

**Young Adult's Wildlife Preservation Behaviors After Taking High School
Environmental Studies Courses**

A DISSERTATION

Submitted to the Faculty of Southern New Hampshire University
in partial fulfillment of the requirements for
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by

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Introduction

Humans worldwide are contributing to the vast environmental degradation taking place on this planet and experiencing the consequences (USGCRP, 2018). As people find themselves victims of unprecedented flooding, fires, and drought, this researcher wonders about those who walked the Earth before and beside humans. Non-human animals, henceforth known as animals, are also suffering those consequences. According to the World Wildlife Fund, climate change is impacting life forms from coral and insects to mighty moose and elephants. It is becoming more evident as resources and ecosystems begin dwindling, that humans will be in greater competition with their animal brethren. “From the shrinking habitat of the polar bear to increased water scarcity driving human-wildlife conflict, these changes will become more pronounced in years to come” (WWF, n.d).

Statement of Problem

UCLA’s Chief Sustainability Officer, Nurit Katz (2018) claims the planet is in ecological overshoot; meaning resources are being used much faster than they can be replaced. If this ecological overshoot is not corrected, the damage will be permanent. The Fourth National Climate Assessment (NCA) states, “While mitigation and adaptation efforts have expanded substantially in the last four years, they do not yet approach the scale considered necessary to avoid substantial damages to the economy, environment, and human health over the coming decades” (USGCRP, 2018). Therefore, it is essential to look at the scope of human impact on the natural environment.

National Geographic contributor Elizabeth Kolbert (2021) states in her article *When ‘Natural’ Disasters Aren’t*, “People now play such a dominant role on the planet, it’s said we live in a new geological epoch: the Anthropocene” (p.16). She shares that half of ice-free land

has been altered by humans and that humans exceed wild mammals by more than eight to one. In addition natural catastrophes once brought on by weather or other natural occurrences can now be attributed to man-made disasters, including earthquakes, hurricanes, wildfires, and pandemics such as COVID-19. She concludes her article with the query “The choice we face is not whether to change the world... The decision going forward is *how* we are going to change it?” (p.18). Thus, it is crucial to explore how knowledge of wildlife preservation and environmental conservation are influencing sustainability behaviors.

In relation to Kolbert’s (2021) question, knowledge about *how* students are behaving with a consciousness towards animals due to their high school environmental education is a gap within current research. Environmental education can successfully promote conservation if individuals learn skills that reduce human-wildlife conflict and learn to make educated decisions around wildlife management (Espinoza & Jacobson, 2012). The Center for Biological Diversity reports, “Although extinction is a natural phenomenon, it occurs at a natural “background” rate of about one to five species per year. Scientists estimate we are now losing species at up to 1,000 times the background rate, with literally dozens going extinct every day” (n.d). If humans are educated on the role wildlife plays in the day-to-day functioning of the world, perhaps that aspect of global degeneration can be reversed.

Suppose it is shown that there is a relationship between high school environmental education and species conservation. In that case, the government and conservationists may be interested in developing more comprehensive conservation programs. The development of more wildlife specific education is important because all life forms are balanced cyclically on one another; if animals are successful so will humans be and vice versa (Neira, 2015).

Since many high schools offer an environmental education component and are influenced by their state government's curriculum dictates, the focus of this study will be on high school graduates. If there is a positive correlation between high school environmental education and species conservation, Departments of Education may be interested in building on the current curriculum. This positive relationship would provide evidence that what is being taught in high school environmental courses correlates to pro-environmental behaviors. If there is no positive relationship between curriculum and wildlife conservation behaviors, perhaps education agencies, the government, and other interested parties would be willing to look more critically at students' needs to develop behaviors favorable to animal-kind. This might include developing more comprehensive high school conservation programs.

Theoretical Frameworks

The theoretical frameworks employed in this research include ecological psychology and social learning theory. James Gibson and Eleanor Gibson claimed that ecological psychology viewed an organism and its environment as one. Gibson theorizes that people learn from engaging in their environment; if children learn to enjoy and revere nature, those behaviors and beliefs remain into adulthood (Chawla & Derr, 2012). Furthering the relationship between environment and society, Harry Heft (2020) explored the implications of ecological psychology and socio-cultural dimensions of the "human econiche" in his article *Ecological Psychology as Social Psychology* (p.814). Heft (2020) reviewed articles which explored the social dimensions of ecological psychology; including an overview on psychology as related to visual perceptions from the 17th century through current day. Heft (2020) concluded that actions develop through participation in a social community environment, and thusly psychological awareness of social constructs are founded in those practices. Further expanding on this, Heft (2020) states social

significance of “places as eco-social entities” and structures is developed through performing social practices (p.823). Gibson’s ecological psychology theory is that as individuals experience and view the world and its social structures they develop practices through engagement which ultimately become habitual.

Also applicable to this research is social learning theory by Alfred Bandura (1971). Bandura’s theory is that children learn through observation; as they observe role-models engage in the world around them they begin to develop through mediational processes their own behaviors (McLeod, 2016). These behaviors are then internally or externally and positively or negatively reinforced by society. This reinforcement ultimately leads to behaviors strengthening and/or changing (McLeod, 2016). Regarding the natural environments, Bandura’s theory concludes that when children’s self-efficacy is developed by witnessing the impact of their efforts on the environment, the feeling of success leads to repeated behaviors (Chawla & Derr, 2012).

These theories will be used to examine the participants’ pro-environmental behaviors and examine the impact the environmental education courses might have had on learned behaviors. These frameworks provide a strong lens through which to view the results of participants attitudes towards animals and the potential relationship between high school environmental education courses and student’s wildlife conservation behaviors.

Terminology:

Within this study there will be numerous terms used frequently. Conservation, environmental education, sustainability, pro-environmental behavior, active citizen continuum (ACC), animal, climate change, environmental education, speciesism, and wildlife conservation. Those terms are defined as the following:

Active Citizen Continuum (ACC): The ACC is a scale created by Break Away (2018), a national nonprofit organization that develops alternative spring break programs. The purpose of this scale is to help individuals identify where their citizenship efforts fall on the continuum and what steps they need to take to create further positive change in the world.

Animal: “Any such living thing other than a human being” (Dictionary.com, n.d.).

Climate Change: “A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (UNFCCC, n.d.).

Conservation: “The basic and central aim of conservation is to prevent irreversible loss of the life on this planet... achieved through management, which influences species, or habitats, or both” (Hambler, 2004, p.1).

Environmental education: According to the US Environmental Protection Agency (EPA) (2018), “Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.” The US EPA says that environmental education does not “advocate a particular viewpoint or course of action,” but does list several components that are critical: awareness and sensitivity, knowledge and understanding, attitudes, skills, and participation.

Pro-Environmental Behavior: “Behavior that consciously seeks to minimize the negative impact of one’s actions on the natural and built world” (IGI Global, 2018). Examples of pro-environmental behavior include: limiting shower time, consuming a plant-based diet, using

reusable water bottles/straws, volunteering on a conservation project, advocating for animal welfare/rights, etc.

Speciesism: Professor and activist Peter Singer popularized this term. He defines speciesism as: “an attitude of bias against a being because of the species to which it belongs” (Yancy & Singer, 2015).

Sustainability: The UN World Commission on Environment and Development states that “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (1987). As simplified by the UCLA Sustainability Committee under Katz (2018), the planet’s natural resources are limited and should be utilized wisely regarding the needs of future generations and the preservation of Earth as it is. Sustainable behaviors include recycling, walking, or bicycling instead of driving, eating less meat products, etc.

Wildlife Preservation: According to the National Park Service, “preservation seeks protection of nature from use... Wilderness preservation is fundamental to the idea of deep ecology – the philosophy that recognizes an inherent worth of all living beings, regardless of their instrumental utility to human needs” (2019).

Research Question

This study will investigate whether or not there is a correlation between participating in a high school environmental education experience and later performing behaviors that align with wildlife conservation. Students may have gained information about conservation behaviors through sustainability, ecology, econservation, environmental ethics, environmental science, and/or environmental studies courses. Research Question: What is the relationship, if any, between high school environmental education and behaviors resulting in wildlife preservation?

This researcher hypothesizes that there is a relationship between high school environmental education and wildlife conservation behaviors. The null hypothesis is that there is no relationship between high school environmental education and wildlife conservation behaviors.

Significance of the Problem

This study may help contribute to the understanding of human behaviors regarding conservation of wildlife species. If correlations are found between high school environmental education and wildlife conservation behaviors, the revelation may help establish more structured and fuller attention to environmental education curriculum development. Ultimately, a more robust environmental education curriculum could lead to more significant preservation efforts by future students; thus, more species can be saved. According to Dr. Marie Neira (2015), the World Health Organization (WHO) Director, “every breath we take depends on another life, another species.” Neira (2015) goes on to share that “many of the global health challenges that we face today, including infectious diseases, malnutrition and noncommunicable diseases, are all linked to the decline of biodiversity and ecosystems.” This adheres to the belief that the success of every life is directly tied to the success of those lives around them. If students have been taught, or are taught in the future, to behave in ways that further conservation efforts, humans can be ensured their own success. There are limited research articles addressing this exact relationship, which means some imagining is needed on the development of this specific research.

The following behaviors were chosen to be studied because of their relationship to wildlife conservation; there were numerous other behaviors that were applicable, but to keep this study more concise the following behaviors were examined.

