering, with the possible exception of private-sphere environmentalism, which is intrinsically linked to one's personal or household behaviors. To this end, this research focuses on environmental volunteering as an inclusive and intentional form of responsible environmental behavior.

Volunteerism

Volunteering can be defined as a form of pro-social behavior. Pro-social behavior is a collective term used to describe all actions and activities that are advantageous to other persons or the larger society (Penner et al., 2005). Altruism, cooperation, and helping are varieties of pro-social behavior (Aydinli et al., 2013). Volunteerism can be classified as a conscious and explicit form of helping (Carpenter & Knowles Myers, 2010). Volunteering is a proactive behavior that typically includes a commitment of time and effort and eschews financial renumeration (Ryan, 2012). From a sociological standpoint, there is a distinction between volunteers and active participants of voluntary organizations, since the latter tend to contribute to public goods that are restricted to fellow members (Wilson, 2000).

Concerning environmental behaviors, volunteerism represents a planned, formalized, public form of helping behavior, undertaken for the benefit of the environment. Environmental volunteering activities appear in all modes of REB, as described by Stern (2000). Additionally,

environmental volunteers are credited with playing a significant role in natural resource management, including the delivery of outreach programs, maintenance of public spaces, and fundraising (Svendsen & Campbell, 2008). In a recent review of volunteer behavior situated within an international context, there were five primary modes of environmental volunteerism identified, including activism, education, monitoring, restoration, and promotion of sustainability (Measham & Barnett, 2008). Monitoring and restoration volunteering are often field-based activities, concerned with leveraging human capital to inventory biological phenomenon and rehabilitate degraded habitats, respectively. Education activities may occur in tandem with monitoring and restoration, as is the case in civic ecology practices, but focus on providing community education for select topics (Krasny & Tidball, 2009). Activism entails varying levels of politicization and is concerned with protecting or otherwise reducing degradation in natural environments. The promotion of sustainability tends to straddle the line between activism and education by aligning closely with schools and other social institutions to advance specific campaigns and encourage responsible environmental behavior.

The prevailing sociological theories explaining volunteerism are separated into two groups: the first assumes that individuals follow relatively simple and uniform mechanisms in response to their complex and dynamic circumstances, while the other recognizes the complexity of individual constitutions and treats the context as a background (Wilson, 2000). The former adopts the behaviorist assumption that a person's decision to volunteer is determined by rational cost-benefit analyses. Through a psychological lens, theories on the antecedents of volunteerism are nested within the latter approach and research efforts focus on individual dispositions (i.e. the other-oriented empathy and helpfulness) or self-attributed motivations that drive individual volunteering (Aylindi et al., 2013). In this way, an individual's motivations, values, and beliefs

are thought to be part of the larger set of cultural understandings that give meaning to and help shape individual behavior.

Volunteers are important to the continued functioning of our modern society (Rochester et al, 2016). The efforts of environmental volunteers are responsible for many contemporary environmental quality improvements (Ryan et al., 2001). As such, a significant body of research has emerged to probe the functional motivations of volunteers in a general sense (Chacón et al., 2017; Clary et al., 1998). Given much of this research relies on quantitative methods to develop and validate motivational indices, few studies have employed qualitative methodologies to explore the motivations of conservation volunteers and the complexity of motivational inputs this sector of volunteers ascribes to driving their involvement (Bruyere & Rappe, 2007). Nonetheless, motivation is recognized across a variety of social disciplines as a proximate factor in driving volunteerism, and is of value to understanding, and eventually promoting the antecedents of herpetological conservation volunteerism.

Herpetofauna Conservation Volunteerism

Within this research, herpetofaunal conservation volunteerism is defined as a taxa-specific form of environmental volunteering, whereby individuals undertake specific helping behaviors to benefit and thereby ensure the persistence of reptile and/or amphibian species. Examples of herpetofaunal conservation volunteerism include: restoring native habitat by removing litter from and revegetating green spaces, lobbying for legislation to protect imperiled wildlife, supporting herpetofaunal conservation and education programs, or otherwise participating in communal or individual activities led by conservation or research collectives. These volunteer behaviors are not limited to formalized conservation programming and can be undertaken by individuals who are unaffiliated with any specific conservation programs.

However, for this study, research participants are limited to those who currently or recently volunteered as part of a larger conservation program.

In addition to the urban conservation concerns facing herpetofauna generally, reptiles and amphibians are often seen as uncharismatic and undesirable by many people and cultures. Fear or aversion to this taxon is common and can interfere with peoples' willingness to conserve imperiled herpetofaunal species (Ceríaco et al., 2012). Using the widespread fear of snakes as an example, the literature points to a somewhat complicated relationship between the adaptations inherited from our primate ancestors and our socialization about, and exposure to, snake taxon. Much of the current psychological literature employs visual representations of snakes to gauge human fear responses and assess reactivity based on indices of emotional activation, such as palmar sweat response (Mineka & Ohmen, 2001; Murray & Foote, 1979). However, this approach has not accounted for the mediating role of aposematic signals, such as the potentially harmful triangular shape of fangs, which are often associated with snakes (Souchet & Aubret, 2016). Moreover, by not addressing the link between aposematic signals and perceived threat posed by snakes, this approach fails to connect the associability of the perceived threat posed by snakes to the aversive outcomes for which they are presumed dangerous (Baynes-Rock, 2017).

This aversion, hypothesized to have developed in tandem with visual specialization as an evolutionary response to the physical traits of venomous snakes, lies dormant within all primate-descendants whose evolutionary history coincided with the presence of such species (Isbell, 2015). However, this subconscious fear response is not universally demonstrated towards all visual snake representations nor by primates who lack socialization and direct experiences with snakes or fear of snakes. This evidence suggests that life experiences, ontogenetic perceptions, and the presence of aposematic signals play a meaningful role in activating the human fear

response. Thus, there is significant merit in understanding the motivations driving individuals to pursue herpetofaunal conservation volunteerism, as these volunteers demonstrate the capacity to overcome considerable social and evolutionary barriers to engaging in responsible environmental behavior.

Motivation and Experiences

Motivation is an antecedent to human behavior that describes the wants or needs which direct behavior towards a goal. In the context of this research, motivation is defined as a psycho-social construct describing the reasons for initiating, sustaining, and discontinuing participation in a given action (Weiss et al., 2012). Understanding what motivates people to act and how motivations drive behavior is an important concern to a variety of disciplines, including political science, psychology, sociology, and others (Kruglanski et al, 2015). There is significant support for integrated and translational approaches to motivational science research to increase the success of social intervention practices (Ryan, 2012), such as civic engagement, mental health programming, and environmental education. Thus, motivational science and research on the antecedents of behavior span many theoretical approaches and methodologies.

Within the last century, a significant shift occurred in motivational science from focusing on the external reinforcements and punishments that direct behavior and towards the inner workings of internal motivations. The contemporary motivational science paradigm seeks to understand an individual's goals and meanings and identify the cognitive, emotional, biological mediators and mechanisms that underlie human behavior (Ryan, 2012; Kruglanksi et al., 2015). There are many theories of human motivation currently referenced in the literature covering a variety of internal mediators and mechanisms. However, some motivational theories are empirically linked to explaining or predicting specific human behaviors, such as participation in

recreational sports (Harwood et al., 2008), eco-tourism (Bansal & Eiselt, 2008), and volunteerism (Wilson, 2012).

Within motivational sciences research, numerous studies investigating volunteer motivations have employed functional motivation theory to frame their investigations (Clary et al., 1999; see Chacon et al., 2017). According to the functional approach, a person's needs and motives are met by their attitudes. Although some people hold similar attitudes regarding a certain topic, this approach asserts that similar attitudes are not necessarily derived from similar motives across all people sharing similar attitudes. Moreover, while many attitudes primarily serve a single type of motivational process, other attitudes may serve multiple purposes for an individual (Katz, 1960). Thus, understanding one's attitudes as a precursor to explaining their opinions and behaviors hinges upon identifying the functional bases or underlying motivational patterns driving their attitudes. Katz hypothesized that attitudes serve four distinct functions: instrumental (aka utilitarian, or adjustive), ego-defensive, value-expressive, and knowledge (1960). Systematic sampling through interviews, behavioral observations, and objective scales allows researchers to assess these functions for which attitudes satisfy. Numerous motivational scales have been designed to facilitate general assessment and contextually specific motivation measurement of specific populations, such as sport and leisure participants (Li & Petrick, 2006; Mayer et al., 2007).

Functionalist approaches have been successfully applied to research determining the motivations underlying volunteerism and reveal functions potentially served by volunteering. The Volunteer Functions Inventory is an instrument designed to assess six hypothesized functions served by volunteering: values, understanding, social, career, protective, and enhancement (Clary et al., 1998). Motivational scales such as this appear frequently in the

literature on volunteerism (Chacón et al., 2017; Petriwskyj & Warburton, 2007). The growing body of volunteer motivation literature has primarily employed quantitative methods, such as survey questionnaires, to determine the importance of a predetermined suite of potential motivators. Qualitative approaches provide valuable insights into social processes (Creswell, 2013). However, there is a dearth of qualitative research exploring volunteer motivations, especially among environmental or conservation volunteers. Recent research reinforces the importance of employing qualitative research approaches to explore urban conservation volunteerism and the experiences that motivate participation (Asah & Blahna, 2012; Asah et al., 2014). That said, to date, there has been no qualitative research exploring the experiences that motivate wildlife conservation volunteerism, generally, and herpetofaunal conservation volunteerism, specifically. Thus, further qualitative research is needed to identify the experiences that motivate urban residents to volunteer in herpetofaunal conservation activities and programs.

In summary, the field of wildlife conservation research is predominated by the positivist quantitative methods of natural science approach despite the innate anthropogenic origins of conservation issues (Mascia et al., 2003). Current conservation research and practices fail to explain or address the social and behavioral antecedents of species decline (Schultz, 2011). Fortunately, the qualitative research methodologies common to social science research are particularly well suited to investigating the personal, emotional, and interpretive elements of human behavior, such as attitudes and motivations (Drury et al., 2011; Rust et al., 2017). The evidence provided in this chapter underscores the need for additional qualitative studies to better understand why people voluntarily choose to perform responsible environmental behaviors to conserve imperiled species. Reptiles and amphibians are globally threatened and comprise a socially uncharismatic taxon for which humans may have adapted a latent aversion (Baynes-

Rock, 2017; Ceríaco et al., 2012; Gibbon et al., 2000; Houlahan et al., 2000). Whether this aversion is evolutionarily driven or socially mediated, volunteers of herpetofaunal conservation represent a unique community of voluntary conservation behavior performers (Isbell, 2006). Furthermore, in urban areas, where individuals are further removed from nature and less likely to encounter native herpetofauna, residents that volunteer for conservation projects may do so for novel reasons, nonpareil to rural volunteers (Asah & Blahna, 2012; Turner et al., 2014). Thus, there is significant cause to explore the experiences of urban residents who volunteer for herpetofaunal conservation and identify the significant lived experiences motivating their actions.

CHAPTER 3

METHODOLOGY

Current conservation research and practices fail to explain or address the social and behavioral antecedents of species decline (Schultz, 2011). There is a clear need for additional qualitative studies to investigate the personal, emotional, and interpretive elements of human behavior, to better conserve imperiled species (Drury et al., 2011; Rust et al., 2017). Reptiles and amphibians are globally threatened and comprise a socially uncharismatic taxon for which humans may have adapted a latent aversion (Baynes-Rock, 2017; Ceríaco et al., 2012; Gibbon et al., 2000; Houlahan et al., 2000). Whether this aversion is evolutionarily driven or socially mediated, volunteers of herpetofaunal conservation represent a unique community of voluntary conservation behavior performers (Isbell, 2006). Furthermore, in urban areas, where individuals are further distanced from nature and less likely to encounter native herpetofauna, residents that volunteer for conservation projects may do so for novel reasons, nonpareil to rural volunteers (Asah & Blahna, 2012; Turner et al., 2014). Thus, there is significant cause to examine the experiences of urban residents who volunteer for herpetofaunal conservation and identify the significant lived experiences motivating their actions.

This study leverages qualitative methodology to explore the lived experiences motivating herpetofaunal conservation volunteerism among urban residents. Qualitative methods are particularly well-suited to study the emotional aspects of the human experience such as exploring the critical events and factors associated with an individual's knowledge and behavioral development (Chawla, 1998; Creswell, 2013). Specifically, this study employs narrative inquiry

in a constructivist research paradigm to collect and interpret narrative data from urban herpetofaunal conservation volunteers. Research findings can inform herpetofauna-centered educational program development and the implementation practices touted by urban wildlife conservation initiatives seeking to foster similar outcomes.

The following chapter begins by describing the proposed research design, the researcher's chosen paradigm, methodology and how all three align to conceptually frame this qualitative study of herpetofaunal conservation volunteers. Next are descriptions of the focal population, the sample for this study, and the process of subjection selection. Finally, this chapter will present the proposed instrumentation for this study and describe the proposed data collection and analysis procedures, including the researcher's subjectivity.

Research Design

The research design of this study is best discussed in terms of paradigm and methodology. A research paradigm is a collection of logically related assumptions and concepts that orient thinking and research practice (MacKenzie & Knipe, 2006). Research paradigms reflect a set of beliefs about the world, how to understand reality, and the approaches to studying human phenomena based on said beliefs (Coghlan & Brydon-Miller, 2014). Research paradigms include beliefs about epistemology, ontology, and axiology. These three branches of philosophy are concerned with the nature of truth, reality, and ethics, respectively, within the research process.

Epistemology is concerned with all aspects of the validity, scope and methods related to the acquisition of knowledge. A researcher's epistemology determines what constitutes a knowledge claim, how that knowledge is produced or acquired, and the extent of its applicability to the real world (Moon & Blackman, 2014). Generally, epistemology informs how researchers

frame their approach to making discoveries and inferences. Epistemological perspectives fall along a continuum based on the relationship between the subject and the object under study; examples include objectivist, constructionist, and subjectivist perspectives.

The ontological perspectives of qualitative research help the investigator to recognize how certain they can be about the nature or existence of the objects that they research (Moon & Blackman, 2014). Research ontology is dichotomized between realism and relativism. Realist ontology holds that a single universal reality exists independent of human experience; whereas relativist ontology recognizes reality as relative and constructed within the human mind such that there is no singular true reality.

Axiology is the philosophical study of values and the axiological perspectives of research paradigms help to set and clarify the guiding tone and rigor for action in research (Aliyu, 2015). Research axiology urges congruence between the ontological and epistemological assumptions by putting forth the standards and requirements of approaches and techniques that are appropriate for the subject under study. Qualitative researchers acknowledge that research is value-laden and that biases are present in the process and therefore seek to openly discuss the personal values and perspectives shaping narratives (Creswell, 2013). Thus, axiology refers to ethical issues and the values attributed at various stages of research process (Kivunja & Kuyuni, 2017). Taken together, these three facets of the research paradigm determine how the researcher can understand reality, the suitability of research approaches, and the morality and values guiding the research process.

Research Paradigm: Constructivist

This study design most closely aligns with the constructivist paradigm. Within the lens of social inquiry, the constructivist paradigm asserts that people actively construct knowledge

within their subjective and intersubjective realities (Coghlan & Brydon-Miller, 2014). Because of this, constructivists believe that different people will construct the meaning of the same object or phenomenon in different ways, based on their respective cultural, historical, and social perspectives. Moreover, constructivism is characterized by a constructivist epistemology which recognizes truth or meaning as a product (and producer) of our engagement with the multiple realities of our world (Moon & Blackman, 2014). In alignment with this epistemological stance, constructivist ontology is more relativist than realist and assumes reflexive stances of knowing and representing studied phenomena. Constructivists acknowledge their personal biases by locating themselves within studied realities and examining the social influences of their actions (Weenink et al., 2016). By 'leaning into' the inherent tension produced by intersubjective meaning-making, constructivist scholars can explore the socially constructed world of human experience while eschewing the unrealistic assumptions of objectivity found in positivist research approaches. Moreover, to account for both the intrinsic and extrinsic motivators of volunteer behavior, this research is framed by social constructivism, which emphasizes further the collaborative and social nature of learning. Thus, the constructivist paradigm aligns with the objectives of this study to explore the lived experiences motivating herpetofaunal conservation volunteers.

It should be noted that the research paradigm is a construct entirely separate from the theoretic framework. Whereas the research paradigm describes the philosophical beliefs around research and knowledge production, the theoretic framework need not be a single, testable theory, but is instead the combination of published empirical and theoretical literature which serves to justify and conceptualize a research investigation (Lederman & Lederman, 2015). This study is rooted in environmental education literature on significant life experiences (hereafter,

SLE). The qualitative tradition and autobiographical data collection methods employed in SLE research allow for direct descriptions of an individual's lived experience which lends greater authenticity to their voice than may be achievable in other research traditions. There is something of significant value in the stories told by participants of SLE research and the researcher believes that this approach, in the tradition of other narrative-based practices, has the power to provide insights that can enhance conservation practice and broaden communication practices in novel ways.

Research methodology refers to the systemic approach to conducting and analyzing research data and can be comprised of multiple methods (e.g., interviews, participant observation, document analysis) (Mackenzie & Snipe, 2006). Research methodologies must be consistent with the paradigm and theoretical framework scaffolding the research design. To ensure alignment with the constructivist paradigm and SLE theoretical framework, this study utilized the qualitative methodology of narrative inquiry.

Theoretical Framework: Significant Life Experiences

The study of significant life experiences (hereafter, SLE) emerged from research in environmental education. The rationale follows that if the objective of environmental education is to develop an informed citizenry motivated and capable of addressing environmental issues, then its practitioners should understand and attempt to replicate those experiences that successfully motivated current environmental stewards (Payne, 1999). Early research suggested that a similar suite of lived experiences contributed to the founding and development of environmental interests among leaders of four citizen conservation organizations (Tanner, 1980). In this seminal study, 44 of 45 respondents cited childhood experiences in the outdoors and pristine environments as significant motivators. Since then, additional research supports the

notion that environmental, as well as social concerns, can drive environmental action, including the presence of an adult role model, indirect experiences with nature (via books, television, etc.), and the loss or degradation of a valued space (Chawla, 1999).

Current research illustrates a complex relationship between lived experiences and the performance of stewardship behavior. Multinational studies and research in developed and developing countries across the world suggest that SLEs play an important role in motivating stewardship behavior. A mixed methods study in Taiwan demonstrated that SLE could effectively distinguish environmentally committed people from those apathetic to environmental protection (Hsu, 2009). Within this study, 54.6% of variances in environmental actions could be explained by significant life experiences. However, a quantitative approach to empirically examine how SLE-related variables relate to environmental knowledge and behavior among North Carolina sixth- and eighth-graders found limited evidence to support a positive relationship (Stevenson et al., 2014). One major drawback of this approach is that the study instrument, a derivative of the Middle School Environmental Literacy Tool, focused on a predetermined selection of SLE, limited to the time spent outside (i.e., with or without family), the presence of an adult role model for environmental sensitivity, and indirect experiences with nature (via books, television, etc.). Moreover, this approach sought to broadly associate SLE with the knowledge and self-reported behavior of middle school students, a civically inactive, prepubescent demographic inappropriate for SLE research. In a review of SLE literature, it was asserted that "research on significant life experiences can achieve its potential importance only when it studies the right people for the right reasons" (Tanner, 1998, pg. 399). The author goes on to scrutinize ten research reports for focusing on environmental educators as opposed to the politically active citizens and activists for whom SLE research was originally proposed to study.

Employing appropriate methods with targeted communities is paramount to conducting robust studies of SLE. Environmental education research has been a historically quantitative pursuit and although recent approaches in the qualitative tradition focus on the feelings and personal understandings that motivate action or maintain inaction (Chawla, 1998). However, qualitative approaches provide important insights into understanding the impact of environmental education (Nazir, 2016). In a mixed methods evaluation measuring the cognitive and affective responses of fourth-graders to a field education program, the qualitative methods revealed that only students who spent time outside in the wetland expressed conservation sentiments (Cachelin et al., 2009). When compared to an outgroup of students who did not attend the wetland field program, only those who visited the wetland were motivated to return by the educational opportunities, and the only students who did not want to visit the wetland were those who had never been. This evidence suggests that qualitative methodologies may hold key insights that are essential to bridging the gap between environmental awareness and motivation to act on behalf of the environment.

Methodology: Narrative Inquiry

Narrative inquiry is a research methodology that engages in the study of people's experiences by using stories (i.e., first-person accounts of experiences) as primary textual data (Merriam, 2009). Narrative inquirers study human experience by viewing lived experience as studied phenomena. There are three dimensions of narrative inquiry spaces: the interaction dimension, representing the personal and social elements of an experience; the continuity dimension, referring to the temporal context of an experience (i.e., past, present or future); and the situation or spatial location and place of an experience (Clandinin, 2006). The three-dimensional narrative inquiry spaces highlight the relational nature of this methodology, wherein

narrative inquirers must deeply inquire into the experiences of their participants and themselves to co-construct relational narratives. In this way, narrative inquirers actively shape, are a part of, and are shaped by the research landscape that they study. This methodology is consistent with the epistemological and ontological assumptions of the constructivist paradigm and is especially well-suited to investigations of lived experiences.

Population and Sample

The purpose of this study was to explore the lived experiences motivating herpetofaunal conservation volunteers. Participants were adults (i.e., at least 18 years of age at the time of the study) residing in the Atlanta metropolitan region, with current or recent (i.e., within the last three years) experience volunteering for a herpetofaunal conservation program or activity. Examples of herpetofauna conservation activities included captive rearing of eggs or egg masses, riparian or terrestrial habitat restoration activities, providing herpetofaunal outreach to the public, or participating in reptile or amphibian citizen science surveys (see Appendix A). Regarding inclusion criteria, all eligible participants resided within the boundaries of the Atlanta metropolitan statistical area, as defined by the United States Census Bureau (Ratcliffe et al., 2016). This spatial boundary included the 29 Georgia counties surrounding the city Atlanta (see Figure 2).

Subject Selection

This study utilized purposive sampling to capture a wide range of lived experiences within the very narrowly defined population of adult herpetofaunal conservation volunteers. Purposive sampling is a nonrandom sampling technique well-suited to hard-to-find populations (Bernard, 2017). To identify potential participants for the sampling frame, an online questionnaire was disseminated via volunteer listservs to the major herpetofaunal conservation

organizations in the state of Georgia. The questionnaire identified and secured a diverse sample of eligible participants among organized volunteers operating in metro Atlanta. These organizations included, but were not limited to: the Orianne Society, the Amphibian Foundation, FrogWatch, local zoos, and aquaria. Based on their responses to the questionnaire, the researcher selected study participants fitting the following criteria: experience volunteering for herpetofaunal conservation within the past three years, residence in metro Atlanta, 18 years of age or older, and willing to be interviewed about their experiences. Qualitative research sample sizes are not standardized and vary among theoretical frameworks, research questions and objectives (Butina, 2015). Sampling is generally terminated when the researcher reaches the point of saturation or redundancy; however, setting a minimum sample size and coding the data as it is collected are recommended to determine when no new information has been collected (Merriam, 2009; Patton, 2014).

Study participants were selected based on their responses to include volunteers representing a wide variety of activities and experience levels in herpetofaunal conservation volunteering. Participation in the online survey was incentivized with a lottery for a $25 Recreation Equipment Inc. (REI) gift card. Additionally, those who agreed to participate in the study also received an REI gift card as compensation for their time and effort, at the end of the data collection process. Incentives and compensation were distributed virtually, using online gift cards.