- 1) Not using plastic straws: Single use lightweight plastics, particularly those used for food and beverage products, make up a majority of micro-plastics in the ocean (Andrady, 2011). These microplastics have vast negative outcomes on wildlife particularly through ingestion and chemical breakdown into the marine environment (Andrady, 2011). Thus, reducing the prevalence of plastic straws and other lightweight plastics, is critical in addressing marine health.
- 2) Cutting apart plastic rings found on soda six-packs: Entanglement of wildlife due to the prevalence of abandoned plastics, often occurs in marine environments (Andrady, 2011). Plastic six-pack rings have been found entangled on turtles, dolphins, and many seabirds. To combat these harmful entanglements some companies have developed biodegradable six-packs (Kart, 2019). Until the biodegradable rings are more widely available, cutting apart these plastic-rings to prevent entanglement is important.
- 3) Participating in a vegetarian diet & 4) Participating in a vegan diet: It was determined that reduction in meat consumption and or participating in a vegetarian diet can positively impact “carbon emissions, acidification, land-use, as well as biodiversity damage” (Martin and Brandão, 2017 as cited in Schenk, et al., 2018, p. 1-2).
- 5) Participating in rehabilitation of injured wildlife: Anthropogenic sources are at the root of many troubled wildlife which require rehabilitative efforts (Hanson, et al., 2021). Rehabilitators can provide conservation of endangered species, promote conservation education, and rescue endangered/imperiled species across all walks of life (Hanson, et al., 2021).

- 6) Removing trash from nature trails: Not only does litter disturb nature's visual aesthetic, it can also cause mortal harm to flora and fauna therein (Brown, et al., 2010). To prevent further harm, it is logical to educate the public on the benefits of carrying out whatever they bring in as well as picking up the bits of trash they may come across during their treks (Brown, et al., 2010).
- 7) Removing trash from the beach/ocean: Wildlife, from marine mammals through plankton, can be negatively impacted by plastics or other such detritus left on beaches and in the ocean (Andrady, 2011). Marine wildlife including birds, struggle with ingestion of microplastics and entanglement in litter left on beaches, the consequences can of which can be death (Andrady, 2011). Since most ocean microplastics stem from beaches, cleaning up beaches is an effective way to improve the health of those marine environments (Andrady, 2011).
- 8) Volunteering on a wildlife conservation project & 9) Volunteering on multiple wildlife conservation projects: Environmental volunteers can majorily benefit the environment, including wildlife, through activism, education, monitoring and restoration efforts, as well as through sustainable living (Measham & Barnett, 2009).
- 10) Advocating for wildlife welfare on social media: Advocating for endangered species or wildlife on social media can benefit conservation efforts if the information being disseminated is factual (Wu, et al., 2018). Media platforms which display pictures and brief bits of information were shown to increase public awareness about conservation issues and policies (Wu, et al., 2018). However, misinformation was shown to weaken public support and understanding of government-led conservation initiatives or policies (Wu, et al., 2018). For this reason it is important to expand public support

and eco-awareness through factual social media posts, which ultimately provides the opportunity for the public to learn/advocate for important environmental issues.

- 11) Advocating for wildlife welfare through fundraisers: Public funding is critical to many non-governmental organizations (NGO) whom lead the charge in conservation efforts (Adams, 2004 & Igoe, 2010). Since NGOs with legitimate conservation efforts rely on public financial support, participating in fundraising for or with these NGOs is a significant way to support conservation initiatives.
- 12) Advocating for wildlife welfare through legislature: Conservation from the federal government down starts through advocacy for stronger conservation legislation. All political parties agree that, to some extent, the environment and imperiled species therein would benefit from more state programs and appropriate federal funding (Fischman et al., 2018).

General Procedures

Data Collection

The setting for this study was a virtual first-year class at a university in the Northeastern United States. This setting was chosen because a majority of students had recent experience in a high school setting and the virtual classes hosted a variety of students majoring in subjects across the university. A university in the Northeast was also chosen for convenience since the researcher is located in the Northeast.

To be included in this study, the participants had to be first-year students who registered in fall and/or spring semester courses. There were a total of 1,210 students enrolled in first-year courses who were invited to participate in this study. The participants had to be traditionally

aged students – ages 18-22, but all other aspects of diversity were included- including race, gender, sexual orientation, ethnicity, religion, ability, and nationality. Students were offered this survey one time during their first year; there were no students offered the survey more than once.

Participants were recruited by email and were given the option to voluntarily enter their name into a raffle to win one of several \$200 gift cards for completing the survey. Participant emails were shared with the researcher by the Director of Academic Advising, after approval from the Institutional Review Board (IRB). Participants were asked to self-report how many high school environmental education courses they took, whether these classes were required or electives, and to identify any outside factors such as environmental clubs and environmentally focused organizations they may have been a part of. These data were used to set the baseline for standard self-reported experience with environmental education curriculum. Other data collected were the number of self-reported behaviors performed to enhance or protect the lives of wild animals learned via their high school experience. The behaviors associated with wildlife conservation include slicing plastic rings, not using plastic straws, using cruelty-free products, volunteering with wildlife or animal initiatives, advocating for wildlife justice, and/or participating in a vegetarian or vegan diet. These data were collected through the use of a one-time survey.

Data Analysis

Data were analyzed using a Spearman's Rank-Order Correlation (Spearman Correlation) and the Statistical Package for the Social Sciences (SPSS). Spearman calculations were expected to range between -1.0 and 1.0. An outcome between -1.0 and -.01 indicates a negative relationship while an outcome between .01 and 1.0 indicates a positive relationship. The closer an outcome is to the whole number the higher the strength of the relationship, and the closer the

outcome is to zero the relationship has lower strength. An outcome of zero indicates there is no relationship at all. Importantly, these outcomes illustrate the strength of the relationship between the variables not causation (Cooper & Schindler, 2003 as cited in Doss, Henley, & McElreath, 2013).

Overview

This chapter is a review and assessment of the relationship between high school environmental education and wildlife conservation behaviors, specifically the significance of this work. This chapter offers a critical account of the United States Global Change Research Program's (2018) findings, which state humans are a primary contributor to the vast environmental degradation occurring across the globe. Paying particular attention to wildlife, the extinction of flora and fauna is happening in the thousands, there is no time to waste in correcting harmful human behaviors (WWF, n.d.).

Identifying a population of high school graduates in their first year at a university located in the Northeast, United States is a starting point for future understanding high school environmental education potentially being a precursor for wildlife conservation behaviors. This research supports further consideration of environmental education curriculum and provides an excellent precursor to future research on engaging students in wildlife conservation behaviors.

Chapter Two: Review of the Literature

This quantitative research study of first-year college students' wildlife conservation behaviors is seated in a review of the literature. As such, the chapter is organized in the following way: a discussion about how environmental education is being taught in public high schools, proceeding into how environmental education can lead to the actualization of sustainable behaviors; then, what environmental education looks like in high schools followed by an overview of available human-wildlife interaction scales. Lastly, there will be a discussion of the research covered throughout this review.

Environmental Education Instruction

Environmental education courses are sometimes offered as stand-alone courses, but can also be taught in an integrated fashion in schools across the United States to K-12 students (Kareiva & Marvier, 2012, as cited in Shumaker, 2020). Researchers at Stanford University analyzed 119 peer-reviewed studies published over a twenty-year span, regarding the consequences of environmental education on K-12 students (Ardoin et al., 2018). They did not specifically look at conservation outcomes linked to environmental education, rather the researchers examined the breadth of environmental education outcomes. Ardoin et al. (2018), discovered that the studies displayed a strong connection between environmental education and “improved academic performance, enhanced critical thinking skills, development of personal growth and life-building skills... civic engagement and positive environmental behavior” (Ardoin et al., 2018, para. 4). Ultimately, Ardoin, et al. (2018) concluded that environmental education research is diverse and vast, leaving many additional outcomes to be more thoroughly explored. So far, environmental education appears to be linked to positive outcomes. The link between environmental education and positive environmental behaviors, specifically those

behaviors performed by individuals to help conserve wildlife, leaves much room for further research.

Before addressing what creates sustainable environmental behaviors or even how students learn in the classroom to make pro-environmental actions, it is important to understand how environmental education is being taught. Harold Hungerford and Trudi Volk (1990), in their book *Changing Learner Behavior through Environmental Education* posited that there are three key variables needed when developing an environmental educational curriculum that increases the likelihood of students performing sustainable behaviors.

First, according to Hungerford and Volk (1990), there is the entry-level variable, which involves acknowledging there is an environmental issue and developing an attitude that the issue needs to be addressed. Next, the ownership variable states that students require an in-depth knowledge of the issue and its consequences on the environment, paired with a personal investment in resolving the issue. Lastly, the empowerment variable claims that students be taught and gain skills in “environmental action strategies,” positive reinforcement for actions, and have an “intention to act.” Hungerford and Volk’s (1990) study was widely based on the previous work of John Ramsey.

Hungerford and Volk (1990) relied on a study by John Ramsey, *The Effects of Environmental Action and Environmental Case Study Instruction on the Overt Environmental Behavior of Eighth-Grade Students* (1981), that concluded students who received environmental action instruction, rather than environmental awareness instruction or science instruction, performed more overt environmental behavior. Hungerford and Volk (1990) defined environmental action instruction as the ability for students to practically apply environmental lessons and environmental awareness instruction as the ability for students to discuss

environmental lessons. Ultimately, Ramsey (as cited by Hungerford & Volk, 1990) concluded that educational reinforcement over time was necessary for students to continue practicing environmentally appropriate behavior. Hungerford and Volk (1990) discussed Ramsey's unpublished follow up study, which concluded that the students who participated in the environmental action program still displayed more environmentally beneficial behaviors than their counterparts, even though their original level of involvement had diminished over time. Although these studies are 30 to 40 years old, the findings still appear relevant; if students are going to become active citizens, they need to feel connected to the issues being presented to them and be taught how to perform the actions necessary for change.

Outside Influences on Wildlife Conservation Behaviors

Anderson (2017) spoke directly to climate change behaviors as learned through social media. The article examined the relationship between climate change opinion, knowledge, and behavior as related to social media use; the researcher found there were positive connections between social media users and climate change information (Anderson, 2017). The research concluded that generally users' climate change opinions were reinforced through social media use, climate change knowledge could be gained especially with the use of visual aids, climate change discussion was encouraged, and activists could be motivated to action (Anderson, 2017). However, social media also provided the opportunity for students to learn misinformation about climate change or to have them be skeptical about it (Anderson, 2017). As social media was ranked as the number one outside source by participants in this study, it stands to reason that wildlife conservation behaviors, like climate change, could also be learned through social media use. Further research into the impact of social media on wildlife conservation behaviors

specifically is warranted, as social media can be an accessible tool to educate children as well as adults.

Conversations between family members and with friends have also been shown to be particularly influential on children (Collado, et al., 2017). In a study performed by Silvia Collado, Gary W. Evans, and Miguel A. Sorrel (2017), children between the ages of 9-13 years old, their best friends, and their parents independently completed a survey on their environmental attitudes (EA) and environmental behaviors (EB). When compared to the surveys taken by their parents it was discovered that parent's EA and EB were predictors of their children's EA and EB, particularly in younger children (Collado, et al., 2017). The EA and EB of best friends were also positively related to a child's EA and EB, but more so among older children (Collado, et al., 2017). The potential benefit of modeling and discussing pro-environmental behaviors at home and with friends clearly is great.

Next Generation High School Science Standards

Hungerford and Volk's (1990) variables appear to be evident in the Next Generation High School Science Standards. According to Next Generation Science Standards (2013) high school science curriculums are centered around three overarching themes: Physical Science, Life Science, and Earth and Space Science. Woven through these overarching themes are class topics which discuss climate change, including but not limited to Interdependent Relationships in Ecosystems, Weather and Climate, and Human Sustainability (NGSS, 2013). For an example, as a result of learning about Interdependent Relationships in Ecosystems and Natural Selection and Evolution, high school students should gain an understanding that "...sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth" (NGSS, 2013, pg. 84). The functions of these topics are to help students

gain knowledge about human impact on wildlife and the environment; students are also taught how humans negatively impact the wild world, and then students are tasked with coming up with solutions to fix the damage (NGSS, 2013). See Appendix A for the Next Generation Science Standards.

Common Core

Although some states follow NGSS, some states follow the Common Core standards. The Common Core Standards were built on pre-existing state education standards and are meant to ensure that all students receive consistent education across the nation as well as career readiness and college preparation (Common Core, n.d.). The Common Core focuses entirely on mathematics and English language arts/literacy standards. Science expectations were mentioned within the “Science and Technical Subjects,” with emphasis on the ability to read and cite scientific text appropriately, the development of science language, symbols, terms, and the ability to carry out technical experiments and research (Common Core, n.d.). To review Common Core standards, view Appendix D.

Creating Sustainable Behavior

The studies above indicate that including action steps into environmental curriculum is beneficial, but how we ensure the behavior is sustainable is equally important. There are two established theories about what causes individuals to behave sustainably, according to Nicholas McGuire of New York University, who published *Environmental Education and Behavioral Change: An Identity-Based Environmental Education Model* (2015). McGuire identified the first strand as based around the “psychology of persuasion... social-identity or category induction, conformity, values, etc., that have been applied to behavior” (2015, pg. 696). McGuire (2015) is commenting on how human behavior influences the environment, claiming that changing

consumerism will reflect behavior trends that may lead to improving the environment. These are the behavioral steps society generally has knowledge about and are supported via extensive studies showing people can be willing to change their behavior related to littering, reducing shower duration, recycling, etc. (McGuire, 2015). McGuire points out that the limitation to this strand is that the slow incremental changes currently in place such as reusable shopping bags and fluorescent lightbulb use are not enough to reverse the damage Earth is already experiencing and in-fact are only influenced by situational cues.

The second strand focuses on how environmental education influences behavior (McGuire, 2015). This style looks more at how knowledge and awareness about the environment play a role in changing behaviors. For example, learning about deforestation makes people want to plant trees. McGuire claims the limitation of this style is that awareness does not always result in people taking action.

McGuire (2015) calls for a more psychological approach that blends the two strands. McGuire identifies this approach as the self-identity influence, which he says should be present in “all decision-making environments” and “be unidirectional—it must consistently push behavior toward less environmentally harmful or consumptive decisions” (2015, p. 697). Self-identity is defined as the combination of a stable global self-concept, conscious attributes, and the always developing domain-specific self-concept, unconscious attributes, within themselves (McGuire, 2015). McGuire (2015) goes on to claim that if individuals receive environmental education in their earliest formative years, environmentalism will become a part of the way they identify themselves, and thus individuals may be more likely to make environmentally conscious decisions.

Daniel Blumstein and Charlie Saylan in their 2007 article *The Failure of Environmental Education (and How We Can Fix It)*, which is based on their book of the same name, claim that current environmental education is a wasted effort since outside of the classroom “people have failed to make the link between their individual actions and the environmental condition” (para. 7). Blumstein and Saylan (2007) suggested seven methods to improve environmental education:

- Designing programs that can be evaluated before and after implementation;
- Teach curriculum that focuses on changing over-consumption;
- Teaching that nature has many non-linear relationships;
- The US needs to teach an inclusive world view;
- Teach how governments work and how to implement change;
- Teach that “conservation-minded legislation” may mean sacrificing creature comforts;
- Teaching critical thinking. (Blumstein and Saylan, 2007)

Blumstein and Saylan (2007) assert that the current model of environmental education superficially informs citizens, and that environmental education needs to go beyond teaching respect and appreciation to changing people’s consumption habits which will lead to more sustainable habits. In essence, make sustainability important to individual citizens so that they can use their combined power to impact greater politics and big businesses that are negatively impacting the environment.

Important research in the development of pro-environmental behaviors is ongoing. In the article *Mind the Gap: Why do People Act Environmentally and What are the Barriers to Pro-environmental Behavior?* by Anja Kollmuss and Julian Agyeman (2010), several important factors to consider in encouraging people to behave pro-environmentally include:

- Internal factors or pro-environmental consciousness- which includes knowledge, attitudes, values, locus of control, responsibility, and emotional involvement in environmental issues;
- External factors involve institutional, social, and cultural ties and influence;
- Demographic factors, which view the influences of gender, pro-environmental knowledge, and willingness to change. (Kollmuss & Agyeman, 2010).

Environmental Education in Action

According to Break Away (2018), high school education can influence students to move along the Active Citizen Continuum (ACC) and is important in the development of self-identity. The purpose of this scale is to help individuals identify where their citizenship efforts fall on the continuum and what steps they need to take to create further positive change in the world (Break Away, 2018). If environmental education results in changes in student behavior, then students should be showing movement along this scale (McGuire, 2015). Break Away defined four steps; the first is 'Member,' someone who is not engaged in the focused social problem. The second step is the 'Volunteer,' someone who is well-intentioned but does not have the education to resolve the social problem at hand. The third step is the 'Conscientious Citizen,' this person is concerned with the root cause of the social problem and knows enough to ask why the social issue is occurring. The fourth step is the "Active Citizen,' this individual has made resolving the social issue a priority in their life and their values and actions reflect that (Break Away, 2018). To simplify this scale, consider the following example. Imagine you are walking by a shallow river with friends when you notice a small piece of trash floating by. If you walk away from the trash you are seen as a 'member' on the ACC, but if you wade into the water and collect the trash you have become a 'volunteer'. While in the water you notice more trash flowing down the river,

so you ask your friends to help you and begin asking where is all of this trash is coming from? This makes you a ‘conscientious citizen.’ Lastly, you decide to leave the river and find out why the trash is in the river and you find a man throwing it in from a bridge, your actions to stop this man and build a protective fence around the bridge makes you an ‘active citizen.’

Any social cause such as pollution, environmental degradation, poaching, etc. can be substituted for the trash in this scenario and the man on the bridge is a metaphor for laws and societal behaviors. Until laws reflect equitable treatment of the environment and wildlife therein, and societal behaviors reflect greater awareness, there may not be any change in environmental issues. Students who become active citizens are likely going to be the people helping solve many of the environmental issues faced by the modern world. So how do high schools foster active citizenship in environmental causes? As noted earlier, students need to be taught action steps (Hungerford & Volk, 1990) and they need to find that their self-identity is in accord with the lessons (McGuire, 2015). Other themes in the research are teaching students through interdisciplinary methods, including practical lessons, and helping students relate to the environmental issues.

In Environmental Education in High School 9th-12th Biology Course Curricula Started to be Implemented in 2007 by Mehmet Erdogan, Mehmet Bahar, and Muhammet Usak, multiple high schools’ biology classes in Turkey were studied to determine if changes needed to be made to the curriculum. Students in each grade were given progressively difficult units regarding environmental literacy appropriate to their grade and then evaluated to determine if they learned the material. The authors felt that environmental education should not be taught separately but rather should be included within other course work. Erdogan, Bahar, and Usak (2012) went on to conclude that just because students understand the concept of environmentalism does not mean

they will be moved to act, rather there needs to be an interactive side of their lessons that includes field trips and practical lessons.

McGuire (2015) also concluded in his study on self-identity, that environmental education was most impactful if the ideals were integrated into traditional classes as opposed to teaching it separately. McGuire reported that the interdisciplinary method was best because self-identity is developed over time, so a single encounter with environmental education would not be enough to inspire a prolonged impact. Developing an environmentally conscious self-identity would ensure more students feel invested in addressing environmental issues, because they would understand how they themselves are tied into the health and wellbeing of the environment (McGuire, 2015).

In agreement with McGuire (2015), a study performed in India by Alexander Ramadoss and Gopalsamy Poyya Moli titled, *Biodiversity Conservation through Environmental Education for Sustainable Development – A Case Study from Puducherry, India* (2011), stated that the key to influencing significant biodiversity conservation was expanding teaching methods out into the immediate environment. Ramadoss and Poyya Moli (2011) performed a pre and post-test before teaching the biodiversity modules they created. The test results showed that teaching active biodiversity education increased students' knowledge, interest, and skills needed to “protect and conserve local natural resources and biodiversity” (Ramadoss & Poyya Moli, 2011).