Instrumentation

Qualitative research seeks to cultivate a deep understanding of human behavior and experiences using textual data, rather than the breadth of understanding achieved through quantitative research methods. The qualitative research tradition seeks to deepen our

understanding and produce in-depth and illustrative information to better understand the multiple dimensions of a research problem (Almeida et al., 2017). Qualitative research eschews numerical representations to focus on aspects of reality that cannot be easily quantified. That said, qualitative research findings are not intended to be generalizable, so the inferences emerging from qualitative data do not necessarily apply to members of the focal population outside of the studied sample. Thus, while quantitative methods may produce findings that can be extrapolated to members of the population that were not explicitly studied, qualitative methods are inappropriate for developing a broad understanding of a focal population.

Often, qualitative researchers must take on the role of 'primary instrument' for data collection and analysis (Merriam, 2009). This is true of many qualitative methods, including ethnography, case study interviews, and biographical studies (Creswell, 2013). Humans possess conscious and unconscious biases that can skew qualitative research findings if not mitigated throughout the investigative process. Reliability and validity concerns arise from the researcher's position as an instrument because people are laden with experiences and beliefs that may impact the investigative process. Fortunately, the long-standing history of qualitative research has developed techniques to identify and monitor sources of bias (LeCompte & Goetz, 1982).

Although the primary thrust of conservation research is dominated by quantitative approaches, the SLE approach is primarily characterized by qualitative methodologies (Chawla, 1998). Quantitative methods prove unsuitable to studies seeking a deep understanding of "particular subgroups and of the underlying processes, values, dilemmas, emotions, conflicts, and relationships which give rise to specific outcomes" (Drury et al., 2010, p. 19). The depth of understanding provided through qualitative methods and the array of potential research areas that can be identified therein are notable strengths associated with the SLE framework (Ceaser, 2001;

Chawla, 2001). In a seminal review of SLE research approaches, Chawla indicated that the qualitative tradition of SLE is itself a strength of contemporary SLE research (Chawla, 1998). The qualitative research methods employed in SLE research are best suited to explore the emotional and interpretive sides of the human experience and, therefore, the significant lived experiences that motivate conservation professionals. That said, data collection and analysis within the qualitative research tradition can both be very time-consuming (Creswell, 2013). The coding of qualitative data can be highly subjective if potential sources of bias within the research design and the researchers themselves are not identified early and mitigated throughout the data collection, analysis, and reporting process (Nazir, 2016). In the same review, the literature suggests standardized reporting and coding of subject responses could benefit the validity and comparability of inferences derived from qualitative SLE studies (Chawla, 1998).

Semi-structured Interviews

In this study, data was collected using semi-structured interviews. A research interview is a process wherein a researcher and participant engage in conversation related to the research questions to obtain personalized information (Merriam, 2009). In semi-structured research interviews, the researcher assumes that participants define the world in unique ways; therefore, this method is often flexibly guided by a list of questions or topics to discuss without rigidly predetermining the wording and order of the questions. Additionally, the researcher may introduce additional questions or prompts to elicit specific information from all respondents (Seidman, 2006). Semi-structured interviews can be less intimidating to a potential participant than a survey questionnaire and may produce more fruitful results as a result (Drury et al., 2010). The flexibility of this approach also enables participants to respond freely, with their own words, to reflect their beliefs and perspectives around the focal phenomenon. When combined with a

comfortable rapport between the researcher and participant, this flexibility will enable the researcher to collect personal insights from urban volunteers about their experiences and motivations for engaging in herpetofaunal conservation. The researcher relied on a predetermined array of semi-structured interview questions to gain detail, depth, and an insider's perspective on the motivational experiences that drive urban herpetofaunal conservation volunteering. After collecting and transcribing this qualitative data, the researcher initiated the coding and thematic analysis processes for robust analysis of the data**.**

Data Collection Procedures

Data collection began after participants were made aware of the rights and role in the research process. Considering current international public health concerns, and with approval from the Institutional Review Board (IRB), the researcher employed virtual communication methods to contact, gain consent, and collect data from participants. Before completing the online survey, potential study participants were sent a document describing the purpose of the research, the ethical considerations, and the rights of the participants in the research process. The online survey requestedrequested contact information (i.e., name, email, phone number, birth year, and zip code) and presented a checklist of volunteer activities for herpetofaunal conservation. The checklist also invitedinvited participants to indicate: which organizations they volunteer with, what kind of volunteer herpetofaunal conservation activities they engaged within the past year, their frequency or level of exposure to volunteer activities (i.e., a single/isolated event, repeated engagement, or regular participant), and whether they were willing to be contacted for further interviews.

The survey checklist (see Appendix A) servedserved as a secondary criterion for identifying recent herpetofaunal conservation volunteers. Participants' zip codescodes were used

to verify residence within the Atlanta Metropolitan Region. To develop an inclusive list of volunteer activities covering the entire spectrum of herpetofaunal conservation practices, the researcher consulted experts in the field of herpetofaunal conservation and current or recent volunteers with the Herpetological Society of the University of Georgia. The finalized checklist used in the online survey included as many herpetofaunal conservation activities open to volunteers as possible in addition to an open-ended 'Other' option for potential participants to describe their volunteer activity.

After subject selection, the researcher contacted participants and scheduled interviews via email. During the scheduling process, the researcher invited participants to select their pseudonyms, which were used exclusively to identify the participant for the duration of the data collection and analysis process (Allen & Wiles, 2016). Any identifying participant information was destroyed after distributing compensatory gift cards. Before recording, the researcher repeated the description of study objectives and reaffirmed verbal consent to participate with all participants. Participant interviews were recorded using the Otter.ai application on an iPad 7. Otter.ai provides real-time transcription services for an added fee. wereTranscripts were reviewed and cleaned to ensure accuracy between the recordings and the textual data produced. The iPad 7 and the files to which audio data was recorded were both password-protected.

The interview protocol guidedguided the conversation between researcher and participants; however, additional follow-up or probing questions werewere asked to encourage greater response depth and clarity (see Appendix B). Congruence between the research objectives, methodology, and methods facilitated rigorous social research (Morse et al., 2002); thus, the overarching goals of the questions included in the interview protocol matched the objectives of the proposed study. The interview questions were designed to explore the lived

experiences of volunteers and how these experiences motivated their actions. During the virtual interview, the researcher recorded handwritten notes and observations regarding both the affectations and expressions of participants and any salient themes or constructs related to participant responses. Any notes, observations, or analytic memos were recorded in a private research journal and secured in a locked room. Analytic memos are a form of supportive devices in qualitative research that encourages reflexivity in the analytic process (Saldana, 2015). Additionally, concurrently collecting and analyzing data increases the rigor of qualitative inquiry by facilitating the determination of saturation (Johnson et al., 2020; Morse et al., 2002). Therefore, interviews were scheduled to allow time for the researcher to preliminarily review and scrutinize the data from each participant before collecting data from another.

Before analyzing data, the researcher reviewed and cleaned the transcribed data by listening to the recorded audio file and revising the transcripts to exactly match the audio recordings. The transcription and cleaning process were conducted in tandem with the collection of interview data. The researcher reviewed the recorded interviews and adjusted the Otter.ai transcripts to match the audio, after each interview. Combining the data collection and transcription processes enables the researcher to become more immersed in the data and distinguish the point of saturation or redundancy (Merriam, 2009). Cleaned transcripts were saved as Google documents and copies were sent to participants to improve credibility through member checking. Member checking is a validation technique to enhance rigor in qualitative research that ensures the participants' own meanings are clearly reflected in the data and its interpretation (Birt et al., 2016). The cleaned transcripts were sent to respective participants via email and participants were invited to cross out or edit sections of their responses, over a predetermined time span. The Google document links containing materials for member checking

were encrypted to only be visible to the email provided by each respective participant, for added security. After the revision period, the updated data was stored on password-secured hard drives and in hard copy files protected in a locked filing cabinet. In alignment with the constructivist paradigm, an additional opportunity for member checking occurred after the data had been analyzed and interpreted by the researcher. All transcripts and recorded audio data will be destroyed two years after the termination of the study to protect the rights and privacy of participants.

Data Analysis Approach

The qualitative data collected in this study was analyzed through iterative coding processes and thematic analysis. Coding is a highly fluid and cyclical process of analyzing qualitative data. It is not a 'precise science' but an interpretive act to "summarize, distill, or condense data" (Saldaña, 2015, p. 4). A code in qualitative inquiry is often a word or short phrase used to symbolically assign attributes to textual or visual data from transcripts, observations, documents, and other communicative outlets. Codes are generated by the researcher to attribute interpretive meaning to a unit of qualitative data for further analysis (Linneberg & Korsgaard, 2019). Coding is the transitional process between data collection and more extensive analysis and many coding methods exist to facilitate the identification of patterns and development of categories and their connections in qualitative data (Vogt et al., 2014).

In the first-cycle coding process, initial codes were further consolidated by meaning to form a category. Categories are words or phrases that explicitly describe segments of the data and give rise to themes (Saldaña, 2015). Themes, which are phrases or sentences that describe subtle or tacit processes in the data, emerged from the interpretation of these categories and codes. If the analysis is the process of searching for patterns in data to develop ideas that help

explain those patterns, then qualitative coding seeks to ascribe codes to the qualitative datum to synthesize categories, themes, and assertions based on the repeated occurrence, or patterning, of emergent codes (Stenner, 2014).

Based on the codes and categories identified in the first cycle, the analysis process entered an intermediary phase of thematic analysis (Rossman & Rallis, 2003). During this period, the researcher developed extended phrases or sentences to distill meaning from ascribed codes or units of data at a manifest or latent level. Thematic analysis can comprise its own intermediate phase or represent a second cycle method, depending on the data and the researcher's interpretation throughout the earlier coding and categorization processes. Thematic analysis focuses on patterns of meaning that emerge across the data set and leverages visual or textual thematic maps to search for themes and identify connections between themes and subthemes (Braun & Clarke, 2012). To distill themes from the coded data, the researcher compiled and reviewed the codes, categories, memos, and specific data passages identified in the first cycle to develop emerging patterns to craft descriptive themes. The second cycle of analysis integrates analytic skills to disassemble and reassemble the codes and categories into a concise set for interpretation (Castleberry & Nolen, 2018). Thus, depending on the patterns identified through earlier iterations of coding, the researcher can either proceed to this stage of thematic distillation and synthesis or cycle back to recode the data based on another first cycle method or a more analytic second cycle coding method**.**

Based on the persisting analytical needs of the dataset, the researcher proceeded from thematic analysis to the second cycle coding method of Elaborative coding. Elaborative coding begins with theoretical constructs from a previous study, to build on and refine these constructs as they relate to the themes and categories derived from the data under analysis (Auerbach &

Silverstein, 2003). Significant life experience (SLE) research is a well-established tradition environmental education that describes a suite of similar lived experiences shared by environmental activists and professionals across many locales and cultures (Chawla, 1998). Elaborative coding builds on the codes, categories, and themes of a previous study and enabled me to frame the findings of my data within the established literature, adding an element of standardization and comparability to the coding process.

This chapter discussed the research paradigm, methodology and methods for the proposed qualitative study of urban herpetofaunal conservation volunteers. An important highlight of this chapter was the qualitative research design and the processes and procedures for collecting and analyzing textual data with sufficient academic rigor. The upcoming chapter will discuss the results and key findings emerging from the researcher's collection and analysis of participant data.

Positionality Statement

Hi there! My name is Micah Copeland Miles. I am a Black, upper-middle-class, cis-gendered woman who is able-bodied, though I grew up with several chronic conditions (i.e., asthma, seasonal and food allergies, etc.) that limited my capacity to engage with the outdoors like my peers. I can recall tight-chested nights spent hooked up to a nebulizer. I'd take slow measured breathes of cortico-steroids aerated through a fine mist, and exhale wheezing fitful rasps of congestion. These nights were usually triggered by my own body's response to histamines, the histamines present in the fields I raced through with my friends, or perhaps the histamines associated with the dander in my neighbor's dogs' saliva. I understood that this was the way my body responded to the world. The living world. And I grew comfortable with my future as an 'indoor' kid.

I grew up in a suburban neighborhood located between two major metropolitan centers, so I did not amass a significant amount of experience with wildlife until I graduated with my Bachelor's degree in Environmental Science at the University of Maryland: College Park. My parents were raised in lower-class suburban/urban areas such that my passion for wildlife did not develop from the values and experiences of their upbringing. Since my medical reality limited by outdoor experiences as a child, I fell in love with wildlife through indirect experiences. Maryland is a highly urbanized stat with the highest median income in the nation. My parents had the resources and backgrounds to recognize my passion for animals and commit to feeding that passion to the best of their abilities. We were members of the Smithsonian's National Zoo so I could attend special events and eventually volunteer as a summer keeper's aide in the Amazonia exhibit. What I understood to be 'nature' was a combination of the exotic species I encountered through zoo exhibits and the media and the matrix of native vegetation and wildlife commanding whatever space remained between anthropogenic structures. London plane trees and generalist oak species were the backdrop of my youth, though I could easily venture 30 minutes south on I-95 to visit lions, pandas, and tree frogs at 'my' zoo for almost free.

Instead, I came to appreciate the flora and fauna of ecosystems very distant to my own through books, videos, and television programming that highlighted Australian and African wildlife (i.e., Steve Irwin's Crocodile Hunter, and the Jeff Corwin Experience). I can't begin to estimate how many hours I spent watching the Animal Planet cable channel. The gorgeous strange landscapes and limitless arrays of facts and natural histories captivated me with an intensity I still pursue today. Current programming varied notably from the content I fell in love with. The current slogan "Surprisingly Human" aptly describes the channel's shift from majority wildlife to majority domestic faunal focus. I remember entire Saturdays spent inside to avoid the

triggering effects of spring's Cherry Blossom bloom, watching marathons of Wild Kingdom of Omaha punctuated with double-features of original programming like the Crocodile Hunter, Meerkat Manor, or the Most Extreme. The hosts of these shows, sometimes only narrators, were the only humans featured in those days. The true focus was the wildlife and the epic documentary-quality footage of animals in action. The hosts never looked like me. And growing up in the planned community of Columbia MD, that didn't seem entirely unusual or something to feel concerned about. I don't recall ever wondering why only white men, and perhaps a handful of white women were given the opportunity to host my favorite series. In fact, as the indoor bookworm that I was, I assumed that education granted them the right to fill these spaces. I was always a quick study and learning came so easily to me. It felt natural for me to believe that when I had learned enough, I too could fill such a role in species conservation and perhaps inspire others to become stewards as well.

As someone suffering from an array of indoor and outdoor allergies, I was uninterested in studying species for which I could not comfortably handle and gravitated towards reptiles and amphibians, which lacked the dander or pollen allergens of mammals or plants. The first time I held a wild lizard, I was living and working in Thousand Oaks CA, interning with the Santa Monica Mountains National Recreation Area. I received a pet bearded dragon after graduating from the University of Maryland the previous May, but by August I was living on the other side of the country. I was a three-hour time difference from just about everyone who I had ever known and who had ever known me. The outgoing intern responsible for training me opened a pitfall trap, a structure designed for herpetofauna and small mammal trapping, revealing a juvenile side-blotched lizard. She handed me the baby lizard and just as I felt with my dragon at home, I fell in love. In an instant, it no longer mattered that I was thousands of miles from home

or that I had thrown up from heat exhaustion on my first day on the job, the week before. I loved them. I loved herps. And when I went on to catch my first snake, by myself, two weeks later, I knew I could be - no - I knew I was destined to be a herpetologist. Towards the end of my training period, I remember one of the outgoing interns telling me that our boss didn't know I was Black from our phone interviews and she was excited to have the first black female intern. We laughed that 'fortunately' Los Angeles County was not the deep South or anything so I was bound to be ok.

As a young Black woman pursuing herpetological field technician positions and later an M.S. in Forest Resources at the University of Georgia, I regularly confronted the racial and gender disparities within ecological disciplines. In my experience, the field of urban ecology is decidedly more diverse than the larger field of ecology; however, urban wildlife ecology often fails to acknowledge the societal or human aspects of urban spaces and the impact of urban culture on species conservation. Transitioning from Los Angeles CA to Athens GA by way of Otto NC, was a venture for which nothing in my background could have ever prepared me. I spent two months living in rural North Carolina at the Coweeta Hydrological Research Station, a site semi-famous in the scientific community for the caudate amphibian diversity and the long-term datasets and research projects documenting that diversity. When I arrived, my car broke down on the side of the road and I became aware of more confederate flags than I have ever seen in my life. After enduring the vulnerability of being a woman of color incapacitated in a visually hostile space, I became even more dependent on my vehicle as I soon realized I could only contact my friends and family from the signal service available on the main road, roughly 15 miles from dorm housing. Each day, I would drive to the main road, park in the Smoky Mountains National Park rest stop to call my parents and resist the overwhelming urge to break

down in response to the concern in their voices. I was more isolated than I had ever been in my life. I remember walking out of the nearby Piggly Wiggly where an employee consistently made an effort to follow my browsing route with her eyes to find a small rally passing by with pickup trucks proudly waving their flags of failed rebellion. It was weeks after the start of the Ferguson riots and Baltimore was still suffering in the aftermath of the Freddie Gray murder. I assisted salamander surveys most nights, beginning at sundown and sometimes lasting past dawn. I weathered emotional breakdowns weekly. I lost weight. I stress-vomited, regularly. I spent pitch-black nights traversing steep slopes searching for salamanders in a dull persisting terror. My student and technician counterparts laughed about the threat of bears and extirpated mountain lions. I was more concerned by the threat of clansmen proudly reclaiming their ownership of the forests their ancestors 'tamed' and mine fled through. One other Black student, a Haitian intern from Rhode Island, was my closest, most trusted ally. While all students and technicians could joke or complain about the lack of sleep and hygiene, only we shared this quiet struggle.

In this way, I may bring potential biases to my research surrounding the importance of race and inclusivity on the efficacy of environmental education and outreach, in addition to preconceptions around the value of representation and decolonizing methodologies with regards to conservation behavior among urban residents.

CHAPTER 4

RESULTS AND DISCUSSION

In species conservation research, there is a clear need for additional qualitative studies to investigate the personal, emotional, and interpretive elements of human behavior, and to mitigate the social and behavioral antecedents of declining biodiversity (Drury et al., 2011; Rust et al., 2017; Schultz, 2011). Reptiles and amphibians are globally threatened, socially uncharismatic taxa for which humans may have adapted an evolutionary aversion (Baynes-Rock, 2017; Ceríaco et al., 2012; Gibbon et al., 2000; Houlahan et al., 2000). As such, volunteers of herpetofaunal conservation represent a unique community of voluntary conservation behavior performers. This is especially true for volunteers in urban areas which may be further removed from in-person encounters with native species (Asah & Blahna, 2012; Isbell, 2006; Turner et al., 2004). Thus, there is significant cause to examine the experiences of urban residents who volunteer for herpetofaunal conservation and identify the significant lived experiences motivating their actions.

This study uses qualitative methodology to explore the lived experiences motivating herpetofaunal conservation volunteerism among urban residents. Specifically, this study employed semi-structured interviews in a constructivist research paradigm to collect and interpret narrative data from current or recent volunteers of urban herpetofaunal conservation programs.

Overarching Research Question: Why do urban residents choose to volunteer in herpetofaunal conservation?

- What are the lived experiences of urban residents who volunteer in herpetofaunal conservation programs?
    - Objective: Explore the lived experiences of urban herpetofaunal conservation volunteers
- How have significant life experiences motivated urban residents to volunteer in herpetofaunal conservation?
    - Objective: Identify the significant life experiences motivating herpetofaunal conservation volunteerism

The following chapter begins by describing the data collection setting and the self-described demographics of the nine volunteers who participated in this study. Next is an overview of the data collection procedures first proposed in chapter 3 along with any variations or deviations implemented during the survey and interview processes. The remaining sections describe the analysis process, present the research findings generated therein, and discuss measures taken to reinforce trustworthiness throughout the study.

Setting

Data collection began in November 2020, roughly eight months after the United States declared a state of emergency in response to the COVID-19 pandemic. Due to rising infection rates during this time, all data was collected virtually using internet-based communications. Participants were recruited using online fliers disseminated via social media platforms (i.e. Instagram, Facebook) and private email listservs associated with herpetofaunal conservation organizations in the Atlanta Metropolitan area (see Figure 1).

Thirty-two prospective participants responded to an open-ended online survey hosted by the University of Georgia's Qualtrics license and 12 were deemed eligible to participate in the study based on inclusion criteria (see Chapter 3). Emails were sent to the 12 eligible respondents, nine individuals agreed to participate in virtual interviews. Participant interviews were scheduled and conducted between November 17, 2020 and February 9, 2021. Interviews were conducted using Zoom and recorded with Otter.ai transcription software. The researcher listened to each

recording multiple times to clean and edit transcripts, before sending to participants for member-checking.

The COVID-19 pandemic limited face-to-face interactions in addition to reducing the frequency of volunteering opportunities available to new or established volunteers. Many venues for herpetofaunal conservation activities in metro-Atlanta were either closed or operating at reduced capacity. As a result, digital communications were the only consistently accessible modes of recruiting participants and collecting data. Moreover, since most affiliated environmental education programs were closed to the public or suspended during the height of the national pandemic, there were fewer opportunities for current volunteers to encounter the recruitment fliers or the survey. Whether an eligible participant encountered the survey and recruitment materials depended on their exposure and access to the internet.

Social distancing and other public health precautions revealed a noticeable gap in the implementation of distanced environmental education programming. The current education and outreach approach touted by metro-Atlanta conservation programs relies upon tactile interactions between instructors, students/visitors, and animals/specimens. In the absence of these in-person programs, volunteers searched for asynchronous methods of engagement, such as creating open-sourced lesson plans and organizing local neighborhood walks/cleanups. For this reason, extra attention may have been paid to non-traditional forms of volunteer engagement with herpetofaunal conservation. In a year unaffected by a global pandemic, these practices may be less common; however, this past year in quarantine necessitated digital or asynchronous avenues of engagement.

Demographics

Participants were not specifically asked to provide demographic data; however, many self-identified demographic traits related to race, religion, sexual orientation, neurodiversity, etc. From interview responses and survey data, the participants in this study represent a diverse array of cultural and social backgrounds. Additionally, study participants represent a variety of neighborhoods in the Atlanta metropolitan region but were concentrated on the eastside of Atlanta (see Figure 2). Finally, most participants had completed at least an undergraduate degree prior to being interviewed in this study.

An individual's appreciation for learning or higher education is a personal attribute that cannot be described as an 'experience' as it is the culminating personality feature that arises from a series of experiences. Like one's cultural identity and location of residence within the metro Atlanta region, demographic features are derived from lifetimes of experiences and processes that remain outside the scope of this study. That said, these demographic features may have played meaningful roles in motivating participants' volunteer engagement but were not interrogated within the analysis process.

Data Collection

Interviews were conducted with nine participants, though only eight sets of transcripts were coded for in-depth analysis. One participant, pseudonym Cochranella, was determined to be ineligible since she volunteered in the past (prior to three years ago) and has become a paid employee of the Atlanta Botanical Gardens since then. Interviews were conducted via Zoom and transcribed in real-time by the Otter transcription service app.

A single interview was conducted with each participant for a duration of 28-52 minutes ($M = 40$ min, 42 s; $SD = 10$ min, 33 s). After each interview, transcripts were reviewed, cleaned, and sent to participants for member-checking (Birt et al., 2016) using an open-source document

sharing and editing platform. There were no technical difficulties, and any indecipherable phrases were corrected by the participants during member checking to assure accuracy and authenticity.