Finding similar results, a Hungarian study titled *Greening Due to Environmental Education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian High School and University Students* by Agnes Zsóka, Zsuzsanna Marjainé Szerényi, Anna Széchy, and Tamás Kocsis (2013). This study compared environmental education outcomes between high school students and university students. The

authors concluded that university students outperformed high school students in awareness and practice of pro-environmental activities (Zsóka et al., 2013). Zsóka et al. (2013) claimed that the university students performed better because they were older, and since they may have elected to take the courses, already had a predisposition for being passionate about environmentalism. However, Zsóka et al. (2013) reported that high school students still showed an improvement in their pro-environmental behavior but claimed that environmental education is primarily targeted at interested individuals and misses less committed individuals. They suggested providing environmental programs that focus on “sustainable living and more sustainable consumer behavior” (Zsóka et al., 2013, para. 65).

Wildlife Conservation Behaviors

The relationship between human behaviors and subsequent impact on wildlife has been investigated numerous times. One of those articles, *Effects of Humans on Behaviour of Wildlife Exceed Those of Natural Predators in a Landscape of Fear* (2012) by Simone Ciuti et al., specifically reported the impact of human behaviors on elk. Ciuti et al. (2012) found that elk were more vigilant on public lands and near roadways than in national parks. Also, elk were more influenced by human behaviors than by factors in their habitat or predators (Ciuti et al., 2012). This is particularly important because the change in elk behaviors was actively attributed to the type of behaviors humans exhibited, not just the amount of people nearby (Ciuti et al., 2012). The article concluded that elk spent more time being vigilant around motorized recreational vehicles and during hunting season than in times where large crowds of people gathered to watch them; the added vigilance cost the elk actual feeding time (Ciuti et al., 2012). Thus, if human behaviors can negatively impact wildlife, the reverse might be shown in other research.

Such evidence was found in *Ecological Impacts of Human-Induced Animal Behavior Change* (2020) by Margaret W. Wilson, April D. Ridlon, Kaitlyn M. Gaynor, Steven D. Gaines, Adrian C. Stier, and Benjamin S. Halpern. Wilson *et al.*, (2020) reported that humans impact the environments in which species live through various activities and actions, since wildlife often depend on their environments to thrive, disruption can prove detrimental or beneficial. Also, wild animals play major roles in the success and perpetuation of their environments, which other species depend on to survive (Wilson et al., 2020). If humans pollute or overfish aquatic environments and decimate terrestrial climates, wildlife will be immediately impacted and so will humans further down the line (Wilson et al., 2020). Ecosystems hang somewhere in the balance between naturally occurring destruction and subsequent renewal, but it is the response in animal behavior to human behaviors that can influence the swing of ecological structures (Wilson et al., 2020). Wilson et al. (2020), suggest further research on the impact of human behavior on wildlife behavior over time is needed as the researchers suspect that as humans are engaging in wild areas longer the more likely there is to be changes in some of the residing wildlife population.

Testing for Wildlife Conservation Behaviors

Two themes emerged during the investigation of the literature surrounding wildlife conservation behaviors after taking high school environmental studies. Those themes include the Animal Attitude Scale (AAS), as well as a great deal about how beneficial getting students out of the classroom and into nature can be.

The AAS was developed by Harold A. Herzog, Nancy S. Betchart, and Robert B. Pittman in 1991. Questions vary from the use of non-human animals for cosmetic testing and/or dissection through hunting and zoos (Herzog, Betchart, & Pittman, 1991). This survey has been

used in numerous studies and assesses human attitudes towards the use of non-human animals. This research tool will be helpful in establishing a baseline for where future research participants are in their relationship with non-human animals.

The last theme that is prevalent throughout this research topic involves the ways in which students are taught about nature. Multiple studies show that if students are brought out into nature to learn about their environment, they will show more of an interest in environmental conservation efforts, learning, and attitudes (Griffin, Glasscock, Schwertner, Atchley, & Tarpley, 2016; Smith, Witherington, Heimlich, Lindborg, Neidhardt, & Savage, 2019; Stoz, Maloy, Garvoille, Herbert, Mothibi 2015).

These themes have proven to be consistent throughout this researcher's exploration of the topic. There are still many more themes to be addressed and that continue to be found throughout the research process. However, there does appear to be a gap in the literature specifically regarding university level conservation behaviors involving wildlife.

Discussion

Our planet is experiencing dire environmental issues. (USGCRP, 2018). In regards to wildlife, conservationist Terri Irwin proclaimed in her book *Steve & Me* (2007), "Until the day comes when the senseless killing ends, we will all have to fight like wildlife warriors to protect our precious planet" (p.220). As noted in this chapter, the need for humans to adapt more sustainable lifestyles and work together is at a critical point. For students to behave more sustainably, environmentally educational experiences need to be taught to them in their childhood and through their school careers so that they may develop a corresponding self-identity (Chawla & Derr, 2012). In addition, schools need to ensure that their curriculum is inclusive of practical lessons that take students out of their classrooms and into the woods

(McGuire, 2015). The greatest strength is the amount of literature being published on the environment in recent years, since environmental issues and sustainability are such pervasive and important topics currently. However, the major limitations in this review are that it is unknown what outside forces contribute to students performing sustainable behaviors, and there are not as many studies available that focus on measuring sustainable behaviors as outcomes of environmental education as there are for measuring environmental awareness outcomes. Since there are so many gaps in measuring the outcomes of wildlife conservation behaviors from environmental education, especially in the US, there is a need for more research. This study helped to address the gaps in the literature by investigating the environmental behaviors of US students attending college in the Northeast to specifically determine if their high school environmental curriculum might have lead them to engage in behaviors that helped to sustain wildlife.

The environment challenge we face is best stated by Bhavya N., Scholar Dr. K. Purnima, and Krishna Murthy in their 2015 article, *An Exploratory Study in Educating High School Children Towards Maintaining an Eco-Friendly Environment*, “The environment in which we live is a complex and dynamic one in which all forms of life are interdependent on each other. Deep and harmonious relationships exist between man and environment” (p.17). These relationships need to be fostered in our schools and our communities, across borders and oceans and just maybe citizens can influence large-scale sustainable changes for our planet.

Chapter 3: Methodology

Introduction

The relationship between high school environmental education courses and wildlife conservation behaviors will be further examined in this chapter; specifically, the methodology and methods for data analysis of this research will be articulated. Chief Seattle, in the 1800's, once said in a letter to the US President, "Man does not weave this web of life. He is merely a strand of it. Whatever he does to the web, he does to himself" (Emaduwa, 2020, para. 20). This research is performed in similar theory, humans impact wildlife and in return wildlife impacts humans. The results of this research will help identify whether participants are building or breaking this web.

Research Question

In this research, the question specifically being asked was: What is the relationship, if any, between high school environmental education and behaviors resulting in wildlife conservation? Determining if a relationship exists may be helpful for several reasons. For example, if the research shows that there is a relationship between high school environmental education courses and positive wildlife conservation behaviors, these courses may become further developed in public schools. If, however, the research shows there is not a relationship between high school environmental education courses and positive wildlife conservation behaviors, the curriculum could be examined to determine how and why this might be the case so that meaningful experiences could be introduced that would result in positive wildlife conservation behaviors among US students. Positive wildlife conservation behaviors result in the continuation of animal species which in turn results in healthier ecosystems for all (WWF, n.d.).

The Sample

Sample:

In this study, the population being surveyed was first-year college students who have graduated from high school and who were enrolled in online classes at a university in the Northeast. Candidates were between 18-20 years old and had graduated from high school the summer before enrolling in their first year at this university. International students were excluded. Candidates identified as male, female, or non-binary. The survey was offered to 1,210 students and did not include those who did not complete their second semester in college.

Sampling Technique:

Non-probability sampling was used as there was no need to be reliant on randomization for the study. This study sampled a specific population. As such, purposive sampling was used as the aim of this study was to survey students who have received a public or private US high school education and are currently enrolled in a university freshman class (Singh, 2018). Convenience sampling was also used. Convenience sampling is a version of non-probability sampling; this means that the participants were not randomly selected. Convenience sampling was used in this study since first-year university students were being targeted. A risk of this convenient sample is that the entire population of recent high school graduates will not be represented, but rather a small subgroup of that population.

In this study, some of the participants may have known the researcher, so bias could include participant participation for the sake of personal gain with this researcher, or for enhanced academic standing with the university. To assure these biases were addressed, participant identifying factors were linked to specific surveys and no academic weight was added or subtracted for participation in this study.

Procedure

Research Design

This study used a Spearman Rank-Order Correlational to analyze the data. A Spearman's Correlational study was chosen to determine whether a relationship exists between high school environmental education courses and animal wildlife conservation behaviors.

Data Collection

Participants in this research completed an optional online survey, which was delivered to participants via their college email accounts. Candidates were emailed a total of six times; the first time was an invitation to participate in the survey and the following five emails were reminders to participate. The tool being utilized was the Animal Attitude Scale (AAS) developed by Harold A. Herzog, Nancy S. Betchart, and Robert B. Pittman in 1991. The AAS helps determine the relationship participants have with animals (Herzog et al., 1991). According to Herzog et al. (1991), the AAS "is one of the most widely used measures of general attitudes toward animal protection" (pg. 101-102). Herzog et al. (1991) specified in their work that the AAS "has excellent psychometric properties. Cronbach's alpha typically ranges from 0.85 to 0.95. The scale's concurrent and convergent validity have also been established" (p. 102). The AAS has twenty statements that are answered on a Likert Scale; response options include Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. The twenty statements assess attitudes towards the use and treatment of animals (Herzog et al., 1991).

The AAS has been used numerous times in studies across the world, according to Herzog et al. (1991) the AAS was used to understand German children's attitudes toward animals (BinngieBer, Willhelm and Randler 2013), Chinese university students' attitudes towards animals (Davey, 2006), as well as differences in Australian community members and animal protectionists (Signal and Taylor, 2006). The AAS was also adapted to study other areas of

human-animal interactions; including empathy (Taylor and Signal, 2005; Daley and Morton, 2008), ethical orientations (Galvin and Herzog, 1992), dietary choices (Ruby, 2012), and witnessing the killing of animals (Daley and Morton, 2008).

In addition to established survey items, the researcher added questions that aimed at specifically gaining insight into demographic information and conservation behaviors performed by participants. The twenty AAS statements were answered on a Likert scale, while the nine demographic questions provided participants with choices to select from; there were no open-ended questions. Please see the below series of questions:

Animal Preservation Behaviors Correlational Study

Demographics

- 1) Gender?
- 2) US State Graduated from?
- 3) Was Environmental Education a class you took in high school?
- 4) Was the environmental education class you took required or an elective?
- 5) How many environmental education classes did you take in high school?
- 6) Did your environmental education classes cover wildlife preservation topics (How to protect wildlife)?
- 7) Did your environmental education classes discuss specific behaviors you could perform to help preserve wildlife?
- 8) Did you learn wildlife preservation behaviors outside of your environmental education classes?
 - o If you answered yes above, where did you learn about wildlife preservation?
 - i. Environmental Clubs
 - ii. Environmental Organizations
 - iii. Boy/Girl Scouts
 - iv. Summer Camp
 - v. Television Shows or Movies
 - vi. Books
 - vii. Social Media
 - viii. Family Members
- 9) What behaviors do you currently perform after learning about them in your high school environmental classes? (Please only check off behaviors you explicitly remember learning about in your environmental education classes):
 - o Not using plastic straws
 - o Cutting apart plastic rings found on soda six-packs
 - o Participating in a vegetarian diet

- Participating in a vegan diet
- Participating in rehabilitation of injured wildlife
- Removing trash from nature trails
- Removing trash from the beach/ocean
- Volunteering on a wildlife conservation project
- Volunteering on multiple wildlife conservation projects
- Advocating for wildlife welfare on social media
- Advocating for wildlife welfare through fundraisers
- Advocating for wildlife welfare through legislature
- None of these

Animal Attitude Scale (Herzog et al., 1991)

10. It is morally wrong to hunt wild animals just for sport.
11. I do not think that there is anything wrong with using animals in medical research.
12. There should be extremely stiff penalties including jail sentences for people who participate in cock-fighting.
13. Wild animals, such as mink and raccoons, should not be trapped and their skins made into fur coats.
14. There is nothing morally wrong with hunting wild animals for food.
15. I think people who object to raising animals for meat are too sentimental.
16. Much of the scientific research done with animals is unnecessary and cruel.
17. I think it is perfectly acceptable for cattle and hogs to be raised for human consumption.
18. Basically, humans have the right to use animals as we see fit.
19. The slaughter of whales and dolphins should be immediately stopped even if it means some people will be put out of work.
20. I sometimes get upset when I see wild animals in cages at zoos.
21. In general, I think that human economic gain is more important than setting aside more land for wildlife.
22. Too much fuss is made over the welfare of animals these days when there are many human problems that need to be solved.
23. Breeding animals for their skins is a legitimate use of animals.
24. Some aspects of biology can only be learned through dissecting preserved animals such as cats.
25. Continued research with animals will be necessary if we are to ever conquer diseases such as cancer, heart disease, and AIDS.
26. It is unethical to breed purebred dogs for pets when millions of dogs are killed in animal shelters each year.
27. The production of inexpensive meat, eggs, and dairy products justifies maintaining animals under crowded conditions.
28. The use of animals such as rabbits for testing the safety of cosmetics and household products is unnecessary and should be stopped.
29. The use of animals in circuses and rodeos is cruel.

Analyses of Data

There are four assumptions that must be met to understand whether the Spearman's Rank-Order Correlation has provided valid results. The first assumption is that the two variables be ordinal,

interval, or ratio (laerd.com, n.d.). The second assumption states that there must be paired observations of the variables (laerd.com, n.d.). The third assumption is that a monotonic relationship exists between variables (laerd.com, n.d.). One of the benefits to using a Spearman Correlation is that it is not overly sensitive to outliers, which means if there is an outlier the data can still be considered valid (laerd.com, n.d.). If one of these assumptions is not met, the study may still be valid, but further investigation using SPSS would be required (laerd.com, n.d.).

The population size for this study was 1,210 students; thus the sample size was calculated to be 219 responses needed. This sample size was calculated with the use of Creative Research Systems by using the population of 1,210, 95% confidence level, and a confidence interval level of +/-6%. In this study the sample size was not met, 197 respondents actually completed the survey, this could mean the study has less statistical power. Running this study, a second time could be an option to determine the significance of the research that was gathered.

In this study, SPSS was used for data analysis. The independent variables being studied were the high school environmental education courses. The dependent variables are the wildlife conservation behaviors displayed by participants. A Spearman's Rank-Order Correlation is being performed to determine the relationship between students self-reporting wildlife conservation behaviors and taking a high school environmental education course(s).

Summary

In this chapter, the methodology for answering the research question has been clearly laid out. A direct correlational relationship between high school environmental education courses and wildlife conservation behaviors is being sought. If a relationship exists, how can high school education courses be enhanced by this knowledge? And, if a relationship does not exist, how can

high school environmental curriculum be restructured to establish one? These are future questions that could result from this work.

Chapter Four: Results

Introduction

This chapter will include the data, findings, results, and a discussion surrounding these items. The research question answered by this research was: What is the relationship, if any, between high school environmental education and behaviors resulting in wildlife preservation? To analyze the data the Spearman Rank-Order Correlation Coefficient (Spearman Correlation) was used. Spearman Correlations were chosen because the variables are measured on an ordinal and nominal scale. An ordinal scale requires that variables be weighted in a specific order, while a nominal scale simply names variables but does not require an order. For example, on this survey, the wildlife conservation behaviors are considered on a nominal scale because there is not a specific order to them; however, the number of E.E. classes participants had in high school is on an ordinal scale because they are listed and thusly weighted in a specific order. Therefore, a Spearman Correlation is necessary to appropriately run correlations on these variables.

The hypothesis is that a relationship between high school environmental education and wildlife conservation behaviors exists. The null hypothesis is that no relationship between high school environmental education and wildlife conservation behaviors exists.

To reject the null-hypothesis certain assumptions had to be met. According to Laerd.com (n.d) the assumptions that needed to be met were: 1) The two variables must be measured on an ordinal, interval, or ratio scale; 2) The two variables need to have paired observations; 3) A monotonic relationship should exist between the two variables. These assumptions were met in the following ways: 1) In all Spearman Correlations, each variable was run against at least one ordinal variable; at times both variables were ordinal. 2) A total of 197 responses were gathered, this represents 197 paired observations. 3) A monotonic relationship exists between the

variables, as one variable rises so does the other. These assumptions were met in one of the the Spearman Correlations calculated.

Findings

The survey delivered to participants contained eight demographic questions which included up to three clarifying questions as well as the AAS which had 20 questions, for a total number of 28 to 31 questions asked per participant. The demographics portion of the survey covered where participants were from, gender, number of E.E. classes taken, topics covered within E.E. classes, wildlife conservation behaviors, and outside of high school E.E. learning sources. The complete list of demographic questions can be viewed in Chapter three, pages 31 and 32. The AAS portion of the survey delivered 20 statements for participants to answer on a Likert Scale, the statements asked participants their views on the use of animals for human gain. The complete AAS can be viewed in Appendix B. Only data from participants who fully completed the demographics portion and the AAS portion of the survey were considered for this research.

The survey was emailed through Qualtrics six times to 1,210 candidates; 235 participants responded, but only 197 participants completed the entire survey. See Appendix E for email sent to participants. Of the 197 participants who fully completed the survey, 118 identified as female, 75 identified as male, and four identified as gender non-binary. Participants identified as living in one of eleven different states as well as the U.S. Virgin Islands. Within this sample, 76% reported they did not attend a class specifically designated as Environmental Education, but 24% of participants reported they did. To further break this down, of the 76% of participants who reported that they did not attend a specific E.E. class, 57% reported they attended a class which covered climate change, environmental conservation initiatives and wildlife; however, 43%

reported they had never attended a class that covered any environmental/wildlife topics. Additionally, when the 57% was asked to specify how many E.E. classes they took, four participants stated they had not participated in any E.E. classes although initially claiming they had; these participants were then removed from the data pool leaving just 54% of participants having exposure to E.E. Within the 24% of participants that did attend a specified E.E. class in high school, 69% reported the class was an elective and 31% claimed their class was required. Also, when asked to specify how many E.E. classes they took one participant stated they had not participated in any E.E. classes, their responses were then removed from the data pool; this did not significantly change the percentage of participants who took EE. Lastly, two participants stated that they did not have exposure to any E.E. classes, but then claimed to have take one class each, these responses were also removed from the data.

The data from the completed surveys further revealed that of the 66% of participants who had taken specific E.E. classes and/or classes which covered environmental factors, 59% had taken at least one class which formally covered these topics and an additional 41% had taken two, three, four, or five+ classes. Within the survey there were twelve options, as seen in Table 1, available for participants to select behaviors they performed; 146 (74%) participants reported performing some combination of one through twelve. A thirteenth option was available for those who do not perform the behaviors listed. Fifty-one people (26%) claimed they do not perform any of the behaviors listed. When participants that did not have exposure to E.E. were removed, 135 participants were left. It was discovered that 121 (90%) of participants self-reported performing the conservation behaviors listed while the remaining 14 (10%) reported they did not perform any of the behaviors listed. Please see Table 1 below.

Table 1

Wildlife Conservation Behaviors Participants Stated They Learned in H.S. E.E.