Data Analysis

During interviews, the researcher took analytic memos to reflexively guide the semi-structured interview and cover any gaps or areas of confusion (Saldana, 2016). These memos were reviewed alongside the transcripts during the cleaning process to decipher phrases incompletely recorded by the transcription service. After member checking, transcribed interviews were reviewed again and printed for hand coding. During this review process, the researcher reflected on the interview notes and transcripts and wrote analytic memos related to each participant and patterns that emerged between participants.

The researcher used the method of eclectic coding by combining three coding methods across the eight participant transcripts. Based on the researcher's limited experience with analyzing textual data, three coding methods were selected based on their broad applicability and capacity to distill the affective qualities that motivate human action. Eclectic coding ascribes two or more coding methods to textual data (Glaser & Strauss, 1967); here, the researcher chose In Vivo (Strauss, 1987), Process (Bogdan & Biklen, 2007), and Emotional coding methods (Goleman, 1995).

In Vivo and Process coding are foundational methods for grounded theory but also serve as highly flexible Initial (aka open-coding) methods (Saldaña, 2015). In Vivo codes (aka literal or verbatim coding) refer to words or short phrases from the actual language in the data corpus (Strauss, 1987; Corbin & Strauss, 2015). In Vivo codes are appropriate to virtually all qualitative studies, especially those that prioritize the voices of participants. In the context of this study, in

vivo codes added credibility to emergent findings by elevating and honoring the verbatim responses of participants. Process coding (aka action coding) uses gerunds, verbs ending with "-ing" to indicate action and reflect the stages or phases of phenomenon (Bogdan & Biklen, 2007). Process plays a part in metaphysical concepts like memory and motivation which are central to the research questions of this study.

The third eclectic method was Emotional coding, an affective coding method that underscores the subjective qualities of human experience by naming and acknowledging those feelings (Saldana, 2015). Emotions can be defined as "a feeling and its distinctive thoughts, psychological and biological states and range of propensities to act," (Goleman, 1995). Acknowledging emotions provides deep insight into the perspectives and life conditions of participants (Saldana, 2015). After coding the entire data corpus, the researcher also constructed Attribute codes from information provided in the Qualtrics interest survey and the data collected during interviews. Attribute coding is the notation of basic descriptive information such as participant characteristics and other variables of interest to the research questions and design (Bazeley, 2003). From these codes, the researcher was able to design generalized participant profiles to facilitate comparisons across individual experiences (see Table 1).

At this point, the researcher employed transitional analytic methods to identify patterns in the data and compare codes across participants and analytic memos. Wordles (aka Word Clouds) were constructed from the Emotional, In Vivo, and Process codes generated during the first cycle of coding. Creating wordles on the online platform WordArt.com allowed the researcher to visualize and quantify the frequency with which words and ideas occurred within the codes of each participant (see Figures 3- 10 and Tables 2-3). Patterns began to emerge from the data and

condense into several categories; however, the researcher sought additional structure to facilitate thematic analysis using Elaborative coding.

Elaborative coding (aka top-down coding) is a second cycle coding method for developing theory further by coding within the lens of theoretical constructs from a previous study (Auerbach & Silverstein, 2003). Elaborative coding is appropriate for any qualitative study that builds upon the findings of a previous or co-occurring study. By condensing the emerging categories within the lens of significant life experience (SLE) literature, the findings of this study can either support, modify, or disconfirm the findings of past SLE studies, as they relate to urban herpetofaunal conservation. This second cycle of coding was facilitated with the QDA Miner Lite program, an open-license computer-assisted qualitative data analysis software (Lewis & Maas, 2007). From this process, the following categories were refined and assigned to first-cycle codes from each participant's data.

- *Family and friends* - These individuals may be volunteers, employees, family members, or even friends, but they are united in demonstrating some level of pro-environmental attitude or support for a participant's herpetofaunal interests or conservation behaviors. This is not to say that all participants possessed an extensive network of supportive friends and family; in fact, participants acknowledged that many of their family members are afraid of or otherwise critical of their volunteering with herpetofaunal conservation. That said, all participants could identify at least one family member or friend who actively supported their eco-philia.
- *Peers, mentors, and role models*- Most participants attested to forming connections with similarly minded peers and identifying mentors or role models through their volunteer experiences. Peers generally included individuals of similar role or position as the participant, while mentors were often individuals with greater experience or seniority who supported the participant through their volunteer experience. Peers and role models might include known individuals, such as other volunteers, program employees, etc. but can also extend to people that participants have not met, such as celebrities and academic idols that participants have seen or read about.
- *Personal and professional development*- Most participants indicated they aspired to or were currently pursuing environmental careers. Codes in this category include experiences geared toward improving individual or collaborative skills, leveraging

existing skills for future employment or life goals, and expanding one's professional and/or personal network.

- *Lifelong learning*- Code in this category include opportunities and experiences that emphasize learning. Topics ranged from information about reptiles, amphibians, and wildlife generally, to ecosystem level processes and concerns of social justice.
- *Spiritual connection*- Several participants described a feeling of spiritual or otherwise metaphysical connection with other entities, as a product or motivator of their volunteer engagement. Within these codes participants reported feeling a sense of connection to herpetofauna, living things in general (i.e. birds, insects, etc.), and an even greater sense of connection with other humans.
- *Prosocial behavior*-All participants indicated that they participated in other service and/or environmental behaviors beyond their volunteering in herpetofaunal conservation. Codes in this category include activities such as informal trash clean-ups, donating food to local food banks, assisting with pet adoption programs, and other prosocial behaviors that are not directly related to urban herpetofaunal conservation programs.
- *Empathetic approaches*- Several participants described experiences characterized by empathy, one's capacity to understand and share the feelings of others. These codes center around participants' experiences identifying with the contextually specific emotions of others or vice versa.
- *Sensory experiences* - all participants discussed their interactions with herpetofauna and the larger biophysical environment within the sensory frame of their experience. Codes in this category are divided between the senses through which participants processed their experiences: sight, sound, and touch. Witnessing the return of vegetation following a stream clean-up, holding a snake for the first time, and hearing familiar frog calls in unfamiliar places are all examples of the codes from this category.
- *Emotional and place attachment*- Most participants reported feeling some level of attachment to the places, people, and animals that they encountered in their volunteering experiences. Codes in this category range from negative to positive as they describe participants' feelings towards elements of their volunteer experiences.
- *Inclusivity and accessibility*- Many participants discussed the accessibility and tolerance of social environments within which they volunteered. These codes center around experiences that highlight the interpersonal climate of participant experiences, including compassion, equity, inclusivity, and marginalization.
- *Multimedia engagement*- Most participants recounted experiences with important books, films, ideas, and mixed media outlets related to the environment and/or herpetofauna. The codes include participant experiences with multimedia environmental education, art displays, visual or social media and participant feelings about these forms of representation.

- *Impact and fulfillment*- All participants described experiences that reinforced a person's impact on herpetofaunal conservation and the value of their sustained efforts. Codes in this category depict a range of impacts from routine feeding and cleaning, to coordinating events and programs focused on conserving critically endangered species. This category also includes feelings of fulfillment derived from serving others and the environment in meaningful ways.

Results

Participant interviews and analysis suggested four overarching themes uniting the categories described above; these included supportive communities, embodied interactions, empowering growth, and civic belonging (see Figure 11). The following section presents each theme, provides textual supporting evidence and discusses potential mechanisms within the frame of past research.

Theme 1: Supportive Communities

Experiences of a supportive social network occurred before, during, and after volunteering for herpetofauna conservation. Before deciding to volunteer, friends and family formed a supportive backdrop for the participant by spending time outdoors and respecting the natural world. During their volunteer engagement, most participants formed connections with their peers in addition to choosing mentors that supported their continued engagement. Even after volunteering, many connections and bonds persisted and developed into friendships and long-term mentor-mentee relationships.

This theme emerged in all interviews, however the extent of family and friend support varied among participants. When asked who motivated their engagement in herpetofaunal conservation, some participants pointed to parents, siblings and extended family members who demonstrated an appreciation for animals or the outdoors, as a supportive or even inspirational presence. EarthMomma96 (hereafter, EM96) recalled her maternal grandmother as a “natural-born naturalist” who introduced her to the biophysical environment during her childhood in

upstate New York. She discussed how her grandmother and her parents played a significant role in motivating her initial environmental attitude and behaviors:

> [My grandmother wanted] to pass on the love of animals and the outdoors with me and she said to me, 'hey EM96, … you see that hopping rock over there? See if you can catch it.' I caught it and as I look closer, [it] definitely wasn't a rock, but instead a giant American toad. Then I became curious - I wondered if these are around my community, too. I lived about 30 minutes away, still a good distance outside of Buffalo. And that's when I discovered more toads, then eventually frogs, some nonvenomous snakes…

Similarly, DzHeff brought up his parents' role in supporting his interests in wildlife and conservation. Through childhood trips to national parks and his father's pet reptile collection, Dzheff was introduced to the animal husbandry and the diversity of life on Earth. This initial appreciation was encouraged by experiences with his father:

> So in addition to my earliest memory being of turtles. In general, my dad would take me to reptile shows as they came to Atlanta. We'd spend a lot of time in the reptile house whenever we go to zoos … I mean there were a couple experiences when I was younger, where I would handle an alligator or a snake. And this was definitely where my parents helped a lot. Pushed this along because they were very supportive of this, my dad likes them too so I was able to be exposed to these things, pretty much whenever I wanted.

In contrast to EM96 and Dzheff, Leo grew up with support for her environmental interests from her mother and siblings. However, as an adult, she notes that few of her friends and family think of her choice to volunteer as a "good use of [her] time." Growing up in an apartment complex adjacent to a local creek, she spent most of her childhood outside with her siblings "exploring the creek," and searching for insects and wildlife. Her mother supported this

past-time and especially during the summer, and she played alongside her siblings and sometimes her cousins. After returning from her position of teaching English in China, she began volunteering with the Amphibian Foundation (hereafter, AF) as a teaching assistant. During COVID, she kept a collection of outreach animals in her home to facilitate virtual teaching. However, her romantic partner, his family, and most of her friends are uninterested in or deeply averse to the reptiles, amphibians, and insects that she cherishes.

> I mean I do have friends that I cannot visit right now, [and some that] were just like, 'oh that's really cool,' … I've had two of them visit me during COVID and I got to show them animals and let them have time with that which is great. It meant a lot for them and me as well … but the people that, like, I live around are just like, 'No.' Like, My partner is like: 'Okay.' He's kind to animals he doesn't believe in causing harm or anything like, but I don't care.

Joining a conservation program or even volunteering a single time can introduce volunteers to a wider network of like-minded peers. Fellow volunteers, part- or full-time employees, and supervisors often forge bonds with one another that develop into peer networks, mentorship, and lasting friendships. Skye began her first herpetofaunal engagement studying pine snakes in the long leaf pine ecosystem as an undergraduate assistant to a graduate student who served as a teaching assistant in her general biology course (hereafter, 'GS'). She and two other students helped collect data for over the course of a summer and even presented their own independent findings at research conferences. In discussing GS and her role in motivating her continued engagement, Skye said:

> I would consider [GS] as my first official mentor. You know she's the one that helped me accomplish, or even get close to obtaining any of these goals. And it also was

> the people that I worked with, with her. So it was also [two other students], who were around my age, a little more so. And we were considered like her little helper people. So we of course first formed our really tight close knit group, and then as the fieldwork came to like an end is when [she] could really let down her teacher side and be more of a friend to us. So, they definitely helped keep me along the right path. I could relate to them and a lot of ways through thinking and just interacting, outside of research.

In this way, the supportive social networks fostered through volunteering can deepen and transform into relationships that coproduce motivation and engagement. Individuals can bond over a shared interest in herpetofauna, conservation, or the larger biophysical environment and motivate themselves and others to engage further. TriGirl began docent training at the Atlanta Botanical Gardens (hereafter, ABG) and met another docent-in-training whose passion and engagement serves as an inspiration to her:

> This woman that I got to be friendly with during docent training, she writes a conservation newsletter. She interviews people in that area. We were classmates [during training] … We got to be like buddies in class and so we studied together for how to give our presentations to the kids… She's very meticulous to detail, and she volunteers at garden too and … she's very involved in conservation. So she's been inspiring.

Moreover, TriGirl indicated that she first began volunteering in the amphibian exhibit after connecting with one of the current volunteers and asking how she could get involved. Peers have the capacity to inspire and introduce each other to additional opportunities, programs, and platforms for volunteer engagement. This capacity for presenting opportunities and connecting individuals with their passions is not limited to mentors and role models and can extend to include friends, peers. Indeed, sometimes mentors and role models can become friends or peers

over time, as with Skye's mentor turned friend GS. She noted, "As the fieldwork came to an end, [that's] when Miranda could really let down her teacher side and be more of a friend to us." The reverse can also occur when participants meet or work with someone who goes on to inspire and mentor them at a later point in time.

During Anna's interview, she recalled all the interesting people she had met as a volunteer and how they inspired her to further pursue conservation volunteering and a future career with wildlife,

> This lady… who I worked with at the Cleveland aquarium was like a big influence because like I always had these ideas…. Like, 'I want to do this and I like to do this' and she kind of like made it real… I just love that you can like know different people and like, through her, you met like other people. So I met this one [who] used to work at Atlanta aquarium and she worked with the beluga whales! … She was definitely like, like I wanted to like strive to be like her.

This sentiment was echoed during Teaspoon's recount of her time spent shadowing Joel Sartore during his photoshoot at ABG. As a freelance creative, Skye was deeply inspired by being able to see her idol and watch his creative process:

> Joel Sartore actually went to the Atlanta botanical garden to photograph some of their frogs. And [my supervisor] at the time surprised me and said, 'you can have the day off. Just, like, go shadow him, go have fun… just stay on set and watch him do the photos.' And so [it] was like a really phenomenal experience and how down to earth he was about it… [He said] 'yeah, everyone who wants to photograph these animals really should do it and spread this awareness…there's so many- there's so much- like, it shouldn't just be me.' And so, his humbling attitude, his kindness, and just how talented

he was, was really, I mean, it's an experience that, again, I can't forget it, because it's so rare and being able to basically watch a really famous photographer work was amazing.

Research suggests that role models may be essential to helping students develop environmental literacy in environmental education (hereafter, EE) programs. A recent study of a five-day immersive residential EE program reported that role models, especially known adult role models, can exert meaningful impacts on students' development of environmental responsibility, and other positive youth development characteristics (Stern et al. 2018). Additionally, studies of Family Nature Clubs, organizations that connect families with children to local green spaces, suggest that these programs promote agency, a sense of competence and opportunities for social modeling (D'Amore, 2015; D'Amore & Chawla, 2020). Prior studies have noted the importance of social belonging and engaging social interactions as motivators of environmental volunteer engagement (Asah & Blahna, 2012; Muirhead, 2011; Jacobson et al., 2012). Among young environmental leaders, the main influences motivating their environmental action included parents, friends, role models and social communities like youth groups and conferences (Arnold et al., 2009). Moreover, these relationships align with the environmental education literature concerning characteristics of effective environmental educators (see Simmons, 2007). Thus, these findings are consistent with those of other studies, confirming the valuable role played by family members, peers, and role models in encouraging responsible environmental behaviors like volunteering in conservation.

Overall, the relationships between current volunteers and their social networks can support their engagement with and continued motivation for conservation volunteerism. The entirety of one's social network need not be supportive or even accepting of an individual's interest in herpetofauna, wildlife, or conservation, generally; however, the presence of supportive

family, friends, peers, mentors, or role models can bolster one's motivation to pursue or continue volunteering for species conservation and environmental action among youth. As a person's social network begins to expand and encompass more individuals who value environmental stewardship, they become further motivated to practice and embody this stewardship themselves.

Theme 2: Embodied Interactions

Embodied interactions refer to the sensory, emotional, and sometimes spiritual lenses through which participants interact with the biophysical environment and one another. In recounting their experiences and motivations, all participants described first-hand interactions with herpetofauna and other animal or plant life, prior to or during their volunteer engagements. Both positive and negative interactions were described by participants, and both served motivational functions. Willow recalled driving home from her volunteering and noticing the high density of road killed animals at an intersection near the AWARE (Atlanta Wild Animal Rescue Effort) rehabilitation center:

> The biggest issue with it is that it's located on this really busy road where there's actually a lot of animals that get hit by cars so it's like, kind of difficult sometimes to go to this place and like put all this time into caring for the species and then as I leave, I see like three dead animals, you know? I've like, started volunteering and like in rehabilitation with injured species and like with wildlife more like I noticed roadkill all the time. And it's like very hard to just like go around my day and be like, oh, look how many dead bodies there are, and they're mostly because of humans,

Witnessing these carcasses saddened her, yet it also reminded her of the value of her impact. In juxtaposition, when Willow turned a pond survey into a teachable moment for

students of a local private school, she felt immense joy at being able to handle a turtle she caught and share that tactile interaction with the students present:

> There was one day when I was out working at the Blue Heron Nature Preserve, and it was overlapping with AF's critter camp, so they had some of the kids out there. And whoever was coordinating that program asked if they could bring some of the kids down to look at what I was doing out in the pond. That was just, like, a really enjoyable experience for me… I got to show them like the nets and they watched me like take the turtles out and we talked about, like the turtles and how to measure them

Such interactions were often described through the sensory lenses of sight, touch, and hearing and served to further motivate the participants' engagement. Participants described meaningful interactions where they held or touched an amphibian or reptile and felt thrilled, excited, or even proud of their experience. The first time that Leo touched a snake as a child visiting the Fernbank Museum, she remembered:

> "[holding] the snake up like 'I'm a badass I'm holding a snake.' *laughter* I was this tiny little thing, the weird little girl and I'm just like, 'Oh, you guys are scared to touch the snake, really? Look, look.' *laughter*."

Conversely, TriGirl's first experience touching a snake occurred only a few months prior to our interview. She recalled how afraid of snakes her mother was, to the extent that "if she knew there was going to be a picture of a snake on something," she would avoid it.

Witnessing changes in individual organisms or across a landscape was a common experience described by DzHeff with regards to removing invasive species, TriGirl's experience watching a metamorphic frog takes its first steps on land, and also Teaspoon's experience of "working like with tadpoles [and] seeing them grow and change and metamorphose." Some

participants, especially those with anuran experiences, recalled the first time they were able to successfully identify a frog by its call. As a conservatory volunteer at the ABG, Trigirl remembered when she first began to hear the calls of the frogs within the tropical exhibit, "Identifying … frog sounds was very cool to me that I could do it, you know. That when I'd walk in [to the conservatory] it was like, I know what that is."

Beyond the sensory lens, participants also described their interactions from emotional and sometimes spiritual perspectives. Participants attached a variety of emotions to their remembered experiences of volunteering for herpetofaunal conservation; emotional codes describing interactions with reptiles and amphibians ranged from joy, excitement, confidence, and pride to wariness, fear, and even panic. Participants were often excited and delighted by the opportunity to hold, touch or watch herpetofauna, as demonstrated by TriGirl's recollection of feeding the tortoises: "I couldn't be happier doing what I get to do. I make salads for the tortoises. They're exciting and I love it. I love every single thing I do there."

However, some participants also admitted to being afraid or wary of outreach specimens or wild animals encountered during surveys. During an AF training event, Leo felt some anxiety when she was handed a snake to hold by herself for the first time. Leo said that the snake "was making movements I was unfamiliar with" and her natural human response was to feel anxious. While processing turtle traps by herself, Willow was surprised to find two snapping turtles at a previously unproductive field site and soon became anxious and overwhelmed with the task of removing them from the trap. She remembers that, "setting free these big massive angry snapping turtles on my own was not easy, I definitely had to call in for help."

The emotions attached to these interactions spanned the gradient of negative (i.e. fear, anger) to positive (i.e. contentment, gratitude) and served to motivate volunteers along

contextually specific pathways. Participants ascribed personal meanings to these interactions and derived distinct motivations from these experiences. For example, Willow felt guilty and remorseful about the roadkill she noticed on drives and Anna described similar feelings of remorse or guilt upon seeing the vegetation removal processes preceding the start of new construction in her neighborhood. The two participants processed these negative experiences of road-based mortality and habitat destruction differently, but both regarded their volunteer engagement as a way to personally contribute to conservation. In this way, the emotional attachments participants placed on their interactions helped them to ascribe meaning to and further perpetuate their volunteer engagement.

For some participants, this emotional attachment extended to the places they volunteered or the outdoor spaces wherein they grew up. Teaspoon's experiences caring for frogs at the ABG inspired her to hold her wedding in the gardens:

> I got married there, just because it was an important place to me. I wanted to be able to have a wedding picture with the frog and I did. It was really, really amazing… That will always be a special place to me.

DzHeff and TriGirl described the places that they volunteered as their "happy place," and "favorite place on Earth," respectively. These sentiments (and others) suggest that volunteering may have influenced participants' place attachments and place meanings as they relate to the places they volunteered. Place attachment is defined by how strongly a person feels about a place and place meaning is defined by the meanings of these attachments; both comprise an individual's sense of place and evidence suggests that these elements are positively associated with environmental behavior (Kudryavtsev et al., 2012). Sense of place was not the primary construct under direct investigation in this study, however, the data corpus includes multiple

references to place attachments and place meanings, with respect to embodied interactions, in addition to content regarding the spiritual connections experienced during these interactions.

A minority of participants discussed the spiritual connections felt by volunteering for herpetofaunal conservation or stewardship, generally, within the context of their religious backgrounds. Most participants recalled some feeling of 'connection' or 'inter-relatedness' between themselves and the natural world or themselves and other people. However, fewer participants related this sense of connection to organized religions. TriGirl used the Hebrew word 'kvell' to relate the bodily joy that she experiences while volunteering with frogs and turtles. In her interview, she said,

> There's, there's a word that if you were going to spell it you spell like k-v-e-l-l, kvell, and it means like your, your body smiles like your fiber-of-self smiles. And that's the way it feels to watch [the tortoises eat].

Whereas Willow discussed her fundamental Christian upbringing as a source of mixed messaging regarding the role of stewardship:

> I actually grew up in a very conservative Christian place, and they did not do the teachings about sciences. A lot of people have the belief that like after like that this particular world is going to burn and we're all gonna move to heaven so like it just doesn't really foster sensitive environmental stewardship.

During her interview, EM96 described her lifelong dream of "studying and learning and also caring for creation around us" after explaining her belief that people's fears of snakes might be rooted in Judeo-Christian narratives such as the biblical story of Adam, Eve, and the serpent

> And then I figured it out that the people who would throw out the idea for nonvenomous snakes [that] they're evil, are the same ones that would look back at that old story in the

> Bible about Adam and Eve and the serpent. So I deductively reasoned I think people started their fear … if they were brought up in their Judeo Christian type area to see a snake as a potential [representative] of sin

In these examples, spirituality served to deepen meanings and sentiments attached to these interactions, further entrenching participant experiences within the embodied memories. The spiritual values and religious imperatives surrounding environmentalism are well-documented (see Maathai, 2010) however, the overarching impacts of these spiritual framings are further discussed in the fourth theme.