Behaviors	% Whom had Exposure to E.E. Curriculum (n=135)
1) Not using plastic straws	41%
2) Cutting apart plastic rings found on soda six-packs	46%
3) Participating in a vegetarian diet	5%
4) Participating in a vegan diet	4%
5) Participating in rehabilitation of injured wildlife	8%
6) Removing trash from nature trails	59%
7) Removing trash from the beach/ocean	57%
8) Volunteering on a wildlife conservation project	4%
9) Volunteering on multiple wildlife conservation projects	2%
10) Advocating for wildlife welfare on social media	19%
11) Advocating for wildlife through fundraisers	7%
12) Advocating for wildlife through legislature	8%
13) None of these	10%

The most commonly reported behaviors were removing trash from nature trails (59%), removing trash from the beach/ocean (57%), and cutting apart plastic rings found on soda six-packs (46%). The least reported behaviors were volunteering on multiple wildlife conservation projects (2%), participating in a wildlife conservation project (4%), and participating in a vegan diet (4%).

In addition to the behaviors in Table 1, which participants reported specifically learning in their high school E.E. classes, participants also reported learning wildlife conservation behaviors outside of the classroom.

Out of the 135 participants who stated they had exposure to E.E. classes, 77% reported they learned wildlife preservation behaviors outside of their high school E.E. classes. This means that 23% of participants who had exposure to E.E. reported they did not learn wildlife preservation behaviors outside of the classroom. Of the 62 participants who reported they did not have exposure to E.E. classes, 73% reported they learned about wildlife preservation behaviors outside of the classroom and 27% reported they did not learn about wildlife preservation behaviors outside of the classroom. Those participants who indicated they did learn wildlife conservation behaviors outside of their E.E. classes were provided with a list of alternative learning opportunities and identified the following additional sources as seen in Table 2.

Table 2

Outside Sources of Environmental Education which led to Wildlife Preservation Behaviors

Outside Source	% of Participants that learned from these Outside Sources (n=149)
1) Environmental Clubs	20%
2) Environmental Organizations	17%
3) Boy/Girl Scouts	23%
4) Summer Camp	20%
5) Television Shows or Movies	68%
6) Books or Magazines	49%
7) Social Media	88%
8) Online Articles	78%
9) Conversations with Family or Friends	64%

Participants could select as many ‘outside sources’ as represented their sources of outside learning. As a result, the most common sources were social media (88%), online articles (78%), and television or movies (68%). When all 197 participants were asked if they learned about wildlife preservation behaviors outside of their E.E. classes, 149 (76%) reported they learned wildlife conservation behaviors outside of their high school E.E. classes. This left 48 (24%) participants who reported that they did not learn wildlife conservation behaviors outside of their high school E.E. classes. It should be noted that although this information does not answer the research question, valuable information was gathered.

Survey Data

The Statistical Package for the Social Sciences (SPSS) was utilized to analyze data and generate reports. After the data were exported from Qualtrics to SPSS, the review and analysis

were performed. Initially data were gathered, reviewed, and then several questions were collated to give students more precise scores. To analyze the data, every response to each survey question was assigned a score; all “yes” responses were assigned a score of one (1), all “no” responses were assigned a score of two (2), and all “non-applicable” responses were assigned a score of zero (0). For multiple answer questions three and twelve, each response was assigned a score of one (1); so, learning in environmental clubs was weighted equally to learning through social media just as not using plastic straws was weighted equally to advocating for wildlife welfare through legislature. The responses were weighted this way so that SPSS could convert the responses into tangible numbers for Spearman Correlations. There was one question within the demographics portion of this survey that was weighted differently. Question ten asked how many E.E. classes participants took in high school and the responses for this question were weighted according to the number of classes- one class was equal to a score of one (1), three classes were equal to a score of three (3), etc., but no classes were equal to a score of zero (0). When it came time to collate some question responses, such as for question twelve which asked students to list what behaviors they performed, once participants had made their selection(s) the individual score for each response was added up to give a participant an overall score. This means that if a participant chose three behaviors from the list of options, they would have an overall score of three. This same process was also implemented for question three regarding the number of outside sources from which the participants reported to learn wildlife preservation behaviors.

Next, there were three Spearman Correlation tests run which were particularly relevant to the research question. In two of the cases there was a positive correlation which means that as one variable increased so did the other. However, in one test the correlation was found to be too weak to show a relationship existed between the variables.

In the Spearman Correlation tests performed between variables 1) The number of classes participants have had and 2) The number of self-reported wildlife preservation behaviors performed, a non-significant correlation was found; $r_s(135) = .082, p < .347$. This means that the amount of E.E classes a participant had taken in high school did not have a significant relationship to the number of wildlife preservation behaviors they performed. View Table 3 for this correlation matrix.

Table 3

Spearman's rho		# of behaviors you currently perform after learning about them in H.S. E.E. classes.
How many E.E. classes did you take in H.S.?	Correlation Coefficient	.082
	Sig. (2-tailed)	.347
	N	135

There was a positive Spearman Correlation found between 1) Environmental Education classes covering wildlife preservation behaviors and 2) The number of self-reported wildlife preservation behaviors performed, $r_s(135) = .273, p = .001$. These results reject the null hypothesis that there is no relationships between EE classes taken in high school and wildlife preservation behaviors. View Table 4 for this correlation matrix.

Table 4

Spearman's rho		# of behaviors you currently perform after learning about them in H.S. E.E. classes.
Did your H.S. E.E. classes cover wildlife preservation behaviors?	Correlation Coefficient	.273**
	Sig. (2-tailed)	.001
	N	135

** . Correlation is significant at the 0.01 level.

Lastly, there was a weak positive Spearman Correlation between 1) Overall Animal Attitude Scale (AAS) score and 2) The number of self-reported wildlife preservation behaviors performed, $r_s(135) = .162$, $p = .061$. The closer a participant's AAS score is to 100, the less likely they are to support the use of other species for human gain; thus, a positive correlation here displays that there is a relationship between higher AAS scores and wildlife preservation behaviors performed. View Table 5 for this correlation matrix.

Table 5

Spearman's rho		# of behaviors you currently perform after learning about them in H.S. E.E. classes.
Animal Attitude Scale Score	Correlation Coefficient	.162
	Sig. (2-tailed)	.061
	N	135

Summary

In summation, the survey was emailed six times to 1,210 potential survey respondents and 197 fully completed survey responses were collected. The first half of the survey asked demographic questions regarding where candidates had graduated from through number of E.E. classes they had in high school, wildlife preservation behaviors, and outside influences on their wildlife preservation behaviors. The second half of the survey contained the Animal Attitude Scale, which measures human attitudes towards animals through scoring statements regarding human use of animals on a Likert Scale (Herzog, et al., 1991).

Survey responses were gathered through Qualtrics, but the data were imported and then analyzed using SPSS. It was determined that a positive Spearman Correlations existed between E.E. classes discussing wildlife preservation behaviors and participants engaging in wildlife preservation behaviors. It was also found that non-significant Spearman Correlations existed between number of E.E. classes a participant has taken, Animal Attitude Scale score, and self-reported wildlife preservation behaviors being performed.

Discussion

The results depict significant and non-significant correlations between the variables studied however, correlation does not mean causation. As noted in one of the earlier Spearman Correlation results, there was also a positive correlation between sources outside of E.E. classes and wildlife conservation behaviors. Although participants were asked to specifically report the behaviors they learned in high school, it's ultimately possible the outside sources could have influenced participant's behaviors. Importantly, the correlations between the variables existed and was found to be significant, but all relationships were still relatively weak. The strength of the correlations can be found in their relationship to one (1) which means a strong positive

relationship, zero (0) which means no relationship, and negative one (-1) which means a strong negative relationship. Any correlation which falls under .2 is considered weak, the correlations between number of conservation behaviors performed and number of E.E. classes taken as well as overall AAS score fell just below .2. However, the correlation between E.E. classes covering wildlife preservation behaviors and wildlife conservation behaviors were stronger and came in at .273.

Chapter 5: Review and Conclusion

Introduction

The International Union for Conservation of Nature (IUCN) states on their website “Species are critical for a healthy planet, but growing pressures from human activities are putting them at risk of extinction. Habitat destruction, invasive species, overexploitation, illegal wildlife trade, pollution and climate change are threatening the survival of species worldwide” (n.d.). The IUCN is acknowledging the human hand in environmental degradation and is actively working to create an international plan to address ongoing climate issues. In support of this, A. Alonso Aguirre (2017) states that since human behavior lies at the roots of climate change, species extinction and exploitation, as well as exasperation and transmission of some zoonotic diseases between humans and other species, then human behavior needs to be critically examined. Thusly, it is paramount that humans examine all solutions towards effective climate justice.

According to Peter Kareiva and Michelle Marvier (2012), humans have been viewed on a dichotomous spectrum as either a “threat to biodiversity” or the “saviors” tasked with preserving and protecting it (as cited in Shumaker, 2020, p. 6). Kareiva and Marvier (2012) make a case that human interests should be integrated further into the conservation approach, which means incorporating conservation with numerous fields of study in the biological sciences, social sciences, political sciences, etc. (as cited in Shumaker, 2020). An integrated approach to teaching human wildlife conservation behaviors takes the focus off of each person becoming an environmental hero or an environmental villain and places it on creating a healthier, more sustainable, and biologically diverse planet through a variety of fields, skills, and actions (Kareiva & Marvier, 2012, as cited in Shumaker, 2020). Behaviors are learned through

observation, engagement, and role-modeling, which can happen at home, in school, or out in the world (Bandura, 1971).

Bandura's (1971) social learning theory is of relevance here as participants reported that some of the wildlife conservation behaviors they performed were behaviors they learned about through their high school environmental education curriculum. If students are observing or engaging in pro-environmental behaviors at school and seeing positive results, this would reinforce their behaviors according to Bandura (1971). Most participants also reported that they learned about wildlife conservation behaviors through outside resources, including social media, television/movies, and family/friends; it is possible that if pro-environmental behaviors have been role-modeled for candidates and they believe they can successfully perform those behaviors, there is a higher likelihood of continued behaviors (Chawla & Derr, 2012).