In a broader sense, interview data suggested the affective elements of embodied interactions (i.e. emotions, sense of place, and spiritual connections) perpetuate engagement through emotional mechanisms akin to feedback loops. Positive feedback enhances or amplifies an initial stimulus (i.e. the frequency of contractions during childbirth or blood clotting after a laceration) while negative feedback responds to initial stimuli by diminishing the reaction (i.e. shivering or sweating in response to decreased or increased body temperature, respectively (Asarian et al., 2012). The more profound or physically immersive their experiences, the more driven these individuals become in their continued pursuit of environmental or conservation impact. Emotions are known to play a mitigating role in environmental education and encouraging environmental behaviors (Carmi et al., 2015). Further research on emotional regulation suggests that human emotions are auto regulating such that regulation of positive emotions follow positive feedback loops, while negative emotions follow negative feedback loops:

> "While negative emotions are prone to lead actively via negative feedback loops to their own termination, positive emotions are desirable and, again by definition, pleasurable.

> The absence of positive states leads to a quest for them (appetite/desire) and their presence leads to attempts to prolong or reinforce them. While there appears to be less clarity concerning specific action tendencies associated with many of the positive affective states there is little ambiguity that there is a push, urge, or motivation to search and amplify them." Drew, 2014

These embodied interactions and experiences are consistent with the overarching narrative of SLE literature. In Chawla's seminal study of environmental action life plans, experiences of natural areas and negative experiences of habitat degradation or pollution were recurrent themes among the 30 participating environmentalists (Chawla, 1999). Experiences with 'wild nature' or 'habitat alteration' figure prominently in reviews of SLE (see Hsu, 2009; Tanner, 1989). Moreover, a review of SLE in environmental justice (hereafter, EJ) literature found, "most EJ activists describe learning experiences that emerge from their everyday embodied experiences with social/environmental marginalization and their emerging activist work" (Ceasar, 2015, p??? for this direct quote).

Embodied cognition is the hypothesis that cognitive processes extend beyond the brain and are grounded in and influenced by the body and the environment (Wilson & Golonka, 2013). Embodied pedagogics emerged from this embodiment theory and emphasize learning as a physically embodied and multisensory process (Kelly et al., 2019). There is empirical evidence that embodied learning, implemented in a classroom setting through motion-based technologies, can significantly impact children's academic performance and cognitive abilities (Kosmas et al., 2018). Additionally, embodied learning has been qualitatively studied with respect to adult activists in action learning spaces and places (Drew, 2014). However, little is known about the

effects of embodied pedagogy or learning in relation to environmental education, and thus remains an area for future research.

Bodily experiences of growth, change, and even destruction in the biophysical realm, may be key to motivating conservation volunteerism, especially when augmented by emotions, place attachments, or spiritual connections. The depth and range of emotions and attachments associated with these embodied interactions often encourage participants to seek out additional embodied experiences. Positive interactions associated with positive feelings are perpetuated, while negative experiences and emotions prompt participants to pursue personal mitigation from a place of environmental empowerment fostered by their experiences.

Theme 3: Empowering Growth

Participants universally described opportunities for personal or professional development within their volunteer experiences. The majority of participants were interested in or actively pursuing environmental careers, especially those associated with their volunteer engagement (i.e. wildlife, ecology, conservation, or environmental educations) and many were currently or previously employed in environmental careers as a byproduct of their volunteering. Beyond career aspirations, participants also recalled opportunities for personal growth, independent learning, and having meaningful impact as further motivating their continued engagement.

In terms of career development, participants recalled taking advantage of program training events, curricula materials, peer networks, and mentor expertise to increase their professional skills and competitiveness. DzHeff knew that he wanted to pursue a career in conservation from an early age and has sought training for wildland fire incident qualification:

> I kind of knew what I wanted to do prior to college, like I want to go into environmental science, biology, and be on track to either herpetology or conservation ecology… I'd like

> to get my red card which is hard …There are courses in Florida but actually getting the red card in hand is next to impossible without having a direct affiliation.

For some participants, the decision to pursue an environmental career came later in life. Participants such as Willow and EM96, had established careers in fields adjacent to ecology and wildlife conservation. Both participants sought ways to leverage skills and experiences from their professional backgrounds to pivot into conservation careers. Willow's background in community agriculture provided some overlap for her desired career change to wildlife conservation.

> I just really want to shift my career, I've been in kind of like agricultural spaces for a while and I feel like I want to work more with wildlife conservation but there's definitely some overlap [such as talking] to private landowners and farmers and things like that.

EM96's background in primary education provided opportunities for her to engage students in topics related to wildlife and community gardening. After the COVID-19 pandemic restricted her access to work, she leveraged knowledge and experience from AF's Master Herpetologist to pivot her career plans and join the Conservation Research Bridge Program

> Over the past seven years, I worked as a science lab teacher at an elementary school part-time, and I started a community garden behind the school to get the kids growing food. And so some of the topics that we would cover would be reptiles and amphibians, and how you could find them in your garden space or your yard, and how they're good for natural pest control… A year ago, I went through the master herpetologist program … And then, with the pandemic coming, my jobs pretty much went away. And it opened the door, where I'm able to step into the Conservation Research Bridge Program at AF

The field experiences and educational opportunities provided by AF enabled these participants to learn more about ecological data collection and species conservation methods by implementing field techniques under the supervision of experienced mentors.

Learning by doing is a hallmark of embodied learning. Research participants were highly educated (see Demographics) and sought continued educational opportunities in their volunteer engagement. Several participants enrolled in or completed environmental education programs provided by AF, including the Master Herpetologist Program and the Conservation Bridge Program. Both EM96 and Leo articulated hopes that these programs would position them for future employment in herpetofaunal conservation. EM96 recalled that "part of that program got me out into the field on a couple field trips and so we were hands-on with [herpetofauna]," which helped her to understand more about the techniques of conservation research. Leo hopes that her participation in the program will benefit her environmental education career aspirations:

> For their educators, [AF] let us actually have this [free] semester of master herpetology. So I'm doing that course right now, and hopefully that opens more avenues for me to really get into it.

Additionally, when asked how they identified potential volunteer opportunities, many participants indicated that educational programs served as their entry point for future volunteer engagement. Before becoming a volunteer at AWARE, Willow took a tour of their facilities. Before volunteering with the ABG Conservatory, Teaspoon attended a Saturday frog feeding event. Outside of in-person programming, some participants discussed multimedia environmental education programs as pathways to volunteering. For Teaspoon, a short film featuring the endangered glass frogs of ABG inspired her to attend that first frog feeding event:

> There is a short documentary and they made one based on a glass frog, but they went and they actually interviewed Mark and they filmed it. So I saw this like 30 -maybe- 30-minute documentary and it moved me to tears because I was just surprised that this existed right there. And I was like maybe- maybe it's attainable and (laughter) it was. I got to meet people and, you know, see these frogs. I feel very lucky to have seen those frogs there that were all from Panama, including the last frog of its kind 'Toughie.'

Digital or online environmental education materials also provided gateways to volunteer engagement. EM96 first encountered an AF advertisement for the Master Herpetologist program on the social media platform, Facebook. She said, “I thought that the layout for the advertisement for the master herpetology program was colorful and inviting.” The effects of multimedia engagement are further discussed in the fourth theme.

Outside of environmental career aspirations, participants also described experiences that allowed them to leverage their personal strengths and skills for the benefit of herpetofaunal conservation. After teaching English at an intensive academy in China, Leo returned to Atlanta with a desire to blend her educational background with the topics and principles in science that she learned from exploring her neighborhood creek. She noted,

> My degree is in performing arts I have a BFA in that. it was either a choice between science or art. And yeah, the thing that I've been doing and has been paid for was art so … I was like, ‘I need- I need some science in my life,’ and I found AF online and I saw that they had like a volunteer program.

Moreover, as a freelance artist, Teaspoon leveraged her creative background to take photos of AF’s outreach collection and uplift other AF-affiliated artists through art shows and events.

> I started doing more creative things for them so I started photographing the frogs because I'm a photographer. Then I was like photographing them. I helped build a calendar for them for - and I also worked on their yearly art show. We tried to do a yearly art show to like raise money and also support the artists that are within the foundation.

Opportunities for career advancement and enhancement are well-documented motivators of environmental volunteerism (McDougle et al., 2011; Sloane & Probstl-Haider, 2019; Woosnam et al., 2019). Volunteering provides a low-pressure setting to practice career skills and develop peer networks that facilitate further engagement and even employment opportunities. Jacobson et al. (2012) noted that career motives were more prevalent among younger respondents and all but two participants in this study were under the age of 40. TriGirl began volunteering after retiring from her long career in the medical field. As the only retiree in this study, she demonstrated virtually no interest in pursuing a career in the environmental sector but still reported experiences of personal growth and learning. When she first began volunteering in the docent program, she had a general interest in herpetofauna and other animal taxa, but had never touched a snake and was very uncomfortable with insects. Through her volunteer experiences, she embraced the challenge to face her aversions and appreciate an animal that she once avoided.

When participants successfully engaged in opportunities for personal and professional growth, they described a sense of empowerment and fulfillment from their experience. As a key example, Leo self-identifies as autistic and recalled her success at forging interpersonal connections and operating as a leader in her field. By volunteering and then being employed as a teaching assistant for AF educational programs, she was able to practice interpersonal interactions, which do not come as naturally to her as it may for neurotypical individuals.

Moreover, since she is interested in pursuing more environmentally-focused career options, she appreciates the opportunities her volunteer engagement provides to build her confidence and contribute to a larger conservation effort

> It gives me more chances to socialize and connect with human beings, being on the autism spectrum and all. *Laughter* So, I get a confidence boost. And also, them allowing me to be a leader in a field that I care about is highly beneficial for also my confidence as well because a lot of people don't really think you can do much when you're a brown person and you have a vagina and like you are not neurotypical - yeah so they don't see you as capable. So when people put that kind of power for you to, you know, grow and progress into your own hands, its - It's wonderful. It's a great feeling.

Empowerment can be described as a process by which individuals exert control over their lives, participate in their communities, and critically understand their environment (Perkins & Zimmerman, 1995). The confidence and sense of agency established through opportunities for personal or professional growth within volunteer experiences can encourage continued engagement. Volunteer engagement can contribute to developing empowerment (Cohen, 2009; Kulik & Megidna, 2011); however, this relationship remains understudied in the field of environmental education.

To summarize, urban herpetofaunal conservation volunteers shared empowering experiences of personal and professional development which served to further motivate their engagement. All participants, including those who did not demonstrate environmental or ecological career aspirations, experienced growth in response to challenges or learning opportunities they encountered while volunteering. The sense of competence and fulfillment

participants received from surmounting these challenges empowered them to exert greater agency over their impact and their lives.

Theme 4: Civic Belonging

Researcher and storyteller, Brene Brown, defines true belonging as a spiritual practice of believing in and belonging to oneself with such depth that individuals can share their most authentic selves (Brown, 2017). The strong sense of connection and belonging described amongst interviewees, stems from their experiences of being fully accepted as environmental stewards and as people. The sense of impact and fulfillment achieved through civic participation can be coupled with accessible, inclusive, and empathetic approaches, to foster a level of civic belonging that empowers and motivates participants to make a difference in whatever way they can. Thus, the central components of this theme are the spiritual or metaphysical connections forged through civic participation and the sense of true belonging fostered by the peers and leadership associated with urban herpetofaunal conservation programs.

The initial discussion of emotional or spiritual connections was presented in the second theme and framed within the embodied interactions between participants and the biophysical environment. However, it should be further noted that participants also ascribed a level of spiritual or religious value to their motivational experiences and general civic engagement. In addition to Trigirl and Willow's Judeo-Christian interpretations of their experiences and motivations (see Theme 2), participants recalled spiritualized connections beyond the theistic boundaries of organized religions. For example, when asked how she felt about the places that she has volunteered, she replied "Whenever I get out in nature, and there's different creatures around me, including herpetology creatures, is I feel a sense of peace and connection."

Additionally, in describing her connection to a local creek, Leo notes how much more connected she felt to the natural world as a result of her neurodivergent background:

> I don't understand humans as well as I understand the natural world - it just all makes sense to me on a fundamental level. And I understand why this is happening, why this does this. When it comes to humans, I'm just like, what are you doing? (Laughter)… So it's very, it was a sense of connection that I didn't have in the, like, predominantly human environment.

Spirituality has studied from an environmental lens, mostly with regard to eco-spiritualism, a sacralized worldview of the spiritual connections between humans and the environment (Lincoln, 2000). This perspective does not adhere to explicit religious dogma, but instead views eco-spirituality as the direct awareness and experience of the sacred in ecology which can support community and individual-based search for a balanced and sustainable use of earth's resources (Van Schalkwyk, 2011). Alternatively, Nobel Peace Prize Laureate Wangari Mathai describes one's inner ecology as "[their] soul or sense of being human" (Mathai, 2010, p. 19). In her book Replenishing the Earth: Spiritual Values for Healing Ourselves and the World, she explores the key values central to her work with the Green Belt Movement, an organization committed to helping women in rural Kenya to plant and sustain millions of trees. She draws from many faiths to assert the healing the world's environmental damage begins with healing the wounds of our inner ecology and rededicating ourselves to the spiritual values that heal ourselves and the plant. Spirituality is rooted in the recognition and celebration of our inextricable connectedness (Brown, 2017). Thus, it makes sense that participants shared a sense of connection between all living things that surpassed the explanatory power of science.

As it relates to herpetofaunal conservation, the sense of true belonging fostered through volunteering can extend beyond one's spiritual identity to embrace belonging across intersecting identities. Intersectionality can be defined as the interconnected nature of social categorizations and identities (such as race, class and gender) and the overlapping systems of discrimination that result from this nature (Crenshaw, 1990). As a theory and framework, intersectionality has been applied to a variety of context-specific inquiries, such as interrogating identity regulation regimes and developing alternatives to discriminatory practices and legislation (Cho et al., 2013). Both Leo and Willow joined the JEDI Committee, a sub-organization of AF striving to create inclusive environments for marginalized communities to participate in conservation, generally (Amphibian Foundation, 2020). When asked about their involvement, Leo was proud of her role and the work they hoped to accomplish.

> We made a committee. And we're gonna make sure that we can get people involved too. Our people of color, people, you know, [of] different neuro-backgrounds, just in sexual orientation to all that, all of that. So I'm proud of it. It's very awesome because you know teaching people about the diversity of frogs and reptiles, first of all, like some of the most diverse groups of animals besides insects. And that just correlates to humans.

By aiming to improve cultural competency and increase the representation of historically marginalized groups in conservation, the committee pursues more equitable practices while also empowering its members. As Leo described "I especially love it when I get to see people of color in my class, and little girls in my class there. It's so amazing how many young girls like that." In this way, urban volunteers of herpetofaunal conservation are encouraged to feel as though they

are accepted and capable, irrespective of societal narratives that diminish or erase marginalized identities, and validated by the impact of their actions.

Likewise, accessibility was a concern shared by many participants, especially in regards to spatial access and communication methods. Multiple participants chose to volunteer at locations that were spatially close to home. Some lived within walking distance of the conservation organizations where they volunteered. Anna said, “I lived right in Midtown when I volunteered there so I would literally walk to there which is also nice, ‘cause I didn't have to drive.” Similarly, in her interview, TriGirl indicated that “Now, I'm so attached. I go to the garden [often]. I mean I live kind of close so it's, I do it on a walk.” Both Anna and TriGirl are capable of driving to volunteer events; however, both chose to volunteer at ABG, in part, because of their proximity to the gardens. Conversely, Leo is not able to drive as a result of motor coordination challenges associated with her autism. When asked if she ever participated in AF clean-up events, she noted “[AF does] have that stuff, but like, i don't, i don't drive. Because the autism, that dyspraxia, I can't drive.” AF’s location within metro-Atlanta contributes to its accessibility for those without extensive traveling privileges.

In addition to spatial accessibility, some participants noted that their choice to volunteer with specific organizations was partially motivated by the accessibility of programming and educational materials. Outside of traditional educational programming, the herpetofaunal conservation organizations of the Atlanta metro practice multimedia engagement that motivated volunteers to get involved. EM96 first discovered AF through an advertisement for the Master Herpetologist program on social media. In discussing AF’s multimedia engagement EM96 said:

> I think that their colorful presentation - that's inviting to people to come join. And with the robust offerings that [they] have I think … that was the lure for me, that's what I want to be involved with this.

As professionally creative person, Teaspoon was "deeply moved" by a brief feature on ABG's glass frog and pursued volunteer engagement almost immediately after watching the film. Both Skye and Leo participated in virtual volunteer engagements and educational programs through AF as a direct result of COVID restrictions on in-person engagement.

By adapting to the needs, circumstances, and preferences of the diverse audiences residing in urban areas, these conservation programs were able to fill the engagement gaps left vacant by less accessible organizations that do not make an effort to pursue more diverse audiences. Accessibility to green spaces is an established environmental justice issue with strong evidence of racial bias (Dai, 2011, Wolch et al., 2014). However, there are fewer empirical studies of accessibility with a focus on environmental education and conservation volunteering. Still, there is evidence to suggest that culturally cognizant approaches to environmental education may open the door to more inclusive pedagogies (Cole, 2007). Moreover, media platforms such as YouTube may provide a more widely accessible venue for environmental education (Masoumi, 2019).

Finally, and perhaps most importantly, it should be noted that much of the connections and true belonging fostered through volunteer experiences with herpetofauna were rooted in empathy and kindness. Participants repeatedly described their volunteer environments as 'inviting' or 'welcoming' places where they felt safe to make mistakes and grow. During Leo's AF training, she was handed a snake for the first time in her life and she dropped it. Punctured with peals of laughter, she recalled, "the whole thing it's very forgiving… There's always room

to just explore these animals, which is awesome." When asked how she would engage with a visitor who might be afraid of the herpetofauna in the conservatory exhibit, TriGirl responded:

> Number one, I guess I would say I understand being uncomfortable around other animals in general. And I want to tell you. First and foremost, that you are safe when you're in there. And getting to see them from a distance is letting you take a peek into another animal's kind of life. And so, once you can see that they're just doing their thing- they're not, it's not threatening- It feels kind of like the cockroach thing to me. Once I'm kind of expecting, I'm gonna see some cockroaches - [I know what] I'm gonna need to do. It's kind of like 'you're gonna see some frogs in here, you're gonna see some tortoises. There's a real wonder and excitement in that. But I know you might feel uncomfortable. Let's stand back, I don't want you to miss anything'

These examples underscore the importance of practicing empathy, especially when working with species that many people fear. Creating a space and an interaction that is both forgiving and reassuring is essential to experiences and approaches of these volunteers. They often use education and personal experience to relate with others who demonstrate fear or aversion. Teaspoon described a circumstance wherein she sat with and comforted a little girl with a strong fear of snakes,

> There was this kid who was terrified of the snakes in this video, like we were learning about snakes and snake bites, and I took her out to the hall and talked to her about it, and sat with her. And then she eventually she stopped crying, she got a little bit more comforted. And then the end of the day. She was so excited to hold my pet snake, whose name is 'Big Boss' because he's four feet, a Ball Python… I think she was really scared about venomous snakes… [so I told her] 'you're so kind and soft and gentle with

everything, you're not gonna accidentally attack a snake and [provoke] it.'…So, I think that was helpful. And I think she just needed to get that crying out of her system. As we all do.

Programs and staff are described as 'forgiving' of mistakes and 'empathetic' to the feelings of visitors and students which empowers people to step beyond their comfort zones and experience something new or foreign. While there is a distinct gap in the literature regarding empathy and snake aversions, these results suggest that an empathetic approach to introducing people to herpetofauna may be crucial to establishing the feelings of safety and trust from which environmental appreciation and stewardship might grow. Moreover, participants accounts suggest that when people feel seen and truly appreciated for who they are, they derive significant fulfillment from their role in local stewardship and civic participation.

Trustworthiness

The trustworthiness of this study and the findings produced therein was augmented using protocols and standards designed to reinforce credibility, transferability, dependability and confirmability (Connelly, 2016). Member checking, analytic memos, triangulation and the researcher's positionality statement all serve to enhance the trustworthiness of these findings.

Credibility is concerned with the accuracy of findings and can be established through triangulation. Data triangulation uses different sources of data to check the validity of findings across individuals and stakeholder groups (Connelly, 2016). In this study, all categories and themes were verified across three or more participants to ensure triangulation. The QDAMiner Lite CAQDAS program facilitated triangulation by allowing the researcher to organize and query codes and categories with respect to each participant's data.

Confirmability refers to the researcher's neutrality and the degree to which the findings are consistent and repeatable. By adhering to appropriate qualitative methods and fostering opportunities for member checking at multiple stages in the data collection and analysis process, this study produced a richly detailed audit trail and encouraged participants to engage with both their individual data and the overall findings. Participants added comments and suggestions directly to their transcripts and the initial findings draft using the GoogleDrive online document editor. These contributions were carefully considered and incorporated to improve interpretations and overall clarity.

Transferability describes how the findings of a study may be applicable to similar situations or circumstances (Connelly, 2016). The focal population of this study, urban residents who volunteer for herpetofaunal conservation, represents a highly specific segment of society. However, the rich detail and in-depth descriptions provided in these findings can be applied to similar circumstances of motivating volunteer engagement with urban residents or for taxa that are culturally unappreciated.

Finally, dependability refers to the stability of the study and the conditions of the study over time (Connelly, 2016). Although this study began and ended during a national pandemic, the data collection and analysis protocols remained consistent over time. This was evidenced through analytic memos taken throughout the study in reflection of changes, problems, and concerns that arose throughout the study. Overall, conditions remained stable throughout the study and only minor technical difficulties and concerns marred the process.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSIONS

As discussed in previous chapters, there is significant cause to examine the experiences of urban residents who volunteer for herpetofaunal conservation and identify the significant, lived experiences motivating their actions. This study leveraged qualitative methodology to explore the lived experiences motivating herpetofaunal conservation volunteerism among urban residents. Further, this study answered the following overarching research question using interview data collected from nine participants: Why do urban residents choose to volunteer in herpetofaunal conservation?

The objectives were to explore the lived experiences of urban herpetofaunal conservation volunteers and identify the experiences motivating their engagement. The following four themes emerged from the data analysis process: supportive communities, embodied interactions, empowering growth and civic belonging. The following conclusions summarize the overall findings, discuss theoretical and practical implications, and provides recommendations for environmental education practitioners and areas of potential future research pertaining to the findings of this study.

Findings Summary

The relationships between current volunteers and their social networks can support their engagement with and continued motivation for conservation volunteerism. The entirety of one's social network need not be supportive or even accepting of an individual's interest in herpetofauna, wildlife, or conservation, generally; however, the presence of supportive family,

friends, peers, mentors, or role models can bolster one's motivation to pursue or continue volunteering for species conservation and environmental action among youth. Previous studies have also reported social or community-based motivations for environmental volunteering (Asah and Blahna, 2012; Muirhead, 2011; Jacobson et al., 2012; Stern et al., 2018). Similarly, recent evidence suggests that role models and family support play a notable role in encouraging environmental volunteer engagement (Arnold et al., 2009; D'Amore, 2015; D'Amore and Chawla, 2020). In this way, as a person's social network expands and encompasses more individuals who value environmental stewardship, they become further motivated to practice this stewardship engagement themselves.

Bodily experiences of growth, change, and even destruction in the biophysical realm, may be key to motivating conservation volunteerism, especially when augmented by emotions, place attachments, or spiritual connections. The current findings add to the body of SLE literature on the importance of positive and negative interactions with wild nature (Ceasar, 2014; Chawla, 1998) by exploring the feelings and sensations associated with these interactions. The depth and range of emotions and attachments associated with these embodied interactions often encouraged participants to seek out additional embodied experiences. The influence of these intangible connections is supported by studies of environmental emotions and spirituality (Carmi et al, 2015; Drew, 2014; Maathai, 2010). Positive interactions associated with positive feelings are perpetuated, while negative experiences and emotions prompt participants to take action from a place of environmental empowerment bolstered by their experiences.

Additionally, urban herpetofaunal conservation volunteers shared empowering experiences of personal and professional development which served to further motivate their engagement. This finding supports previous research identifying career or professional motives

for environmental volunteers (McDougle et al., 2011; Sloane and Probstl-Haider, 2019; Woosnam et al., 2019) and also identifies personal development and growth as motivators of volunteer engagement. All participants, including those who did not demonstrate environmental or ecological career aspirations, experienced growth in response to challenges or learning opportunities that they encountered while volunteering. The sense of competence and fulfillment participants received from surmounting these challenges empowered them to exert greater agency over their impact and their lives.

Finally, the strong sense of connection and belonging described amongst interviewees, stems from their experiences of being fully accepted as environmental stewards and as people. Despite the commonality of spiritual belonging and civic fulfillment in our day-to-day lives, there exists a gap in the literature connecting these deeply personal facets of the human experience to stewardship motivations. However, these results suggest that sense of impact and fulfillment achieved through civic participation can be coupled with accessible, inclusive, and empathetic approaches to foster a level of civic belonging that empowers and motivates participants to make a difference in whatever way they can. The central components of this theme were the spiritual or metaphysical connections forged through civic participation, and the sense of true belonging fostered by the inclusive and empathetic practices of their peers and conservation leadership. The takeaway message from participant accounts suggested that when people feel seen and truly appreciated for who they are, they derive significant fulfillment from their role in local stewardship and civic participation.

Overall, study findings suggest a significant overlap between the motivating experiences of participating herpetofaunal conservation volunteers and those described in the SLE literature of environmental education research. Volunteers shared experiences of supportive communities

comprising friends, family, and mentors, in addition to being motivated by empowering opportunities of personal or professional development. Analysis reveals that recent or current volunteers of urban conservation programs actively draw from their embodied experiences with reptiles and amphibians, and reaffirmations of civic belonging to motivate them to continue or further their engagement. While many participants leveraged their volunteer experiences to expand social networks and advance career aspirations, the overarching takeaway from their experiences underscores the importance of community, empathy, and spirituality in encouraging and achieving social objectives for urban conservation.

Implications and Limitations

Motivation is the catalyst to human action and behaviors. People perform responsible environmental behaviors, like volunteering for conservation organizations, as a direct or indirect result of their internal motivations (Kollmuss and Agyeman, 2002). Thus, the primary contribution of this study is an increased understanding of the motives and experiences of urban volunteers for herpetofaunal conservation, from a social constructivist lens. The exploratory design of this study revealed findings that can serve as a blueprint for further encouraging a unique form of responsible environmental behavior. Widespread aversions to snakes and other herpetofaunal contribute to cultural stigmatization and present social barriers to conservation efforts (Ceríaco, 2012). In recognition of the significant challenges associated with mitigating global reptile and amphibian decline, these findings outline key experiences that motivated individuals to devote their time to preserving and conserving herpetofauna.

The findings of this study make a strong case for the multifaceted benefits of service-oriented stewardship and the importance of civic participation alongside environmental education. Coupling local environmental education initiatives with conservation service

opportunities allows participants to learn more about their local plant life and wildlife while making meaningful contributions to species conservation. The combined impact of these elements contributes to a greater sense of fulfillment and agency which encourages them to continue volunteering and even seek more impactful engagement. Evidence from this study suggests that environmental education programs served as gateways for volunteers to learn about and become more involved in the conservation concerns of their locality. Moreover, the learning facilitated through these service-oriented programs suggest that embodied learning and embodied pedagogy may be important techniques for improving EE outcomes such as knowledge construction and behavior modification. The findings of this study, specifically supporting evidence for the empowering opportunities and civic belonging themes, indicate that there is significant educational, experiential, and motivational value in crafting EE programs in tandem with community service.

Additionally, the ubiquity of supportive communities across participant accounts suggests that creating community and fostering social connections should be a priority of volunteer programs. In addition to ensuring that volunteer assignments contribute to a sense of fulfillment within volunteers, coordinators and organization leadership should strongly consider implementing events and initiatives that encourage volunteers to connect and bond over shared interests and experiences. The constructivist paradigm of this research underscores the significance of the socially constructed meanings and values underlying participant motivations and experiences. The social and emotional capital-building capacities of environmental volunteerism are well documented in the literature (see Carmi et al., 2015; Muirhead, 2011). Thus, a key implication of this study is that the social network building of volunteer engagement plays a major role in motivating and retaining conservation volunteers.

Finally, the theme of civic belonging has important implications for accessibility and inclusion in urban conservation volunteerism. Cities are densely populated by diverse communities of people representing a variety of races, cultures, religions, neurodiversity, and other identities. Expanding accessibility and inclusivity practices to equitably engage the diverse audiences residing in urban areas should be a fundamental aim of any urban conservation organization. Participants of this study often spoke about the tension created by the underrepresentation of marginalized identities in species conservation practice. Thus, there is value in implementing programs and processes that aim to mitigate social inequities alongside environmental programming. Furthermore, employing multimedia and digital communication methods might open doors to novel communities in searching for meaningful ways to make a difference in species conservation. The key to successful implementation may

The findings of this study may be instrumental to guiding species conservation and environmental education practices, but only for those topics and communities which overlap with the study design and objectives. The research topic was bounded to residents of Metro-Atlanta with recent experiences volunteering for reptile and/or amphibian conservation programs. Therefore, programs or initiatives outside these specific boundaries, such as rural environmental programs, ornithological conservation initiatives, or urban environmental employment corps may not benefit from these findings. However, conservation or environmental education programs that overlap with the focal topic of urban herpetofaunal conservation volunteerism may operationalize these findings to improve the experiences of current volunteers or encourage new engagement.

Areas of Future Research

The findings of this study make a strong case for the value of social inquiry in conservation research and the motivational capacity of volunteer stewardship geared towards species conservation. There is a need to qualitatively study communities representing a variety of perspectives concerning environmental issues, such as wildlife biology and urban ecology. Applying qualitative methodology within the SLE framework to understand the motivations and experiences of a diverse array of conservation practitioners provides additional, contextually-specific approaches to encouraging conservation behaviors and attitudes among the wider populace. For example, an experiential education program was designed to improve perceptions and preventative measures related to human-coyote interactions (Sponarski et al., 2016). The experiential education approach was associated with significant positive effects on participant attitudes and sense of fear. Based on the results of this study, further research might investigate how participant perceptions of snakes are impacted by herpetofaunal education programs rooted in empathy and belonging. Alternatively, there is abundant room for further progress understanding how experiences with empathy-based environmental education contribute to performance of responsible environmental behaviors. This can be accomplished through longitudinal evaluation studies of novel programs or existing organizations (Margoluis et al., 2009), such as the Amphibian Foundation or the Atlanta Botanical Garden.

The findings of this study underscore the gap in SLE and broader EE literature concerning marginalized experiences in conservation and stewardship. There is a need for additional research on the experiences of communities that have been historically excluded from conservation practice and modern environmental education programming (Bailey et al., 2020; Ceasar, 2015). SLE research with more diverse subjects opens the door to identity-based conservation approaches capable of connecting with marginalized communities that have been

historically excluded from dominating conservation narratives. Culturally-relevant approaches arising from future SLE research can be applied to circumstances and topics that remain unserved by broader majority-based approaches. For example, global climate change poses significant and varied threats to living things, depending on their location and other factors (Karl and Trenberth; 2003). Similarly, societal responses to the variable impacts of climate are culturally specific (Adger et al., 2013) and may benefit from education and communication approaches derived from the specific values of targeted communities**.** In this way, SLE research can amplify the experiences of marginalized communities and contribute to the implementation of more equitable environmental engagement (Donovan, 2015).

Finally, this research can serve as a basis for future studies on the efficacy and practice of service-based environmental education programming, such as civic ecology. Civic ecology is an area of inquiry and practice concerned with the outcomes of community-based environmental stewardship practices and the resultant interactions between practitioners, participants, community members, governing institutions, and the biophysical environment at large (Krasny & Tidball, 2015). Civic ecology practices combine the learning objectives of more traditional environmental education programs with community service activities rooted in environmental stewardship to produce social learning outcomes for participants and measurable biophysical impacts to the local, usually urban, landscape. Further research should be done to evaluate the impact of civic ecology programming with focus on wildlife and species conservation. In this tradition, the term ‘civic herpetology’ could describe programs focusing on herpetofaunal conservation by blending herpetofaunal education with community-based service projects and conservation volunteerism. Since civic ecology practices reflect the spatial and cultural contexts of their respective cities, future civic herpetology studies might ask research questions about the

effects of species conservation programs on perceptions, actions, and values at a community level. In the COVID pandemic era, in-person programming became too risky and many EE programs switched to digital or virtual programming. In the absence of face-to-face programming, how might digital or multimedia EE programs encourage stewardship behavior? How might a hybridized model of digital media combined with in-person stewardship encourage private or public sphere environmentalism at a community-level? Future research on these topics may open doors to novel, culturally relevant approaches to mitigating species decline.

Recommendations

The qualitative evidence in this study supports the following recommendations to further evolve and refine the existing social practices of species conservation:

- There is significant educational, experiential, and motivational value in combining local environmental education initiatives with species conservation service opportunities.
- Coordinators and leadership of conservation organizations should strongly consider implementing events and initiatives that encourage volunteers to connect and bond over shared interests and experiences.
- Employing multimedia and digital communication methods can open doors to novel communities in searching for meaningful ways to make a difference in species conservation.
- Programs that foster equity, inclusion, and accessibility through meaningful service can engender fulfillment and motivation among participating volunteers and surrounding communities.

- Multimedia education, such as online programs, visual art displays, social media engagement, etc. plays a part in bringing embodied interaction to communities that may be further removed from first-person interactions with the biophysical environment.
- Combining multimedia education with opportunities for local stewardship service provides both virtual and in-person pathways for individuals to be exposed to conservation concerns and behaviors

Strategic Communication

Effective communication is essential to creating meaningful social change in any field; however, modern approaches to planned social change communication are often rooted in neoliberalism and erasure of marginalized voices (Dutta, 2015). The multiple disciplines of conservation research also recognize the importance of communication in achieving integrative conservation goals (Bickford et al., 2012). Thus, it is important for integrative conservation research to include a strategic communication element that can deliberately disseminate findings so that they might benefit the local organizations contributing to species conservation within the metro Atlanta region. To illustrate a portion of this study's practical implications, the researcher created a strategic communication tool to summarize the research findings. This tool is intended to be widely accessible using digital methods and deliberately disseminated so that they might benefit the local organizations contributing to species conservation within the metro Atlanta region. Digital communication methods present novel opportunities for conservation (Arts et al., 2015) and seem especially appropriate during the COVID pandemic, as in-person programming is still highly restricted.

The term infographic is short for informational graphics and refers to the use of computer-supported visual representations of information or data (Siricharoen, 2013; Smicklas, 2012). Also referred to as information visualization or InfoVis, these representations use text, images, symbols, and schemas to communicate information more clearly and effectively. The ease of visual communication and the attractiveness of vibrant imagery were discussed by participants of this study in association with their motivations to volunteer. To this end, an infographic was designed to convey the importance of wildlife conservation volunteerism, the ways in which people can get involved in the Atlanta Metropolitan region and the personal and conservation benefits associated with volunteering (see Figure 11). The infographic can be utilized for recruiting new volunteers, guiding program development, and improving volunteer satisfaction and engagement. Moreover, the visualization includes photos donated by study participants, content from Joel Sartore's PhotoArk and images from other digital platforms of Atlanta-based conservation organizations.

In conclusion, the findings of this research present novel directions for future species conservation practices and environmental education programs. Supportive communities, embodied interactions, empowering opportunities, and civic belonging are key themes that motivated urban residents to volunteer for herpetofaunal conservation. The value of these findings was best conveyed by study participant Leo. In her words,

> We love our little community, but… we have to be talking about this stuff [herpetofaunal conservation] with everybody else because they're not getting it and they're not aware of their actions and their decisions and how it affects everything else… Humans have a pattern of, you know, making fun of [or] being terrified of things that are different that they don't fully understand. And if it's creepy or fearsome, they don't really

make an effort to really understand it in a way that is beneficial. Because everything is worth learning about! It will always teach you something about yourself and the world and how it works.

REFERENCES

Adams, L. W. (2005). Urban wildlife ecology and conservation: A brief history of the discipline. *Urban Ecosystems*, *8*(2 SPEC. ISS.), 139–156. https://doi.org/10.1007/s11252-005-4377-7

Adger, W. N., Barnett, J., Brown, K., Marshall, N., & O'Brien, K. (2013). Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, *3*(2), 112–117. https://doi.org/10.1038/nclimate1666

Aliyu, A. A., Singhry, I. M., Adamu, H., & ABubakar, M. M. (2015). Ontology, Epistemology and Axiology in Quantitative and Qualitative Research: Elucidation of the Research Philosophical Misconception. In *https://www.researchgate.net/publication/318721927 ONTOLOGY,*. Retrieved from https://www.researchgate.net/publication/318721927

Allen, R. E. S., & Wiles, J. L. (2016). *Qualitative Research in Psychology A rose by any other name: participants choosing research pseudonyms*. https://doi.org/10.1080/14780887.2015.1133746

Almeida, F., Superior, I., Gaya, P., Queirós, A., & Faria, D. (2017). Strengths and Limitations of Qualitative and Quantitative Research Methods Innovation and Entrepreneurship View project Observatory of Portuguese Academic Spin-offs View project European Journal of Education Studies STRENGTHS AND LIMITATIONS OF QUALITATIV. *European Journal of Education Studies*, *3*(9), 369–387. https://doi.org/10.5281/zenodo.887089

Alves, R. R. N. (2012). Relationships between fauna and people and the role of ethnozoology in animal conservation. *Ethnobiology and Conservation*, *1*(2012). https://doi.org/10.15451/ec2012-8-1.2-1-69

Ananjeva, N. B., Uteshev, V. K., Orlov, N. L., & Gakhova, E. N. (2015). Strategies for conservation of endangered amphibian and reptile species. *Biology Bulletin*, *42*(5), 432–439. https://doi.org/10.1134/S1062359015050027

Ardoin, N., & Merrick, C. (2013). *Environmental education: a brief guide for US grantmakers*.

Ardoin, N. M., & Heimlich, J. E. (2013). Views From the Field: Conservation Educators' and Practitioners' Perceptions of Education as a Strategy for Achieving Conservation Outcomes. *The Journal of Environmental Education*, *44*(2), 97–115. https://doi.org/10.1080/00958964.2012.700963

Arnold, H., Cohen, F., & Warner, A. (2009). Youth and environmental action: Perspectives of young environmental leaders on their formative influences. *Journal of Environmental Education*, *40*(3), 27–36. https://doi.org/10.3200/JOEE.40.3.27-36

Arts, K., Van Der Wal, R., & Adams, W. M. (n.d.). Digital technology and the conservation of nature. *Ambio*, *44*. https://doi.org/10.1007/s13280-015-0705-1

Arts, K., van der Wal, R., & Adams, W. M. (2015). Digital technology and the conservation of nature. *Ambio*, *44*, 661–673. https://doi.org/10.1007/s13280-015-0705-1

Asah, S. T., & Blahna, D. J. (2012). Motivational functionalism and urban conservation stewardship: Implications for volunteer involvement. *Conservation Letters*, *5*(6), 470–477. https://doi.org/10.1111/j.1755-263X.2012.00263.x

Asah, S. T., Lenentine, M. M., & Blahna, D. J. (2014). Benefits of urban landscape eco-volunteerism: Mixed methods segmentation analysis and implications for volunteer retention. *Landscape and Urban Planning*, *123*, 108–113. https://doi.org/10.1016/j.landurbplan.2013.12.011

Asarian, L., Gloy, V., & Geary, N. (2012). Homeostasis. In *Encyclopedia of Human Behavior: Second Edition* (pp. 324–333). https://doi.org/10.1016/B978-0-12-375000-6.00191-9

Auerbach, C., & Silverstein, L. B. (2003). Qualitative data: An introduction to coding and analysis. In *Qualitative Data: An Introduction to Coding and Analysis* (Vol. 21). https://doi.org/10.5860/choice.41-4324

Aydinli, A., Bender, M., & Chasiotis, A. (2013). Helping and Volunteering across Cultures: Determinants of Prosocial Behavior. *Online Readings in Psychology and Culture*, *5*(3). https://doi.org/10.9707/2307-0919.1118

B. Lindenmayer, D., Fischer, J., Felton, A., Montague-Drake, R., D. Manning, A., Simberloff, D., … P. Elliott, C. (2007). The complementarity of single-species and ecosystem-oriented research in conservation research. *Oikos*, *116*(7), 1220–1226. https://doi.org/10.1111/j.0030-1299.2007.15683.x

Babchuk, N. (n.d.). The Role of the Researcher as Participant Observer and Participant-as-Observer in the. In *Source: Human Organization* (Vol. 21).

Bailey, K., Morales, N., & Newberry, M. (2020). Inclusive conservation requires amplifying experiences of diverse scientists. *Nature Ecology and Evolution*, *4*(10), 1294–1295. https://doi.org/10.1038/s41559-020-01313-y

Ballouard, J.-M., Brischoux, F., & Bonnet, X. (2011). Children Prioritize Virtual Exotic Biodiversity over Local Biodiversity. *PLoS ONE*, *6*(8), e23152. https://doi.org/10.1371/journal.pone.0023152

Bansal, H., & Eiselt, H. A. (2004). Exploratory research of tourist motivations and planning. *Tourism Management*, *25*(3), 387–396. https://doi.org/10.1016/S0261-5177(03)00135-3

Barrett, K., & Price, S. J. (2014). Urbanization and stream salamanders: a review, conservation options, and research needs. *Freshwater Science, 33*(3), 927–940.

Baynes-Rock, M. (2017, January 2). Human Perceptual and Phobic Biases for Snakes: A Review of the Experimental Evidence. *Anthrozoos*, Vol. 30, pp. 5–18. https://doi.org/10.1080/08927936.2017.1270584

Bazeley, P. (2003). Computerized data analysis for mixed methods research. *Handbook of Mixed Methods in Social and Behavioral Research, 1*(4), 385–422.

Bennett, N. J., Roth, R., Klain, S. C., Chan, K., Christie, P., Clark, D. A., … Wyborn, C. (2017, January 1). Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biological Conservation*, Vol. 205, pp. 93–108. https://doi.org/10.1016/j.biocon.2016.10.006

Berenguer, J., Corraliza, J. A., & Martin, R. (2005). Rural-Urban differences in environmental concern, attitudes, and actions. *European Journal of Psychological Assessment, 21*(2), 128–138. https://doi.org/10.1027/1015-5759.21.2.128

Bernard, H. R. (2017). *Research methods in anthropology: Qualitative and quantitative approaches*. Rowman & Littlefield.

Bickford, D., Posa, M. R. C., Qie, L., Campos-Arceiz, A., & Kudavidanage, E. P. (2012, July 1). Science communication for biodiversity conservation. *Biological Conservation*, Vol. 151, pp. 74–76. https://doi.org/10.1016/j.biocon.2011.12.016

Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member Checking: A Tool to Enhance Trustworthiness or Merely a Nod to Validation? *Qualitative Health Research, 26*(13), 1802–1811. https://doi.org/10.1177/1049732316654870

Bogdan, R., & Biklen, S. K. (1997). *Qualitative research for education*. Allyn & Bacon Boston, MA.

Braun, V., & Clarke, V. (2012). Thematic analysis. In *APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological.* (pp. 57–71). https://doi.org/10.1037/13620-004

Brown, B. (2017). *Braving the wilderness: The quest for true belonging and the courage to stand alone*. Random House.

Browne, R. K., Li, H., Robertson, H., Uteshev, V. K., Shishova, N. V, Mcginnity, D., … Gakhova, E. N. (2011). *Reptile and amphibian conservation through gene banking and other reproduction technologies*.

Bruyere, B., & Rappe, S. (2007). Identifying the motivations of environmental volunteers. *Journal of Environmental Planning and Management*, *50*(4), 503–516. https://doi.org/10.1080/09640560701402034

Büscher, B., Sullivan, S., Neves, K., Igoe, J., & Brockington, D. (2012). Towards a synthesized critique of neoliberal biodiversity conservation. *Capitalism, Nature, Socialism*, *23*(2), 4–30. https://doi.org/10.1080/10455752.2012.674149

Butina, M. (2015). A Narrative Approach to Qualitative Research. *Clinical Laboratory Science*, *28*(3), 196. Retrieved from http://hwmaint.clsjournal.ascls.org/

Cachelin, A., Paisley, K., & Blanchard, A. (2008). Using the Significant Life Experience Framework to Inform Program Evaluation: The Nature Conservancy's Wings & Water Wetlands Education Program. In *THE JOURNAL OF ENVIRONMENTAL EDUCATION*.

Carmi, N., Arnon, S., & Orion, N. (2015). Transforming Environmental Knowledge Into Behavior: The Mediating Role of Environmental Emotions. *The Journal of Environmental Education*, *46*(3), 183–201. https://doi.org/10.1080/00958964.2015.1028517

Carroll, C., Noss, R. F., Paquet, P. C., & Schumaker, N. H. (2004). *Extinction Debt of Protected Areas in Developing Landscapes*. *18*(4), 1110–1120.

Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in Pharmacy Teaching and Learning*, *10*(6), 807–815. https://doi.org/10.1016/j.cptl.2018.03.019

Ceaser, D. (2015). Significant life experiences and environmental justice: positionality and the significance of negative social/environmental experiences. *Environmental Education Research*, *21*(2), 205–220. https://doi.org/10.1080/13504622.2014.910496

Ceríaco, L. M. (2012). Human attitudes towards herpetofauna: The influence of folklore and negative values on the conservation of amphibians and reptiles in Portugal. In *Journal of Ethnobiology and Ethnomedicine* (Vol. 8). Retrieved from http://www.ethnobiomed.com/content/8/1/8

Chacón, F., Gutiérrez, G., Sauto, V., Vecina, M. L., & Pérez, A. (2017). Volunteer Functions Inventory: A Systematic Review. *Psicothema*, *29*(3), 306–316. https://doi.org/10.7334/psicothema2016.371

Chao, Y. L., & Lam, S. P. (2011). Measuring responsible environmental behavior: Self-reported and other-reported measures and their differences in testing a behavioral model. *Environment and Behavior*, *43*(1), 53–71. https://doi.org/10.1177/0013916509350849

Chawla, L. (2001). Significant Life Experiences Revisited Once Again: Response to Vol. 5(4) "Five Critical Commentaries on Significant Life Experience Research in Environmental

Education." *Environmental Education Research, 7*(4), 451–461. https://doi.org/10.1080/13504620120081313

Chawla, L. (1998). Significant life experiences revisited: A review of research on sources of environmental sensitivity. *Environmental Education Research*, *4*(4), 369–382. https://doi.org/10.1080/1350462980040402

Chawla, L. (1999). Life paths into effective environmental action. *Journal of Environmental Education*, *31*(1), 15–26. https://doi.org/10.1080/00958969909598628

Chawla, L., & Flanders Cushing, D. (2007). Education for strategic environmental behavior. *Environmental Education Research*, *13*(4), 437–452. https://doi.org/10.1080/13504620701581539

Cho, S., Crenshaw, K. W., & McCall, L. (2013). Toward a field of intersectionality studies: Theory, applications, and praxis. *Signs*, *38*(4), 785–810. https://doi.org/10.1086/669608

Clandinin, D. J. (2006). *Narrative Inquiry: A Methodology for Studying Lived Experience* (Vol. 27).