It is from these critical research findings that this research was developed, to determine if there was any relationship between high school E.E. classes and wildlife conservation behaviors. However, this research is simply a foundation. Further examination of human behaviors in relation to wildlife conservation can be drawn from the results and could provide a launching point for future research.

Interesting areas for future study might include gender as it relates to wildlife conservation behaviors, individual state science curriculum as it relates to wildlife conservation behaviors, as well as outside influences as they relate to environmental education. As it stands, finding a positive relationship between high school E.E. classes and wildlife conservation behaviors lends itself to developing more wildlife intensive curriculum in high schools. If human behavior is one of the core contributors to climate degradation, then human behavior needs to be modified to be more environmentally just. In response to understanding human behavior in

relation to wildlife conservation a survey was emailed to candidates which explored where participants learned about wildlife conservation behaviors and the behaviors they currently performed.

In summation, the survey was emailed six times to 1,210 candidates at a small university located in the Northeast. The survey consisted of eight multiple choice demographic questions with a possibility of three additional clarifying questions, and the AAS which consisted of twenty statements answered on a Likert Scale. There were 197 completed survey responses, all uncompleted surveys were removed prior to data analysis. Once collected through Qualtrics the data was exported to SPSS; from there, it was determined that Spearman Correlations were necessary since ordinal and nominal scales were being compared.

The research question: What is the relationship, if any, between high school environmental education and behaviors resulting in wildlife preservation?, was answered once the hypothesis was accepted. There is a non-significant relationship between high school environmental education and behaviors resulting in wildlife conservation. This research question was developed upon reflection of the urgent need to address climate degradation and an understanding of the importance education plays in addressing it. The USGCRP (2018) reports that mankind has the ability to slow some of the most pressing environmental concerns, however action is required. The USGCRP (2018) states action is required on a much more global scale than individual choices, it in fact hinges on the reduction of greenhouse gas emissions and global human adaptations; however global change and adaptations start with individuals. The research question was developed in part to examine the environmental education of individuals going through American high schools as well as the development of skills to act pro-environmentally.

This researcher's intention is to eventually create an inclusive curriculum for teachers to use that helps students learn how to become more environmentally active citizens.

Review of Findings

The research shows that there is not a significant relationship between E.E. classes and wildlife conservation behaviors. The Spearman Correlations performed, displayed a non-significant positive relationship between number of environmental education classes, specified wildlife conservation topics taught in class, and a higher overall Animal Attitude Scale score. This means that participants who took more E.E. classes, took classes that expressly discussed wildlife conservation, and that have better attitudes towards animals and animal use were more likely to perform wildlife conservation behaviors.

The research also showed that respondents relied heavily on other sources to learn about the environment. Social media, online articles, television shows/movies, and conversations with family and friends ranked among the highest of these outside sources.

The importance of social media, online articles, television shows, movies, and conversations with family and friends should not be discounted. Each of these areas constitutes an important marker in the gaining of environmental lessons and pro-environmental behaviors. Online science journals for children and young adults are ripe with pro-environmental messages, for example: HowStuffWorks, and The Exploratorium are highly popular online science resources for teens and young adults. The same pro-environmental messages can be found in television shows and movies throughout the ages: Bambi, Bill Nye the Science Guy, Jack Hanna's Into the Wild, and Avatar; these films and shows have been viewed millions of times and some have even been incorporated into classroom discussions.

Implications

As noted within this research, most participants attended at least one class which covered environmental education topics such as climate change, conservation, and wildlife preservation. The positive relationship between environmental education classes and wildlife conservation behaviors lends itself to further development of environmental education curriculum.

Within this study, 70% of participants came from a state which utilizes Next Generation Science Standards (NGSS) for their elementary through high school science curriculum. In addition to that, 28% of participants came from states which had adapted their science curriculum from NGSS, leaving just 2% of participants from states or U.S. territories that independently ran their science standards. Since a majority of participants (98%) received science courses influenced by NGSS it is fair to assume that they received fairly similar science curriculum. The NGSS curriculum can be broken down into three categories: elementary education- grades K-5, middle school education- grades 6-8, and high school education- grades 9-12. In the NGSS elementary science standards, students learn about “physical sciences; life sciences; earth and space sciences; and engineering, technology, and applications of science” (NSTA, 2013). Within the kindergarten standards for earth and space science, students are learning that humans and animals alter their environments for comfort as well as that humans can take steps to reduce negative impacts on the earth. This thread continues throughout the rest of the elementary science curriculum. The middle school science standards take a deeper dive into the “physical sciences; life sciences; earth and space sciences; and engineering, technology, and applications of science” (NSTA, 2013). Among many other things, climate change, interdependency of ecosystems, and human impact is discussed at greater length; students are given more opportunities to see themselves within their environment and to develop solution-

based thinking. To view elementary school and middle school standards more in-depth, go to Appendix A. Given that the high school NGSS curriculum builds on the previous years of science and that science is a high school general education requirement, there is some wondering as to why 43% of students in this study reported that they did not discuss any environmental education topics while in high school. A study focusing on actual high school environmental education curriculum would be beneficial in understanding why some students who used the NGSS curriculum had no recollection of learning wildlife conservation behaviors. Although it is not conclusively known at this time, the significant numbers above may be due to a few reasons: 1) The classes and topics may not have been exclusively called environmental education or wildlife preservation, 2) The students may have missed such classes and topics if the classes were considered electives, 3) The teacher did not cover these specific topics or go into depth due to COVID-19, etc. The possibilities listed here could serve as a starting point for future research.

Departments of Education may be interested in using the research provided here to bolster their environmental education classes or, if classes do not exist within their current curriculum, to develop classes which do cover these topics. Wildlife conservation behaviors taught specifically in class were shown, through this research, to positively correlate with pro-environmental behaviors outside of the classroom and at least post high school one year. The gap in high school E.E., as noted by participants, speaks to the need for greater attention to wildlife conservation behaviors being taught in schools.

Limitations

There are a few limitations within this study. First, the participants in this study come from diverse high school backgrounds; this means that some participants may have received more or less environmental education than others, thusly some participants may appear to be

outliers. Secondly, the ability of the participants to have learned and reflected on their environmental education courses may have provided different levels of understanding which could influence the results of this research. Thirdly, the participants may be engaging in conservation behaviors outside of the behaviors being addressed in this research. Fourthly, participants' behaviors could be influenced by factors outside of their high school environmental education courses which could skew the results. To account for this, participants were given a list of possible outside influences to indicate which factors, if any, have influenced their wildlife conservation behaviors. Fifth, participants' environmental education in their last year of high school may have been impacted by COVID-19 measures. Sixth, cultural differences in participants' personal lives may account for different perceptions in the use of wildlife. Seventh, only a portion of the participants had exposure to environmental education topics, this smaller sample size restricted the power of the study and could have increased the margin of error. Lastly, participants were asked to self-report their behaviors, so their actual behaviors cannot be known with certainty.

Delimitations

There are a few delimitations of this study, 1) the focus of this study was only on behaviors which impact wildlife in the short term. Participants may be engaging in numerous other pro-environmental behaviors, but that data were not reflected in this study. Secondly, a convenient sample of first-year university students was sampled. This means individuals who graduated earlier than summer 2020 were not included. 3) This study was limited to recent high school graduates in their first semester of university classes and not newly enrolled college students who graduated several or more years ago. This distinction was made with the hope that newly-graduated students would have a better ability to reflect on the high school classes in

which they recently participated. Participants in this study had all chosen to pursue higher education. This means individuals that graduated high school but did not go on to pursue higher education did not have their behaviors accounted for in this study. This particular group of individuals could be part of future research populations.

Recommendations

There are several recommendations that would further advance the impact of this research. First, the analysis of this research identifies correlations but not causation. Future research looking specifically at causation would be impactful. To determine causation, an experiment could be run comparing wildlife conservation of candidates that had received high school E.E. classes against students that did not have any high school E.E. classes. Considering the populations and educations are similar in all other aspects the outcome between the two (or more) populations would be telling. If causation can be determined, components within E.E. curriculum which contribute to wildlife conservation behaviors may become more obvious and then expanded upon.

A second recommendation involves a mixed method approach to the research. Such an approach might have allowed participants to have a greater opportunity to report wildlife conservation behaviors and/or outside sources of environmental education. In addition to broadening the survey for participants to submit written responses, interviews might provide another chance for voices to be shared regarding personal experiences with wildlife conservation behaviors and environmental education. Questions that could potentially be asked, include:

- How were you taught about wildlife conservation in high school E.E. classes?
- Why do you (or do you not) perform these specific wildlife conservation behaviors?
- Which was more influential, high school E.E. classes or outside learning opportunities?

- Why do you (or do you not) care about preserving wildlife and/or wildlands?
- Did you choose to take E.E. classes because you were already interested conservation?
 - Or did you become interested in conservation because of your E.E. classes?

These interviews would have allowed for greater depth in understanding the possible personal aspect of the relationship between E.E. classes and wildlife conservation behaviors. It would also be especially helpful to understand the worldview of teachers teaching the E.E. curriculum, specifically their views on pro-environmental behaviors and wildlife conservation. A teacher's understanding of climate change has been known to influence student's midterm grades on that same subject (Nation & Feldman, 2021). Perhaps the same might be true of wildlife conservation behaviors taught in the classroom. Ultimately, combining the quantitative data gathered in this study with additional qualitative data would have reinforced the conclusion as well as clarified data points.