Clary, E. G., Ridge, R. D., Stukas, A. A., Snyder, M., Copeland, J., Haugen, J., & Miene, P. (1998). Understanding and assessing the motivations of volunteers: A functional approach. In *Journal of Personality and Social Psychology* (Vol. 74). https://doi.org/10.1037/0022-3514.74.6.1516

Coghlan, D., & Brydon-Miller, M. (2014). The SAGE Encyclopedia of Action Research. In *The SAGE Encyclopedia of Action Research*. https://doi.org/10.4135/9781446294406

Cohen, A. (2009). Welfare Clients' Volunteering as a Means of Empowerment. *Nonprofit and Voluntary Sector Quarterly*, *38*(3), 522–534. https://doi.org/10.1177/0899764008320196

Cole, A. G. (2007). Expanding the field: Revisiting environmental education principles through multidisciplinary frameworks. *The Journal of Environmental Education*, *38*(2), 35–46. https://doi.org/10.3200/JOEE.38.1.35-46

Coley, R. L., Kuo, F. E., & Sullivan, W. C. (1998). Influence of Nature on Neighbor Relations in Urban Public Housing. In *American Journal of Community Psychology* (Vol. 26).

Connelly, L. M. (2016). Trustworthiness in qualitative research. *Medsurg Nursing*, *25*(6), 435.

Corbin, J., & Strauss, A. (2014). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage publications.

Cortés-Gomez, A. M., Ruiz-Agudelo, C. A., Valencia-Aguilar, A., & Ladle, R. J. (2015). Ecological functions of neotropical amphibians and reptiles: A review. *Universitas Scientiarum*, *20*(2), 229–245. https://doi.org/10.11144/Javeriana.SC20-2.efna

Crenshaw, K. (1990). Mapping the Margins: Intersectionality, Identity Politics, and Violence against Women of Color. *Stanford Law Review*, *43*. Retrieved from https://heinonline.org/HOL/Page?handle=hein.journals/stflr43&id=1257&div=&collection=

Creswell, J. W. (2013). Qualitative Inquiry & Research Design: Choosing Among Five Procedures. *Reference Source*.

Crooks, K. R., Suarez, A. V., & Bolger, D. T. (2004). Avian assemblages along a gradient of urbanization in a highly fragmented landscape. *Biological Conservation*, *115*(3), 451–462. https://doi.org/10.1016/S0006-3207(03)00162-9

Cushman, S. A. (2006). Effects of habitat loss and fragmentation on amphibians: A review and prospectus. *Biological Conservation*, *128*(2), 231–240. https://doi.org/10.1016/j.biocon.2005.09.031

D'Amore, C., & Chawla, L. (2020). *Significant Life Experiences that Connect Children with Nature: A Research Review and Applications to a Family Nature Club*. https://doi.org/10.1007/978-3-319-67286-1_49

Dai, D. (2011). Racial/ethnic and socioeconomic disparities in urban green space accessibility: Where to intervene? *Landscape and Urban Planning*, *102*(4), 234–244. https://doi.org/10.1016/j.landurbplan.2011.05.002

D'Amore, C. (2015). Family Nature Clubs: Creating the Conditions for Social and Environmental Connection and Care. *ProQuest Dissertations and Theses*, 431. Retrieved from http://easyaccess.lib.cuhk.edu.hk/login?url=http://search.proquest.com/docview/1696752342?accountid=10371%5Cnhttp://findit.lib.cuhk.edu.hk/852cuhk/?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&genre=dissertations+%26+theses&sid=ProQ:P

de Miranda, E. B. P. (2017, December 15). The plight of reptiles as ecological actors in the tropicss. *Frontiers in Ecology and Evolution*, Vol. 5. https://doi.org/10.3389/fevo.2017.00159

Dearborn, D. C., & Kark, S. (2010). Motivations for Conserving Urban Biodiversity. *Conservation Biology*, *24*(2), 432–440. https://doi.org/10.1111/j.1523-1739.2009.01328.x

Deaton, R., Randle, C. P., Ruthven, D. C., Lutterschmidt, W. I., Janis, M., & Cureton, J. C. (2014). Effects of urbanization on genetic diversity, gene flow, and population structure in the ornate box turtle (Terrapene ornata). *Amphibia-Reptilia*, *35*(1), 87–97. https://doi.org/10.1163/15685381-00002930

Devictor, V., Julliard, R., Couvet, D., Lee, A., & Jiguet, F. (2007). Functional homogenization effect of urbanization on bird communities. *Conserv Biol*, *21*(3), 741–751. https://doi.org/10.1111/j.1523-1739.2007.00671.x

Ditchkoff, S. S., Saalfeld, S. T., & Gibson, C. J. (2006). Animal behavior in urban ecosystems: Modifications due to human-induced stress. *Urban Ecosystems*, *9*(1), 5–12. https://doi.org/10.1007/s11252-006-3262-3

Dolan, R. W., Harris, K. A., & Adler, M. (2015). Community involvement to address a long-standing invasive species problem: Aspects of civic ecology in practice. *Ecological Restoration*, *33*(3), 316–325. https://doi.org/10.3368/er.33.3.316

Doremus, H., & Pagel, J. E. (2001). Why Listing May Be Forever: Perspectives on Delisting under the U.S. Endangered Species. In *Society for Conservation Biology* (Vol. 15).

Doyle, M. W., & Havlick, D. G. (2009). Infrastructure and the Environment. *Annual Review of Environment and Resources*, *34*(1), 349–373. https://doi.org/10.1146/annurev.environ.022108.180216

Drew, L. (2015). Embodied learning processes in activism. *Canadian Journal for the Study of Adult Education*, *27*(1), 83–101.

Drury, R., Homewood, K., & Randall, S. (2011). Less is more: the potential of qualitative approaches in conservation research. *Animal Conservation*, *14*(1), 18–24. https://doi.org/10.1111/j.1469-1795.2010.00375.x

Dunn, R. R., Gavin, M. C., Sanchez, M. C., & Solomon, J. N. (2006). The Pigeon Paradox: Dependence of Global Conservation on Urban Nature. *Conservation Biology*, *20*(6), 1814–1816. https://doi.org/10.1111/j.1523-1739.2006.00533.x

Dutta, M. J. (2015). Decolonizing Communication for Social Change: A Culture-Centered Approach. *Communication Theory*, *25*(2), 123–143. https://doi.org/10.1111/comt.12067

Ehlers Smith, Y. C. (2016). *Assessing Anthropogenic Impacts on the Persistence of Forest Mammals within the Indian Ocean Coastal Belt of Southern KwaZulu-Natal Province*. (March).

Erdogan, M., Ok, A., & Marcinkowski, T. J. (2012). Development and validation of Children's Responsible Environmental Behavior Scale. *Environmental Education Research*, *18*(4), 507–540. https://doi.org/10.1080/13504622.2011.627421

Esposito, L. (2002). Integrative Conservation. *SAIS Review*, *22*(2), 53–75. https://doi.org/10.1353/sais.2002.0031

Evans, D. M., Che-Castaldo, J. P., Crouse, D., Davis, F. W., Epanchin-Niell, R., Flather, C. H., … Male, T. D. (2017). Species recovery in the United States: increasing the effectiveness of the Endangered Species Act. *Issues in Ecology*.

Feldpausch-Parker, A. M., Slagle, K. M., Schneider, J., Wedemeyer-Strombel, K. R., Peterson, M. J., Neftali Sanchez, R., … Salvador, E. (2019). Engaging Fishers' Ecological Knowledge for Endangered Species Conservation: Four Advantages to Emphasizing Voice in Participatory Action Research. *Fronteirs in Communication*, *4*, 30. https://doi.org/10.3389/fcomm.2019.00030

Ficetola, G. F., & De Bernardi, F. (2004). Amphibians in a human-dominated landscape: The community structure is related to habitat features and isolation. *Biological Conservation*, *119*(2), 219–230. https://doi.org/10.1016/j.biocon.2003.11.004

Fien, J., Scott, W., & Tilbury, D. (2001). Education and Conservation: Lessons from an evaluation. *Environmental Education Research*, *7*(4), 379–395. https://doi.org/10.1080/13504620120081269

Fletcher, R. (2012). Using the Master's Tools? Neoliberal Conservation and the Evasion of Inequality. *Development and Change*, *43*(1), 295–317. https://doi.org/10.1111/j.1467-7660.2011.01751.x

Fry, L. J. (1973). Participant observation and program evaluation. *Journal of Health and Social Behavior*, *14*(3), 274–278. https://doi.org/10.2307/2137119

Gallagher, M. T., Snodgrass, J. W., Brand, A. B., Casey, R. E., Lev, S. M., & Van Meter, R. J. (2014). The role of pollutant accumulation in determining the use of stormwater ponds by amphibians. *Wetlands Ecology and Management*, *22*(5), 551–564.

Germano, J. M., & Bishop, P. J. (2009). Suitability of Amphibians and Reptiles for Translocation. *Conservation Biology*, *23*(1), 7–15. https://doi.org/10.1111/j.1523-1739.2008.01123.x

GIBBON, J. W., SCOTT, D. E., RYAN, T. J., BUHLMANN, K. A., TUBERVILLE, T. D., METTS, B. S., … WINNE, C. T. (2000). The Global Decline of Reptiles, Déjà Vu Amphibians. *BioScience*, *50*(8), 653. https://doi.org/10.1641/0006-3568(2000)050[0653:tgdord]2.0.co;2

Gibbs, J. P., Marquez, C., & Sterling, E. J. (2008). The role of endangered species reintroduction in ecosystem restoration: Tortoise-cactus interactions on Española Island, Galápagos. *Restoration Ecology*, *16*(1), 88–93. https://doi.org/10.1111/j.1526-100X.2007.00265.x

Glaser Barney, G., & Strauss Anselm, L. (1967). The discovery of grounded theory: strategies for qualitative research. *New York, Adline de Gruyter*.

Goleman, D. (2005). *Emotional intelligence*. Bantam.

Guba, E. G. (1990). The paradigm dialog. *Alternative Paradigms Conference, Mar, 1989, Indiana u, School of Education, San Francisco, ca, Us*. Sage Publications, Inc.

Gunnthorsdottir, A. (2001). Physical Attractiveness of an Animal Species as a Decision Factor for its Preservation. *Anthrozoös*, *14*(4), 204–215. https://doi.org/10.2752/089279301786999355

Hamer, A. J., & McDonnell, M. J. (2008, October). Amphibian ecology and conservation in the urbanising world: A review. *Biological Conservation*, Vol. 141, pp. 2432–2449. https://doi.org/10.1016/j.biocon.2008.07.020

Harwood, C., Spray, C. M., & Keegan, R. (2008). Achievement goal theories in sport. In *Advances in sport psychology, 3rd ed.* (pp. 157-185,444-448). Champaign, IL, US: Human Kinetics.

Head, E. (2009). The ethics and implications of paying participants in qualitative research. *International Journal of Social Research Methodology*, *12*(4), 335–344. https://doi.org/10.1080/13645570802246724

Houlahan, J. E., Fidlay, C. S., Schmidt, B. R., Meyer, A. H., & Kuzmin, S. L. (2000). Quantitative evidence for global amphibian population declines. *Nature*, *404*(6779), 752–755. https://doi.org/10.1038/35008052

Hsu, S. (2009). Significant life experiences affect environmental action: a confirmation study in eastern Taiwan. *Environmental Education Research*, *15*(4), 497–517. https://doi.org/10.1080/13504620903076973

Igoe, J., & Brockington, D. (2007). Neoliberal Conservation: A Brief Introduction. *Conservation and Society*, *5*(4), 432–449. Retrieved from www.jstor.org/stable/26392898

Isbell, L. A. (2006). Snakes as agents of evolutionary change in primate brains. *Journal of Human Evolution*, *51*(1), 1–35. https://doi.org/10.1016/j.jhevol.2005.12.012

Jackson, S. T., & Sax, D. F. (2010). Balancing biodiversity in a changing environment: extinction debt, immigration credit and species turnover. *Trends in Ecology and Evolution*, *25*(3), 153–160. https://doi.org/10.1016/j.tree.2009.10.001

Jacobson, S. K., Carlton, J. S., & Monroe, M. C. (2012). Motivation and Satisfaction of Volunteers at a Florida Natural Resource Agency. In *Journal of Park and Recreation Administration Spring* (Vol. 30).

Johnson, J. L., Adkins, D., & Chauvin, S. (2020). A review of the quality indicators of rigor in qualitative research. *American Journal of Pharmaceutical Education*, Vol. 84, pp. 138–146. https://doi.org/10.5688/ajpe7120

Karl, T. R., & Trenberth, K. E. (2003). Modern Global Climate Change. *Science*, *302*(5651), 1719–1723. https://doi.org/10.1126/science.1090228

Katz, D. (1960). The Functional Approach to the Study of Attitudes. *Public Opinion Quarterly*, *24*(2, Special Issue: Attitude Change), 163. https://doi.org/10.1086/266945

Kelly, A. B. (2011). Conservation practice as primitive accumulation. *Journal of Peasant Studies*, *38*(4), 683–701. https://doi.org/10.1080/03066150.2011.607695

Kelly, B., Margolis, M., McCormack, L., LeBaron, P. A., & Chowdhury, D. (2017). What Affects People's Willingness to Participate in Qualitative Research? An Experimental Comparison of Five Incentives. *Field Methods*, *29*(4), 333–350. https://doi.org/10.1177/1525822X17698958

Kelly, M., Ellaway, R., Scherpbier, A., King, N., & Dornan, T. (2019). Body pedagogics: embodied learning for the health professions. *Medical Education, 53*(10), 967–977. https://doi.org/10.1111/medu.13916

Kessler, W. B., & Thomas, J. W. (2006). Conservation Biology from the Perspective of Natural Resource Management Disciplines. *Conservation Biology*, *20*(3), 670–673. Retrieved from www.jstor.org/stable/3879225

Kivunja, C., & Kuyini, A. B. (2017). Understanding and Applying Research Paradigms in Educational Contexts. *International Journal of Higher Education*, *6*(5), 26. https://doi.org/10.5430/ijhe.v6n5p26

Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why Do People Behave Environmentally and What are the Barriers to Pro-Environmental Behaviour. *Environmental Education Research*, *8*(3), 239–260. https://doi.org/10.1080/1350462022014540

Kosmas, P., Ioannou, A., & Zaphiris, P. (2019). Implementing embodied learning in the classroom: effects on children's memory and language skills. *Educational Media International*, *56*(1), 59–74. https://doi.org/10.1080/09523987.2018.1547948

Krasny, M. E., & Tidball, K. G. (2015). Civic ecology: Adaptation and transformation from the ground up. In *Civic Ecology: Adaptation and Transformation from the Ground Up*. https://doi.org/10.1080/15575330.2017.1313530

Krasny, M., & Tidball, K. (2009). Community Gardens as Contexts for Science, Stewardship,and Civic Action Learning. *Cities and the Environment*, *2*(1). Retrieved from www.gardenmosaics.org

Kruglanski, A. W., Chernikova, M., & Kopetz, C. (2015). Motivation Science. In *Emerging Trends in the Social and Behavioral Sciences* (pp. 1–16). https://doi.org/10.1002/9781118900772.etrds0104

Kudryavtsev, A., Stedman, R. C., & Krasny, M. E. (2012). Sense of place in environmental education. *Environmental Education Research*, *18*(2), 229–250. https://doi.org/10.1080/13504622.2011.609615

Kudryavtsev, A. (2013). *Urban environmental education and sense of place*.

Kulik, L., & Megidna, H. (2011). Women empower women: volunteers and their clients in community service. *Journal of Community Psychology*, *39*(8), 922–938. https://doi.org/10.1002/jcop.20478

Kwiatkowski, M. A., Schuett, G. W., Repp, R. A., Nowak, E. M., & Sullivan, B. K. (2008). Does urbanization influence the spatial ecology of Gila monsters in the Sonoran Desert? *Journal of Zoology*, *276*(4), 350–357.

LeCompte, M. D., & Goetz, J. P. (1982). Problems of Reliability and Validity in Ethnographic Research. *Review of Educational Research*, *52*(1), 31–60. https://doi.org/10.3102/00346543052001031

Lederman, N. G., & Lederman, J. S. (2015, November 1). What Is A Theoretical Framework? A Practical Answer. *Journal of Science Teacher Education*, Vol. 26, pp. 593–597. https://doi.org/10.1007/s10972-015-9443-2

Lee, C. J. G. (2012). Reconsidering Constructivism in Qualitative Research. *Educational Philosophy and Theory*, *44*(4), 403–412. https://doi.org/10.1111/j.1469-5812.2010.00720.x

Lewis, R. B., & Maas, S. M. (2007). QDA Miner 2.0: Mixed-Model Qualitative Data Analysis Software. *Field Methods*, *19*(1), 87–108. https://doi.org/10.1177/1525822X06296589

Liarakou, G., Kostelou, E., & Gavrilakis, C. (2011). Environmental volunteers: Factors influencing their involvement in environmental action. *Environmental Education Research*, *17*(5), 651–673. https://doi.org/10.1080/13504622.2011.572159

Lincoln, V. (2000). Ecospirituality. A pattern that connects. *Journal of Holistic Nursing : Official Journal of the American Holistic Nurses' Association*, *18*(3), 227–244. https://doi.org/10.1177/089801010001800305

Linneberg, M. S., & Korsgaard, S. (n.d.). *Coding qualitative data: a synthesis guiding the novice*. https://doi.org/10.1108/QRJ-12-2018-0012

Liordos, V., Kontsiotis, V. J., Kokoris, S., & Pimenidou, M. (2018). The two faces of Janus, or the dual mode of public attitudes towards snakes. *Science of the Total Environment*, *621*, 670–678. https://doi.org/10.1016/j.scitotenv.2017.11.311

Liu, Z., He, C., Zhou, Y., & Wu, J. (2014). How much of the world's land has been urbanized, really? A hierarchical framework for avoiding confusion. *Landscape Ecology*, *29*(5), 763–771. https://doi.org/10.1007/s10980-014-0034-y

Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder*. Algonquin books.

Maathai, W. (2010). *Replenishing the Earth: Spiritual Values for Healing Ourselves and the World*. Retrieved from https://books.google.com/books?id=U-n8mW7suk8C

Mackenzie, N., & Knipe, S. (2006). Research dilemmas: Paradigms, methods and methodology. In *Issues in Educational Research* (Vol. 16).

Margles, S. W., Peterson, R. B., Ervin, J., & Kaplin, B. A. (2010, January). Conservation without borders: Building communication and action across disciplinary boundaries for effective

conservation. *Environmental Management*, Vol. 45, pp. 1–4. https://doi.org/10.1007/s00267-009-9383-8

Margoluis, R., Stem, C., Salafsky, N., & Brown, M. (2009). Design alternatives for evaluating the impact of conservation projects. *New Directions for Evaluation*, *2009*(122), 85–96. https://doi.org/10.1002/ev.298

Martin, L., & Murray, B. (2011). A predictive framework and review of the ecological impacts of exotic plant invasions on reptiles and amphibians. *Biological Reviews*, *86*(2), 407–419. https://doi.org/10.1111/j.1469-185X.2010.00152.x

Mascia, M. B., Brosius, J. P., Dobson, T. A., Forbes, B. C., Horowitz, L., McKean, M. A., & Turner, N. J. (2003). Conservation and the Social Sciences. *Conservation Biology*, *17*(3), 649–650. https://doi.org/10.1046/j.1523-1739.2003.01738.x

Masoumi, F. (2019). *Increasing Environmental Education Accessibility Through New Media*. Retrieved from https://scholarworks.umt.edu/grad_portfolios

Mayer, J. D., Faber, M. A., & Xu, X. (2007). Seventy-five years of motivation measures (1930-2005): A descriptive analysis. *Motivation and Emotion*, *31*(2), 83–103. https://doi.org/10.1007/s11031-007-9060-2

Maynard, L., Monroe, M. C., Jacobson, S. K., & Savage, A. (2020). Maximizing biodiversity conservation through behavior change strategies. *Conservation Science and Practice*. https://doi.org/10.1111/csp2.193

McCleery Robert A., Moorman Christopher E., P. M. N. (2014). Urban Wildlife Conservation. In *Springer*. https://doi.org/10.1007/978-1-4899-7500-3

McComb, B. C. (2008). *Wildlife habitat management : concepts and applications in forestry* (2nd ed.). Amherst.

McDougle, L. M., Greenspan, I., & Handy, F. (2011). Generation green: understanding the motivations and mechanisms influencing young adults' environmental volunteering. *International Journal of Nonprofit and Voluntary Sector Marketing*, *16*(4), 325–341. https://doi.org/10.1002/nvsm.431

McEntyre, N. E., Knowles, K., & Hope, D. (2000). Urban ecology as an interdisciplinary field: differences in the use of "urban" between the social and natural sciences. *Urban Ecosystems*, *4*, 5–24.

McKenzie-Mohr, D. (2000). Fostering sustainable behavior through community-based social marketing. *American Psychologist*, *55*(5), 531–537. https://doi.org/10.1037/0003-066X.55.5.531

Mckinney, M. L. (2002). Urbanization , biodiversity , and conservation. *BioScience*, *52*(10), 883–890.

McKinney, M. L. (2006). Urbanization as a major cause of biotic homogenization. *Biological Conservation*, *127*(3), 247–260. https://doi.org/10.1016/j.biocon.2005.09.005

Measham, T. G., & Barnett, G. B. (2008). Environmental Volunteering: Motivations, modes and outcomes. *Australian Geographer*, *39*(4), 537–552. https://doi.org/10.1080/00049180802419237

Merriam, S. B. (2009). Qualitative research: A guide to design and implementation. *The JosseyBass Higher and Adult Education Series*, *2nd*, 304. https://doi.org/10.1097/NCI.0b013e3181edd9b1

Metro Atlanta Chamber. (2020). Profile of Metro Atlanta: Metro Atlanta Demographics Overview. Retrieved from Resources website: https://www.metroatlantachamber.com/resources/reports-and-information/executive-profile

Mills, L. S. (2009). *Conservation of Wildlife Populations: Demography, Genetics and Management*. Retrieved from https://books.google.com/books?id=fVLEV64qYfcC

Mineka, S., & Öhman, A. (2001). Phobias and preparedness: The selective, automatic, and encapsulated nature of fear. *Biological Psychiatry*, *52*(10), 927–937. https://doi.org/10.1016/S0006-3223(02)01669-4

Monroe, M. C. (2003). Two Avenues for Encouraging Conservation Behaviors. *Human Ecology Review*, Vol. 10, pp. 113–125. https://doi.org/10.2307/24706961

Monroe, M. C., Andrews, E., & Biedenweg, K. (2007). A framework for environmental education strategies. *Applied Environmental Education and Communication*, *6*(3–4), 205–216. https://doi.org/10.1080/15330150801944416

Montenegro, C. (2017). *Behavioral Differences Between Urban and Rural American Crows (Corvus brachyrhynchos)*.

Moon, K., & Blackman, D. (2014). A Guide to Understanding Social Science Research for Natural Scientists. *Conservation Biology*, *28*(5), 1167–1177. https://doi.org/10.1111/cobi.12326

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification Strategies for Establishing Reliability and Validity in Qualitative Research. In *International Journal of Qualitative Methods* (Vol. 1).

Muirhead, S. (2011). *Nature and well-being : building social and emotional capital through environmental volunteering*. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=edsble&AN=ethos.016534765&site=eds-live&scope=site

Mullendore, N., Mase, A. S., Mulvaney, K., Perry-Hill, R., Reimer, A., Behbehani, L., … Prokopy, L. S. (2014). Conserving the Eastern Hellbender Salamander. *Human Dimensions of Wildlife*, *19*(2), 166–178. https://doi.org/10.1080/10871209.2014.853221

Muñoz, J. (2007). Biodiversity conservation including uncharismatic species. *Biodiversity and Conservation*, *16*(7), 2233–2235. https://doi.org/10.1007/s10531-006-9147-1

Murray, E. J., & Foote, F. (1979). The origins of fear of snakes. *Behaviour Research and Therapy*, *17*(5), 489–493. https://doi.org/10.1016/0005-7967(79)90065-2

Murray, M. H., & St. Clair, C. C. (2015). Individual flexibility in nocturnal activity reduces risk of road mortality for an urban carnivore. *Behavioral Ecology*, *26*(6), 1520–1527. https://doi.org/10.1093/beheco/arv102

Nazir, J. (2016). Using phenomenology to conduct environmental education research: Experience and issues. *Journal of Environmental Education*, *47*(3), 179–190. https://doi.org/10.1080/00958964.2015.1063473

Neel, M. C., Leidner, A. K., Haines, A., Goble, D. D., & Scott, J. M. (2012). By the Numbers: How is Recovery Defined by the US Endangered Species Act? *BioScience*, *62*(7), 646–657. https://doi.org/10.1525/bio.2012.62.7.7

OpenStaxCollege. (2013, March 6). *Homeostasis*.

Ordeñana, M. a, Crooks, K. R., Boydston, E. E., Fisher, R. N., Lyren, L. M., Siudyla, S., … Vuren, D. H. Van. (2010). Effects of urbanization on carnivore species distribution and richness Effects of urbanization on carnivore species distribution and richness. *Journal of Mammalogy*, *91*(6), 1322–1331. https://doi.org/10.1644/09-MAMM-A-312.1.Key

Organ, J. F., Geist, V., Mahoney, S. P., Williams, S., Krausman, P. R., Batcheller, G. R., … Regan, R. (2012). The North American model of wildlife conservation. *The Wildlife Society Technical Review, 12*(04).

Padilla, B. J., & Rodewald, A. D. (2015). Avian metapopulation dynamics in a fragmented urbanizing landscape. *Urban Ecosystems*, *18*(1), 239–250. https://doi.org/10.1007/s11252-014-0390-z

Parlange, M. (1998). The City as Ecosystem. *BioScience*, *48*(8), 581–585. https://doi.org/10.2307/1313416

Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.

Payne, P. (1999). The Significance of Experience in SLE Research. *Environmental Education Research*, *5*(4), 365–381. https://doi.org/10.1080/1350462990050403

Penner., L. A., Dovidio., J. F., Piliavin., J. A., & Schroeder., D. A. (2005). Prosocial Behavior: Multilevel Perspectives. *Annual Review of Psychology*, *56*(1), 365–392. https://doi.org/10.1146/annurev.psych.56.091103.070141

Perkins, D. D., & Zimmerman, M. A. (1995). Empowerment TheoIT, Research, and Application. In *American Journal of Community Psychology* (Vol. 23).

Petriwskyj, A., & Warburton, J. (2007). Motivations and barriers to volunteering by seniors: A critical review of the literature. In *THE INTERNATIONAL JOURNAL OF VOLUNTEER ADMINISTRATION*. Retrieved from https://www.researchgate.net/publication/43478483

PICKETT, S. T. A., & CADENASSO, M. L. (2006). Advancing urban ecological studies: Frameworks, concepts, and results from the Baltimore Ecosystem Study. *Austral Ecology*, *31*(2), 114–125. https://doi.org/10.1111/j.1442-9993.2006.01586.x

Pinheiro, L., Fabrício, J., Rodrigues, M., & Borges-Nojosa, M. (2016). Formal education, previous interaction and perception influence the attitudes of people toward the conservation of snakes in a large urban center of northeastern Brazil. *Journal of Ethnobiology and Ethnomedicine*, *12*, 25. https://doi.org/10.1186/s13002-016-0096-9

Prange, S., & Gehrt, S. D. (2004). Changes in mesopredator-community structure in response to urbanization. *Canadian Journal of Zoology*, *82*(11), 1804–1817. https://doi.org/10.1139/z04-179

Ratcliffe, M., Burd, C., Holder, K., & Fields, A. (2016). Defining rural at the US Census Bureau. *American Community Survey and Geography Brief*, *1*, 8.

Riley, S. P. D., Busteed, G. T., Kats, L. B., Vandergon, T. L., Lee, L. F. S., Dagit, R. G., … Sauvajot, R. M. (2005). Effects of urbanization on the distribution and abundance of amphibians and invasive species in southern California streams. *Conservation Biology*, *19*(6), 1894–1907. https://doi.org/10.1111/j.1523-1739.2005.00295.x

Riley, S. P. D., Serieys, L. E. K., Pollinger, J. P., Sikich, J. A., Dalbeck, L., Wayne, R. K., & Ernest, H. B. (2014). Individual behaviors dominate the dynamics of an urban mountain lion population isolated by roads. *Current Biology*, *24*(17), 1989–1994. https://doi.org/10.1016/j.cub.2014.07.029

Rochester, C., Paine, A. E., Howlett, S., Zimmeck, M., & Paine, A. E. (2016). *Volunteering and Society in the 21st Century*. Springer.

Rossman, G. B., & Rallis, S. F. (2011). *Learning in the field: An introduction to qualitative research*. Sage.

Rust, N. A., Abrams, A., Challender, D. W. S., Chapron, G., Ghoddousi, A., Glikman, J. A., … Hill, C. M. (2017). Quantity Does Not Always Mean Quality: The Importance of

Qualitative Social Science in Conservation Research. *Society and Natural Resources*, *30*(10), 1304–1310. https://doi.org/10.1080/08941920.2017.1333661

Ryan, R. M. (2012). *The Oxford handbook of human motivation*. OUP USA.

Saari, S., Richter, S., Higgins, M., Oberhofer, M., Jennings, A., & Faeth, S. H. (2016). Urbanization is not associated with increased abundance or decreased richness of terrestrial animals - dissecting the literature through meta-analysis. *Urban Ecosystems*, 1–14. https://doi.org/10.1007/s11252-016-0549-x

Saldaña, J. (2015). *The coding manual for qualitative researchers*. Sage.

Schmidt, B. R. (2004). Declining amphibian populations: The pitfalls of count data in the study of diversity, distributions, dynamics, and demography. *Herpetological Journal*, *14*(4), 167–174. https://doi.org/10.5167/uzh-58012

SCHULTZ, P. W. (2011). Conservation Means Behavior. *Conservation Biology*, *25*(6), 1080–1083. https://doi.org/10.1111/j.1523-1739.2011.01766.x

Schwartz, M. W. (2008). The performance of the endangered species act. *Annual Review of Ecology, Evolution, and Systematics*, *39*, 279–299.

SEDDON, P. J., ARMSTRONG, D. P., & MALONEY, R. F. (2007). Developing the Science of Reintroduction Biology. *Conservation Biology*, *21*(2), 303–312. https://doi.org/10.1111/j.1523-1739.2006.00627.x

Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (5th ed.). Teachers college press.

Semlitsch, R. D., Walls, S. C., Barichivich, W. J., & O'Donnell, K. M. (2017). Extinction Debt as a Driver of Amphibian Declines: An Example with Imperiled Flatwoods Salamanders. *Journal of Herpetology*, *51*(1), 12–18. https://doi.org/10.1670/16-090

Shirey, P. D., & Lamberti, G. A. (2010). Assisted colonization under the U.S. Endangered Species Act. *Conservation Letters*, *3*(1), 45–52. https://doi.org/10.1111/j.1755-263X.2009.00083.x

Shwartz, A., Turbé, A., Julliard, R., Simon, L., & Prévot, A. C. (2014). Outstanding challenges for urban conservation research and action. *Global Environmental Change*, *28*(1), 39–49. https://doi.org/10.1016/j.gloenvcha.2014.06.002

Simmons, B. (2007). Standards for the Initial Preparation of Environmental Educators. *Recuperado De*, (November), 1–21.

Siricharoen, W. V. (2013). Infogragraphics: The New communication Tools in Digital Age. In *The International Conference on E-Technologies and Business on the Web*. Retrieved from http://sdiwc.net/digital-library/infographics-the-new-communication-tools-in-digital-age

Sloane, G. M. T., & Pröbstl-Haider, U. (2019). Motivation for environmental volunteering - A comparison between Austria and Great Britain. *Journal of Outdoor Recreation and Tourism*, *25*, 158–168. https://doi.org/10.1016/j.jort.2019.01.002

Smiciklas, M. (2012). The Power of Infographics: Using Pictures to Communicate and Connect with Your Audience. In *The power of infographics*.

Soga, M., Gaston, K. J., Yamaura, Y., Kurisu, K., & Hanaki, K. (2016). Both Direct and Vicarious Experiences of Nature Affect Children's Willingness to Conserve Biodiversity. *Int J Environ Res Public Health*, *13*(6). https://doi.org/10.3390/ijerph13060529

Souchet, J., & Aubret, F. (2016). Revisiting the fear of snakes in children: the role of aposematic signalling. *Nature Publishing Group*. https://doi.org/10.1038/srep37619

Sponarski, C. C., Vaske, J. J., Bath, A. J., & Loeffler, T. (2016). Changing attitudes and emotions toward coyotes with experiential education. *The Journal of Environmental Education*, *47*(4), 296–306. https://doi.org/10.1080/00958964.2016.1158142

Stenner, P. (2012). Pattern. In C. Lury & N. Wakeford (Eds.), *Inventive methods: The happening of the social* (pp. 136–146). Routledge.

Stern, M. J., Frensley, B. T., Powell, R. B., & Ardoin, N. M. (2018). What difference do role models make? Investigating outcomes at a residential environmental education center. *Environmental Education Research*, *24*(6), 818–830. https://doi.org/10.1080/13504622.2017.1313391

Stern, P. C. (2000). Psychology and the science of human-environment interactions. *American Psychologist*, *55*(5), 523.

Stern, P. C. (2000). Toward a Coherent Theory of Environmentally Significant Behavior. *Journal of Social Issues*, *56*(3), 407–424. https://doi.org/10.1111/0022-4537.00175

Stevenson, K. T., Peterson, M. N., Carrier, S. J., Strnad, R. L., Bondell, H. D., Kirby-Hathaway, T., & Moore, S. E. (2014). Role of Significant Life Experiences in Building Environmental Knowledge and Behavior Among Middle School Students. *The Journal of Environmental Education*, *45*(3), 163–177. https://doi.org/10.1080/00958964.2014.901935

Storfer, A. (2003). *Amphibian declines: future directions*. Retrieved from http://www.blackwellpublishing.com/journals/ddi

Strauss, A. L. (1987). *Qualitative analysis for social scientists*. Cambridge university press.

Svendsen, E., & Campbell, L. K. (2008). Urban ecological stewardship: understanding the structure, function and network of community-based urban land management. *Cities and the Environment (CATE)*, *1*(1), 4.

Talens, J. D. (2016). Development and Validation of Responsible Environmental Behavior Scale towards Solid Waste Management (REBS-SWM) in School Setting. *International Journal of Advanced Engineering, Management and Science (IJAEMS)*, *2*(4). Retrieved from www.ijaems.com

Tanner, T. (1980). Significant life experiences: A new research area in environmental education. *Journal of Environmental Education*. https://doi.org/10.1080/00958964.1980.9941386

Tanner, T. (1998). Choosing the right subjects in significant life experiences research. *Environmental Education Research*, *4*(4), 399–417. https://doi.org/10.1080/1350462980040404

Taufik, D., & Venhoeven, L. (2018). Emotions and Pro-Environmental Behaviour. In *Environmental Psychology* (pp. 189–197). https://doi.org/10.1002/9781119241072.ch19

Taylor, A. F., Kuo, M., & Sullivan, W. C. (2014). *Coping with ADD. The Surprising Connection to Green Play Settings*. https://doi.org/10.1177/00139160121972864

Theobald, D. M. (2004). Placing exurban land-use change in a human modification framework. *Frontiers in Ecology and the Environment*, *2*(3), 139–144. https://doi.org/10.1890/1540-9295(2004)002[0139:PELCIA]2.0.CO;2

Tidball, K. G. (2018). Grassroots to Global: Broader Impacts of Civic Ecology. In *Grassroots to Global: Broader Impacts of Civic Ecology*. Retrieved from https://books.google.com/books?id=GNU6DwAAQBAJ

Tingley, R., Meiri, S., & Chapple, D. G. (2016, December 1). Addressing knowledge gaps in reptile conservation. *Biological Conservation*, Vol. 204, pp. 1–5. https://doi.org/10.1016/j.biocon.2016.07.021

Truong, V. D. (2014). Social Marketing. *Social Marketing Quarterly*, *20*(1), 15–34. https://doi.org/10.1177/1524500413517666

Turner, W. R., Nakamura, T., & Dinetti, M. (2004). Global urbanization and the separation of humans from nature. *Bioscience, 54*(6), 585–590.

Turner, W. R., Nakamura, T., & Dinetti, M. (2004). Global Urbanization and the Separation of Humans from Nature. In *BioScience* (Vol. 54). Retrieved from https://academic.oup.com/bioscience/article-abstract/54/6/585/294707

United Nations, Department of Economic and Social Affairs, Population Division. (2019). *World Urbanization Prospects 2018 Highlights*.

US Fish and Wildlife Service. (2017). *Critical Habitat*. Retrieved from https://ecos.fws.gov/ecp/report/

Van Schalkwyk, A. (2011). Sacredness and sustainability: Searching for a practical eco-spirituality. *Religion and Theology*, *18*(1–2), 77–92.

Vogt, W. P., Gardner, D. C., Haeffele, L. M., & Vogt, E. R. (2014). *Selecting the right analyses for your data: Quantitative, qualitative, and mixed methods*. Guilford Publications.

VYGOTSKY, L. S. (1978). Mind in Society. In *Mind in Society*. https://doi.org/10.2307/j.ctvjf9vz4

Walls, S. C. (2014, September 10). Identifying monitoring gaps for amphibian populations in a North American biodiversity hotspot, the southeastern USA. *Biodiversity and Conservation*, Vol. 23, pp. 3341–3357. https://doi.org/10.1007/s10531-014-0782-7

Ward, R. J., Griffiths, R. A., Wilkinson, J. W., & Cornish, N. (2017). Optimising monitoring efforts for secretive snakes: A comparison of occupancy and N-mixture models for

assessment of population status. *Scientific Reports*, *7*(1), 1–12. https://doi.org/10.1038/s41598-017-18343-5

Weenink, E., Bridgman, • Todd, & Bridgman, T. (2016). *Taking Subjectivity and Reflexivity Seriously: Implications of Social Constructionism for Researching Volunteer Motivation*. https://doi.org/10.1007/s11266-016-9824-y

Weiss, M. R., Amorose, A. J., & Kipp, L. E. (2012). Youth motivation and participation in sport and physical activity. In *The Oxford handbook of human motivation* (pp. 520–553). Oxford University Press.

West, J. (2018). Importance of Amphibians: A Synthesis of Their Environmental Functions, Benefits to Humans, and Need for Conservation. *BSU Honors Program Theses and Projects, Item 261*.

Whitley, C. T., Takahashi, B., Zwickle, A., Besley, J. C., & Lertpratchya, A. P. (2018). Sustainability behaviors among college students: An application of the VBN theory. *Environmental Education Research*, *24*(2), 245–262. https://doi.org/10.1080/13504622.2016.1250151

Wilson, A. D., & Golonka, S. (2013). Embodied Cognition is Not What you Think it is. *Frontiers in Psychology*, *4*. https://doi.org/10.3389/fpsyg.2013.00058

Wilson, J. (2012). Volunteerism Research: A Review Essay. *Nonprofit and Voluntary Sector Quarterly*, *41*(2), 176–212. https://doi.org/10.1177/0899764011434558

Wilson, J. (2000). Volunteering. *Annual Review of Sociology*, *26*, 215–240.

Wolch, J. R., Byrne, J., & Newell, J. P. (2014). *Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough.'* https://doi.org/10.1016/j.landurbplan.2014.01.017

Woosnam, K. M., Strzelecka, M., Nisbett, G. S., & Keith, S. J. (2019). Examining millennials' global citizenship attitudes and behavioral intentions to engage in environmental volunteering. *Sustainability (Switzerland), 11*(8), 13–16. https://doi.org/10.3390/su11082324

APPENDICES

Category	Examples	Frequency	Organization
Habitat Restoration	Cleaning-up local streams, ponds, parks, and other potential reptile or amphibian habitats (i.e. removing graffitti, trash and recyclables)		
	Planting trees and other vegetation in potential habitat		
	Removing invasive species from potential habitat		
	Other Habitat Restoration activity:		
Monitoring	Collecting reptile or amphibian citizen science data (i.e. FrogWatch, HerpMapper, etc.)		
	Assisting reptile or amphibian data collection for formal research (i.e. University or governmental research projects		
	Rearing or assisting captive rearing programs for reptiles or amphibians		
	Other Monitoring activity:		
Activism	Raising and donating funds for reptile or amphibian conservation programs		
	Lobbying governmental agencies or representatives regarding legislation that impacts reptiles or amphibians		
	Protesting events/legislation/organizations that threaten reptile or amphibian conservation		
	Other Activism activity:		
Education	Maintaining outreach reptiles or amphibians (i.e. animal care, museum specimen preservation, etc.)		
	Operating booths or information desks about reptiles or amphibians		
	Creating educational materials that cover reptiles or amphibians		
	Other Education activity:		

Appendix A Herpetofaunal Conservation Volunteer Activity Checklist

Interview Guide

1. Tell me a little bit about your interest in reptiles and amphibians.
    - Why reptiles? Why amphibians?
    - What experiences did you have with these taxa before beginning as a volunteer?
    - Who or what introduced you to these animals?
2. Referring to activities list – Tell me about your volunteering experiences in herp conservation, so far.
    - Which activities did you enjoy the most? The least?
    - How did you find out about these opportunities?
    - Describe your most memorable experiences volunteering for herp conservation. *** SAVE FOR LAST
3. What motivated you to get involved in herp conservation?
    - Who helped guide your interest and/or involvement?
    - What role did environmental education programs play in motivating your involvement?
    - Can you recall anyone or anything else that significantly motivated your actions?
4. Reflecting on your conservation experiences, what does volunteering for herp conservation mean to you?
    - How satisfied are you with your choice to volunteer?
    - How do you feel about the extent/quality of your impact?
    - How do you feel about the places that you have volunteered?
    - How would you describe the benefit of your volunteering efforts?
5. Beyond volunteering, what alternate conservation or environmental activities did you consider engaging in? Why?
    - Do you volunteer for other causes?
    - Are you a part of other conservation organizations?
    - What other ways do you act to support species conservation?
6. How would you encourage others to participate in herp conservation?
    - What would you say to someone who is interested in herps to encourage them to volunteer?
    - What would you say to someone who is uncomfortable with or afraid of reptiles and amphibians?

Appendix B Semi-Structured Interview Questions

UNIVERSITY OF GEORGIA

Tucker Hall, Room 212
310 E. Campus Rd.
Athens, Georgia 30602
TEL 706-542-3199 | FAX 706-542-5638
IRB@uga.edu
http://research.uga.edu/hso/irb/

Human Research Protection Program

EXEMPT DETERMINATION

November 5, 2020

Dear Kyle Woosnam:

On 11/5/2020, the Human Subjects Office reviewed the following submission:

Title of Study:	Motivating 'Civic Herpetology': exploring motivations for herpetofaunal conservation volunteering
Investigator:	Kyle Woosnam
Co-Investigator:	Micah Miles
IRB ID:	PROJECT00002783
Review Category:	Exempt 2(ii)

We have determined that the proposed research is Exempt. The research activities may begin 11/5/2020.

Since this study was determined to be exempt, please be aware that not all future modifications will require review by the IRB. For more information please see Appendix C of the Exempt Research Policy (https://research.uga.edu/docs/policies/compliance/hso/IRB-Exempt-Review.pdf). As noted in Section C.2., you can simply notify us of modifications that will not require review via the "Add Public Comment" activity.

A progress report will be requested prior to 11/5/2025. Before or within 30 days of the progress report due date, please submit a progress report or study closure request. Submit a progress report by navigating to the active study and selecting Progress Report. The study may be closed by selecting Create Version and choosing Close Study as the submission purpose.

Please close this study when it is complete.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Appendix C IRB Exemption Determination

TABLES

Table 1 Participant Attribute Codes

			Types of Volunteering				
Participant Psuedonym	**Approximate Age (years)**	**Zip Code**	**Habitat Restoration**	**Monitoring**	**Activism**	**Education**	**Organizations**
Willow	31	30032	N/A	regular participant	N/A	regular participant	Amphibian Foundation; AWARE Wildlife Center
DzHeff	30	30324	regular participant	more than once	more than once	more than once	GA DNR; Amphibian Foundation; Mountain Bog Restoration; USARK; Fernbank Science Center; Decatur city
EM96	47	30097	more than once	more than once	regular participant	more than once	Amphibian Foundation
Skye	26	30101	regular participant	regular participant	N/A	regular participant	Amphibian Foundation; KSU; OutSchool online teaching platform
Leo	39	30354	single or isolated	N/A	more than once	regular participant	Amphibian Foundation
Teaspoon	31	30030	more than once	more than once	regular participant	regular participant	Amphibian Foundation; Atlanta Botanical Garden
Anna	31	30329	single or isolated	regular participant	N/A	regular participant	Amphibian Foundation; Atlanta Botanical Garden; Gwinnett Clean and Beautiful
TriGirl	68	30306	more than once	regular participant	N/A	regular participant	Atlanta Botanical Garden

Table 2 Participant Sketches and Most Frequent Codes

Participant Pseudonym	Profile	10 Most Frequent Words Used in Codes
Willow	Willow is transitioning from a nonprofit backgound in community agriculture to a more ecological or wildlife-focused career. Without an educational background in STEM, she uses her volunteer involvement to gain field experience in ecological data collection and environmental education. Since she employed full time, she conducted most of her volunteer work on weekends. She engages in political activism and has volunteered for souther queer advocacy groups. In an informal sense, she and her partner promote habitat and vegetation restoration in their private garden.	Time Volunteer Work Interest Turtle Reptile Before Kind Help Learned
DzHeff	Dzheff's love of the outdoors was fostered by his parents who owned pet reptiles and traveled with him to national parks throughout his childhood. Dzheff always knew he wanted to pursute a career in conservation and he has volunteered with many of the conservation organizations in metro Atlanta, in additiion to internships and service projects in other regions. He describes himself as the Amphibian Foundation's "handyman" and has built large enclosures for their outreach collection. He feels most confortable in the outdoors and hopes to establish a career in conservation by leveraging his education and volunteer work	love fulfilled helps parents support passions conservation course feel herps
EM96	EarthMomma96 (abbreviated to EM96) was raised in upstate New York and introduced to reptiles and amphibians by her maternal grandmother. A "natural-born naturalist," her grandmother encouraged her to pick up the toads, snakes, and other herpetofauna that occupied her property. As a trained educator, she has found ways to incorporate science and community gardening into her curricula, though as a mother of two, her priorities have shifted significantly in response to the pandemic. She completed the Master Herpetology course to establish a "refined lens" for understanding herpetofaunal conservation and has gone on to join the Conservation Bridge Program. Outside of conservation, she volunteers with the Junior League and at-risk teenaged girls in addition to leading neighborhood walks with members of her local community.	program master nature walk herp naturalist help people find opportunities
Skye	Skye is an early-career ecologist who began her postsecondary education as a pre-veterinary major. After connecting with a graduate student recruiting volunteers, she spent a summer helping to collect pine snake data in longleaf pine ecosystems. From this experience and mentorship, she was able to present independent findings at multiple conferences and connect with the Amphibian Foundation. She has supported captive rearing of gohper frogs and flatwood salamders, and assisted in virtual Critter Camp iterations during the pandemic. Her prior volunteer experiences centered on pet adoption programs although she also coordinates summer kayaking ventures where she and her friends clean-up trash along the way	snake experience opportunity teach more kind friend mentor volunteer life

Leo	Growing up alongside a local creek, Leo has always had an immense respect for nature and recalls exploring the creek with her siblings and friends from an early age. Leo self-identifies as a person of color on the autism spectrum and appreciates the opprotunites for personal and social growth provided through volunteering. Her background in education and intrinsic love of insects and herpetofauna serve her as a teaching assistant for the Master Herpetologist progam and reinforce her growing network of peers with similar biophillic interests.	Connect Teach People Snake Creek Know Animal Want Kids Being
Teaspoon	Teaspoon only recently realized that she has always loved frogs. Coming from anartistic background, much of her initial exposure to herpetofauna occurred through books, images, and documentaries. After seeing a 30-minute film feature on glassfrogs at the Atlanta Botanic Gardens, she attended an in-person feeding event and asked to become a volunteer. As a visual person in a creative field, she has taken photos of the Amhibian Foundation outreach collection and participated in a PhotoARK photoshoot with Joel Sartore.	animal know frog kid want more people abg learn experience
Anna	Anna works in the environmental sector as a water resources inspector for a local municipality. Before moving to metro Atlanta for work, Anna was a regular volunteer with a raptor rehabilitation prgoram in her home state of Ohio and interned with a tortoise rehabilitation program in Florida. Her herpetofaunal conservation experiences began with husbandry and have expanded in scope to include environmental education. As an unpaid element of her position in water resources, she also coordinates and supports events in the Gwinnett Clean and Beautiful program.	Volunteer Animal Something Care Time People Doing Know Captive Work
TriGirl	TriGirl began volunteering after retiring from the medical field. She was a zoology major in undergraduate and has always possessed a love of animals. She first began as a docent for the Botanical Gardens and became introduced to the frog and tortoise programs of the conservatory not long after. She considers her role to be "extender services" and supports the staff and programs in any way needed. From routine husbandry, cleaning, misting plants, and even purchasing fresh produce for tortoise feedings, she is excited to do anything to support the larger conservation goals of the garden. She lives within walking distance of the garden and has begun cultivating her own personal garden to benefit local birds. She also volunteers for programs that combat hunger, and offer Hebrew tutoring for students to become bar/bat mitzvah through her synagogue.	learn know garden love tortoise more feel joy work feed

Table 3 Atlanta Metro Herpetofaunal Conservation Program Contact List

Name	Contact email	Website (if any)	Contact person (if any)	Initial contact	Confirmed Contact	Winter Followup
The Amphibian Foundation	info@amphibianfoundation.org	https://www.amphibianfoundation.org/	Mark or Crystal Mandica mark@amphibianfoundation.org	yes 9/6	yes 9/6	1/17
The Orianne Society	info@oriannesociety.org	https://www.oriannesociety.org/		yes 9/6		1/17
West Atlanta Watershed Alliance	info@wawa-online.org	http://wawa-online.org/		yes 9/6	yes 9/6	1/17
Zoo Atlanta	volunteer@zooatlanta.org	https://zooatlanta.org/program-type/frogwatch/		yes 9/6		1/17
The Georgia Aquarium	visitorservices@georgiaaquarium.org	https://www.georgiaaquarium.org/		yes 9/6		1/17
Atlanta Botanical Garden	info@atlantabg.org	https://atlantabg.org/		yes 9/6		1/17
Tree Atlanta	info@treesatlanta.org	https://www.treesatlanta.org/	Susan - volunteer coordinator susan@treesatlanta.org	yes 9/6	yes 9/9	1/17
Fernbank museum	Volunteer@FernbankMuseum.org.	https://www.fernbankmuseum.org/				1/17

FIGURES

Figure 1 Sample of Participant Recruitment Advertisement

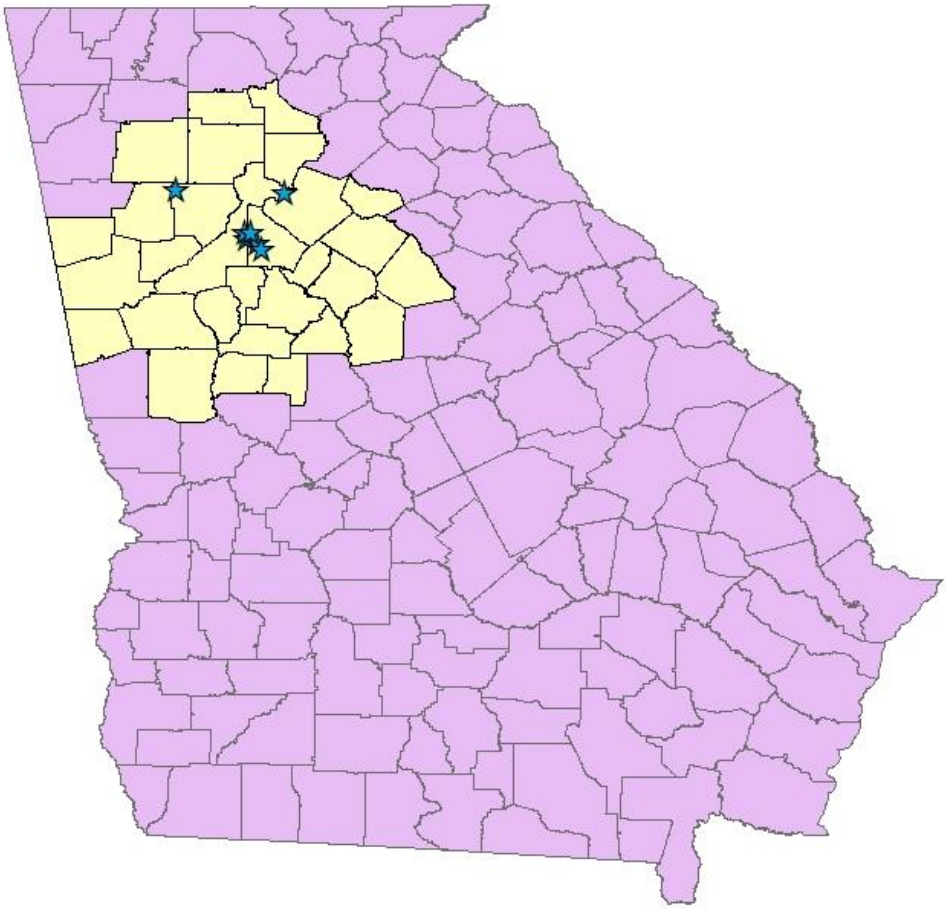

Figure 2 Map of Atlanta Metro Region and Participant Zip Codes

Figure 3 Wordle of Anna's Codes

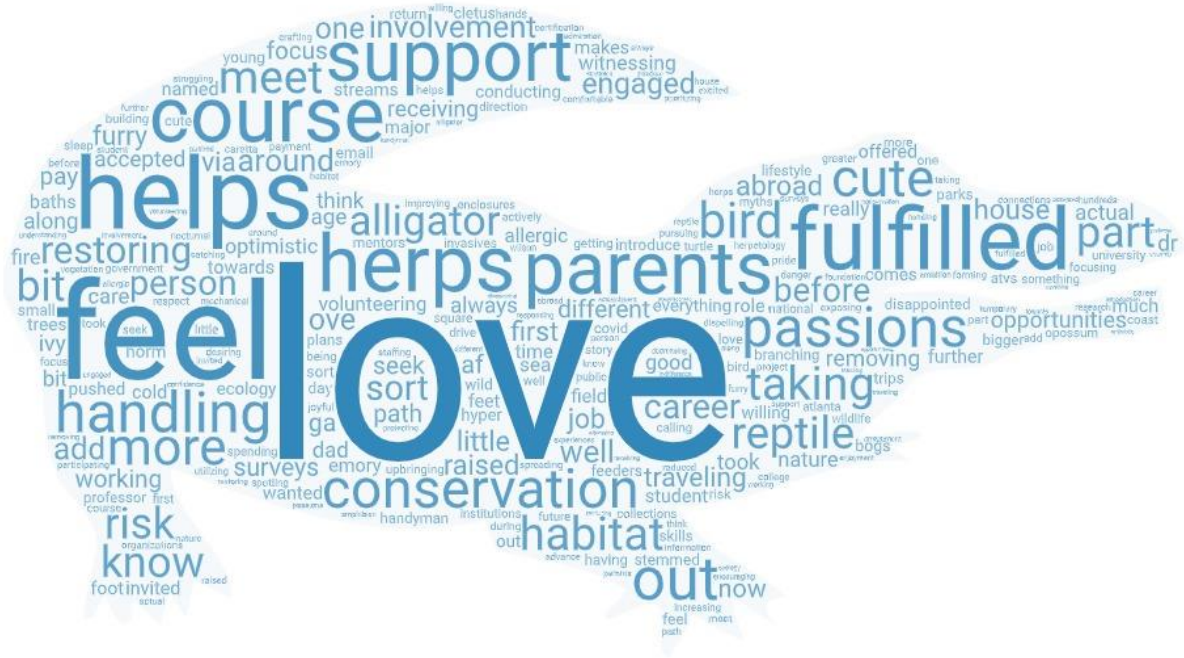

Figure 4 Wordle of DzHeff's Codes

Figure 5 Wordle of EM96's Codes

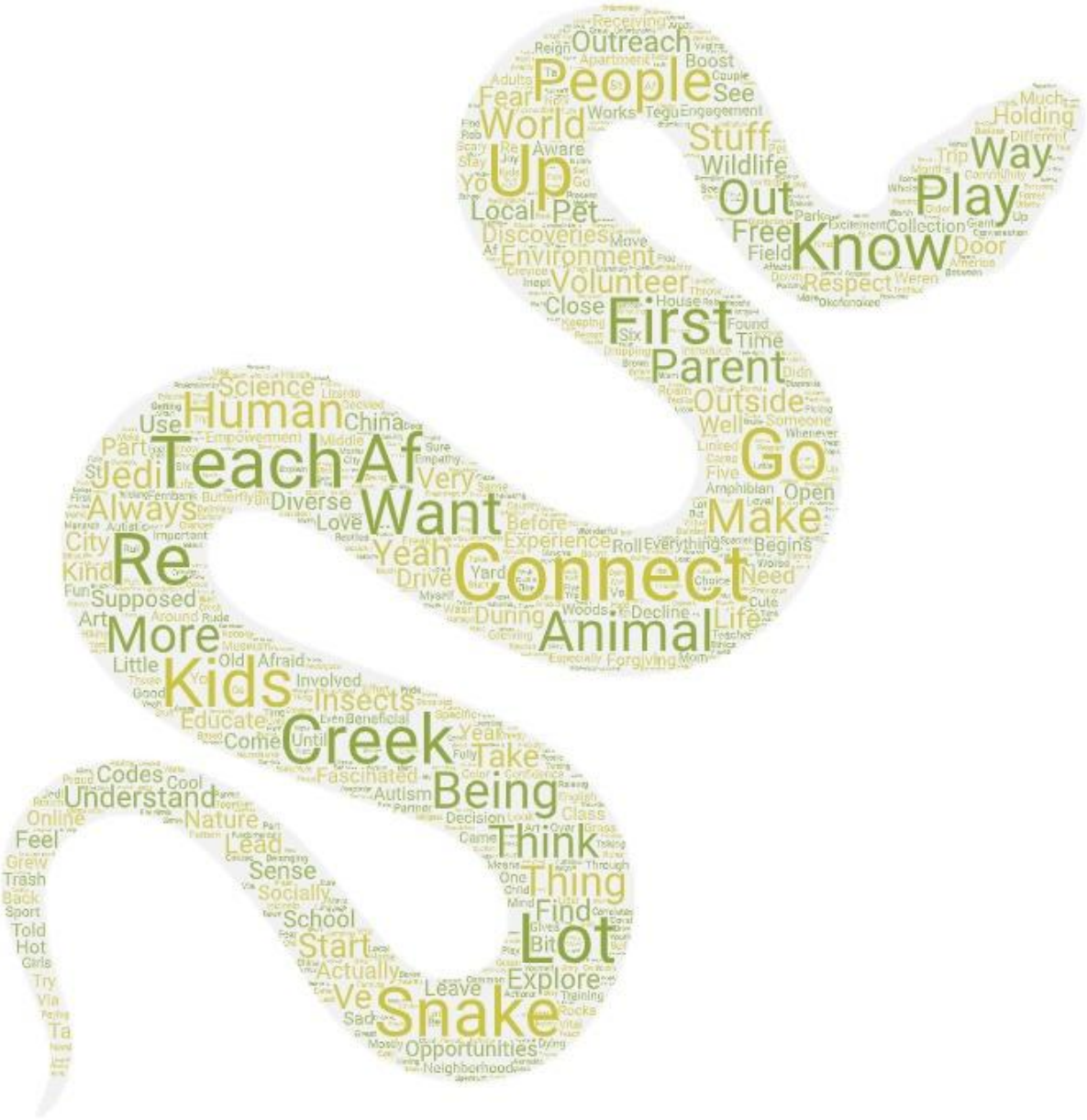

Figure 6 Wordle of Leo's Codes

Figure 7 Wordle of Skye's Codes

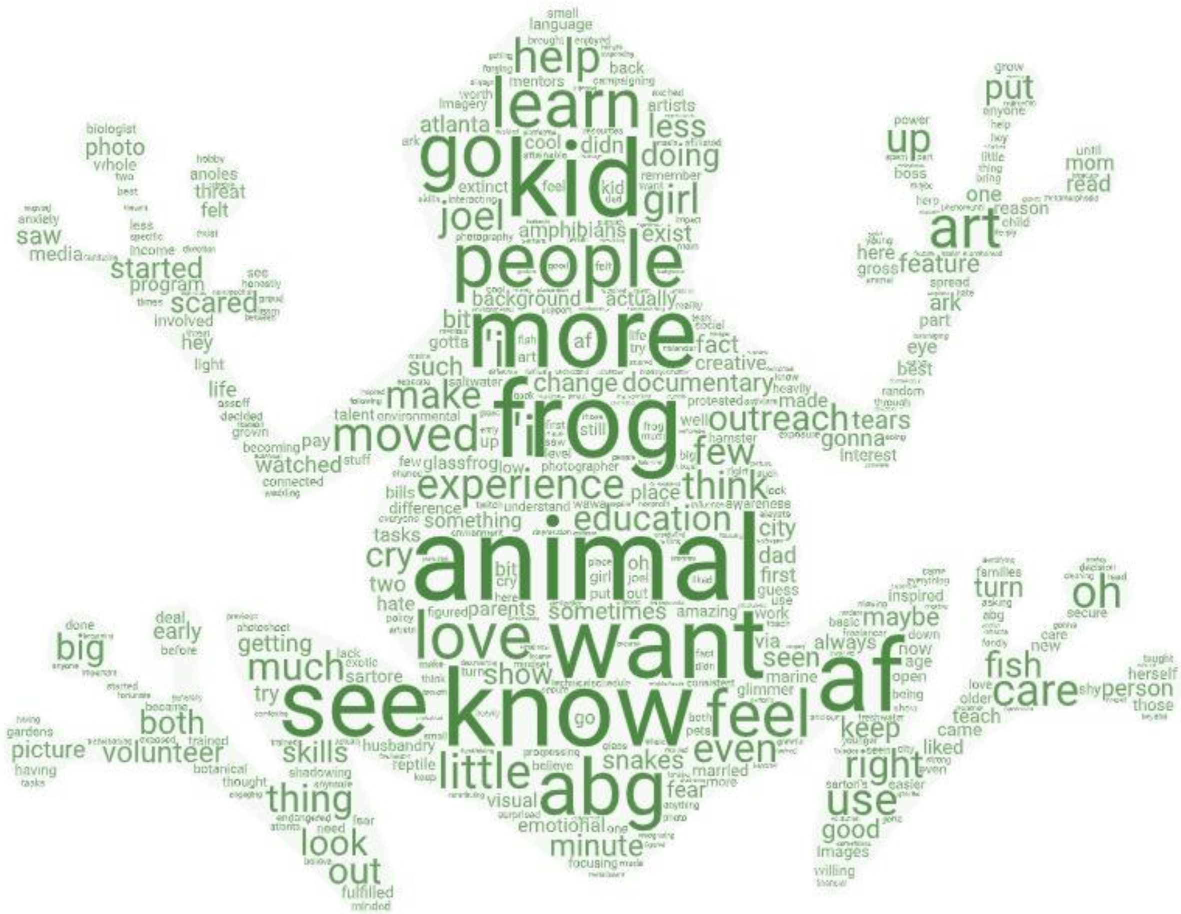

Figure 8 Wordle of Teaspoon's Codes

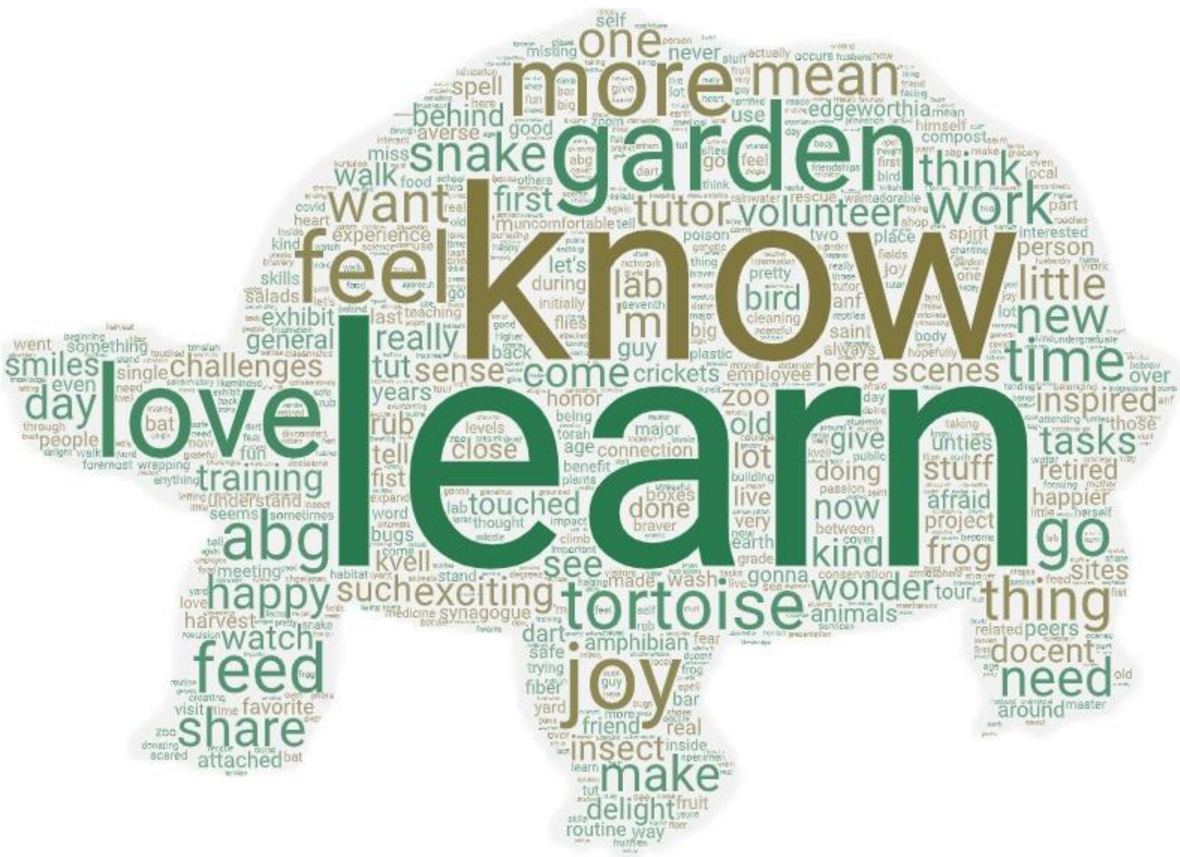

Figure 9 Wordle of TriGirl's Codes

Figure 10 Wordle of Willow's Codes

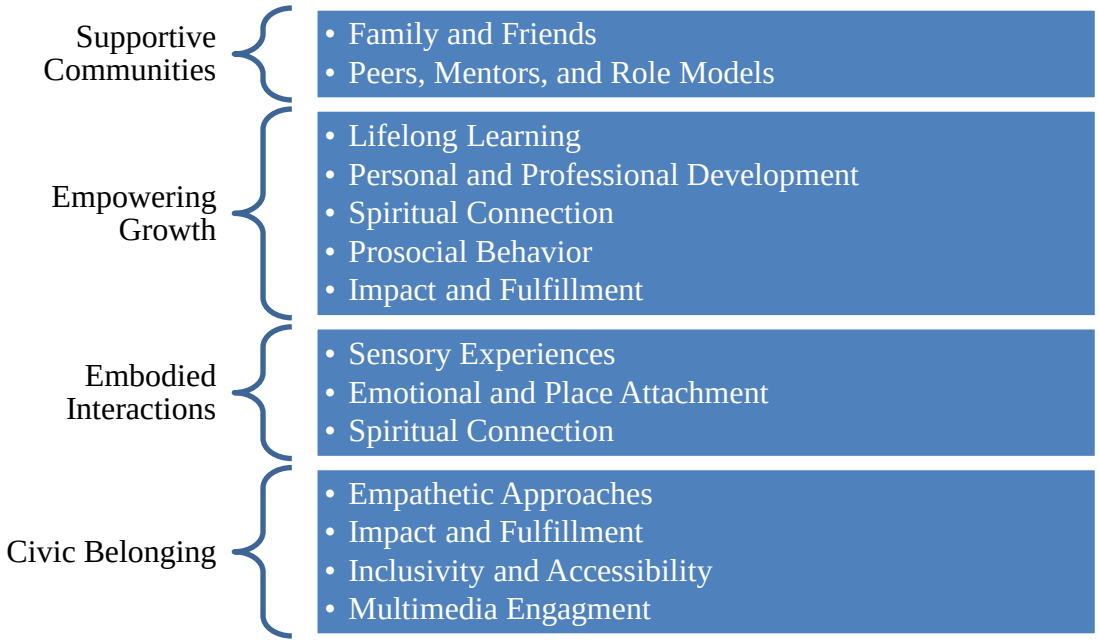

Figure 11Flowchart of overarching themes derived from categories.

https://prezi.com/i/view/Ef4III532sJOPOzn7ZAM

Figure 12Findings Infographic for communicating findings to local conservation organizations