A third recommendation would be to perform a study on a high school's general approach to sustainability. This study could examine schools for availability of recycling opportunities, composting and/or sustainable farming practices, promotion of student voices at legislative sessions regarding environmental welfare, and participation in wildlife conservation events or trips. Comparing the curriculum between schools who do none, some, or all of these things would provide useful information for developing E.E. curriculum as well as active citizens.

One last recommendation is to determine how integrated of an approach to E.E. classes are in overall high school curriculum. As Kareiva and Marvier (2012) concluded, an integrated approach to conservation leads to better conservation results (as cited in Shumaker, 2020). However, identifying the integration of conservation measures in E.E. may lead to some

pushback from educators, students, and the community. “Education itself has become a cultural and political battlefield, as the struggle between a carbon-soaked status quo and a more equitable and sustainable future plays itself out in the halls of learning” (Henderson & Drewes, 2020).

Climate change is now widely accepted across the political spectrum as a real issue, according to Henderson and Drewes (2020); the true hurdle is helping people move from acknowledging climate degradation to changing their behaviors to benefit the planet. Pro-environmental behavior is not as simple as it seems, since there is disagreement about the best way to go about addressing climate change, particularly in classrooms. The National Education Association (NEA) (2020) acknowledged that environmental degradation is largely due to human activity, with this realization the NEA developed several lesson plans that can be neatly included with current science lessons. If those lesson plans do not meet the needs for discussion, know that 60% of Americans believe climate change is a “major threat” to the United States (Tyson & Kennedy, 2020).

According to Paul G. Bain, Matthew J. Hornsey, Renata Bongiorno, and Carla Jeffries (2012) in their letter, promoting pro-environmental action in climate change deniers, climate change has moved beyond science to become entwined with ideological values. Bain et al., (2012) encourages educators to move past converting climate change deniers and instead focus the conversations on how their behaviors will positively impact society. Educating climate change deniers on how their behaviors can “promote scientific and economic progress” appears to be one way to gain pro-environmental behaviors (Bain et al., 2012, p.602). Thus, if you are faced with deniers in the classroom, respectfully show them the scientifically sound studies performed through bipartisan research at the Pew Research Center and/or the government sponsored climate change assessments provided through bipartisan investigation. If the research

is not enough, you may also ask students/guardians to view news stations from across the globe which depict weather anomalies and “natural disasters” with ever increasing frequency. If a student or guardian needs further evidence, have a conversation with them about societal values and their personal role in improving the environment regardless of climate changes source. For a list of additional classroom and personal resources please visit the Climate Change page on the official United States Environmental Protection Agency website (www.epa.gov/climate-change).

There is room for an integrated approach that stays within the confines of traditional education while incorporating the non-political aspect of climate change. Schools provide the chance for students to think critically about their relationship with nature; although Next Generation Science Standards were developed separately from the Common Core, they can work in conjunction with one another, this means some schools may already be covering some of the topics below. An integrated approach in English courses may look like writing argumentative essays on wildlife and wildland conservation and students’ role within that. Mathematics may cover predictive analyses of wildlife species and habitat acreage in relation to human growth and development. Social Studies may discuss root causes and consequences of climate change as well as the impact on past and future populations. The Sciences could explore the interconnectedness of all living things and the behaviors which impact one another within that web. The integrated approach extends to Health classes and how human wellbeing is tied to their environment, Language courses which provide an opportunity to learn about how foreign countries address climate issues, Art courses which allow students the freedom to express what they feel, see, and experience in their environment. The list goes on, the amount of literature available for conservation integration into nearly every general education requirement abounds.

Conclusion

The environment is being unduly degraded by mankind (USGCP, 2019). As inspired by Chief Seattle and posted by the gates to Olympic National Forest, “If all the beasts were gone, man would die from a great loneliness of spirit. For whatever happens to the beasts soon happens to man. All things are connected.” There are numerous ways in which to address climate change, however there can be little doubt that changing human behavior and providing more in-depth E.E. classes are possible answers. Perhaps, with greater development of environmental education and thusly wildlife conservation within the nation’s schools, the world will see an upswing in environmental activists seeking environmental justice. It is also hoped that the mass extinctions of flora and fauna may be reduced as pro-environmental behaviors are learned in high school classrooms.

The personal wish of this researcher is to see continued youth involvement and activism in the field of wildlife conservation and climate action. In 2019, across the globe, millions of young people marched in strikes to protest current carbon emissions and the degradation of Earth’s resources. This planet is not just for today’s children, it’s for tomorrow’s as well- it is long past time we all got on board; the conversations may start in our classrooms, but where they end we can only hope to know.

APPENDICES

APPENDIX A

Next Generation Science Standards:

Elementary, Middle, and High School Science Standards

<https://www.nextgenscience.org/sites/default/files/AllTopic.pdf>

APPENDIX B

ANIMAL ATTITUDE SCALE

Here is a copy of the Animal Attitude Scale as we have used it in recent studies. The original version had 29 items (Herzog, Betchart & Pittman, 1991). Some of the items (21 to 29) were designed as a subscale to assess the tendency to actually engage in action to help animals. Factor analysis, however, indicated that all of the items in the scale lumped into one factor. Hence, we have dropped these items. In various administrations, we have found that the alpha of the present version is generally about .90.

The items are scored so that a high score indicates pro-animal welfare attitudes (SA = 5, SD = 1). Note that items marked ** are reverse-worded.

Two short versions of the scale are available (a 5 and a 10 item version). Both correlate highly with the full 20 item AAD (r 's > .95) and have good reliability. See Herzog, H., Grayson, S., & McCord, D. (in press). Brief measures of the Animal Attitude Scale. *Anthrozoos*.

I encourage use of the scales, and investigators are welcome to modify it to meet their research needs. I would, however, appreciate knowing how the scale is being used and receiving translations, references and copies of papers based on the AAS.

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Herzog, H.A., Betchart, N.S, and Pittman, R. (1991) Gender, sex role identity and attitudes toward animals. *Anthrozoos*, 4, 184-191.

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ANIMAL ATTITUDE SCALE

Listed below are 20 statements regarding the use of animals. Circle the letters that indicate the extent to which you agree or disagree with the statement:

SA = Strongly Agree

A = Agree

U = Undecided

D = Disagree

SD = Strongly Disagree

1. It is morally wrong to hunt SA A U D SD wild animals just for sport.
2. I do not think that there is SA A U D SD** anything wrong with using animals in medical research.
3. There should be extremely SA A U D SD stiff penalties including jail sentences for people who participate in cock-fighting.
4. Wild animals, such as mink SA A U D SD and raccoons, should not be trapped and their skins made into fur coats.
5. There is nothing morally SA A U D SD** wrong with hunting wild animals for food.
6. I think people who object SA A U D SD** to raising animals for meat are too sentimental.
7. Much of the scientific SA A U D SD research done with animals is unnecessary and cruel.
8. I think it is perfectly SA A U D SD** acceptable for cattle and hogs to be raised for human consumption.
9. Basically, humans have the SA A U D SD** right to use animals as we see fit.
10. The slaughter of whales SA A U D SD and dolphins should be immediately stopped even if it means some people will be put out of work.

11. I sometimes get upset when SA A U D SD
I see wild animals in cages
at zoos.
12. In general, I think that SA A U D SD**
human economic gain is more
important than setting aside
more land for wildlife.
13. Too much fuss is made over SA A U D SD**
the welfare of animals these
days when there are many
human problems that need to
be solved.
14. Breeding animals for their SA A U D SD**
skins is a legitimate use of
animals.
15. Some aspects of biology can SA A U D SD**
only be learned through
dissecting preserved animals
such as cats.
16. Continued research with SA A U D SD**
animals will be necessary if
we are to ever conquer
diseases such as cancer, heart
disease, and AIDS.
17. It is unethical to breed SA A U D SD
purebred dogs for pets when
millions of dogs are killed in
animal shelters each year.
18. The production of inexpensive SA A U D SD**
meat, eggs, and dairy products
justifies maintaining animals
under crowded conditions.
19. The use of animals such as SA A U D SD
rabbits for testing the safety
of cosmetics and household
products is unnecessary and
should be stopped.
20. The use of animals in rodeos SA A U D SD
and circuses is cruel.

APPENDIX C

Demographic Survey Questions

Demographic:

- 1) Gender: Male, Female, Non-Binary
- 2) US State Graduated from: (ALL US STATES LISTED)
- 3) Was Environmental Education a class you took in high school? Yes or No
- 4) Was the environmental education class you took required or an elective? Required, Elective
- 5) How many environmental education classes did you take in high school: 1,2,3,4,5,6+
- 6) Did your environmental education classes cover wildlife preservation topics (How to protect wildlife)? Yes or No
- 7) Did your environmental education classes discuss specific behaviors you could perform to help preserve wildlife? Yes or No
- 8) Did you learn wildlife preservation behaviors outside of your environmental education classes?
 - a. If you answered yes above where did you learn about wildlife preservation?
 - i. Environmental Clubs
 - ii. Environmental Organizations
 - iii. Boy/Girl Scouts
 - iv. Summer Camp
 - v. Television Shows or Movies
 - vi. Books
 - vii. Social Media
 - viii. Family Members
- 9) What behaviors do you currently perform after learning about them in your high school environmental classes? (Please only check off behaviors you explicitly remember learning about in your environmental education classes):
 - a. Not using plastic straws
 - b. Cutting apart plastic rings found on soda six-packs
 - c. Participating in a vegetarian diet
 - d. Participating in a vegan diet
 - e. Participating in rehabilitation of injured wildlife
 - f. Removing trash from nature trails
 - g. Removing trash from the beach/ocean
 - h. Volunteering on a wildlife conservation project
 - i. Volunteering on multiple wildlife conservation projects
 - j. Advocating for wildlife welfare on social media
 - k. Advocating for wildlife welfare through fundraisers
 - l. Advocating for wildlife welfare through legislature
 - m. None of these

Appendix D

Common Core Standards:

<http://www.corestandards.org/ELA-Literacy/RST/introduction/>

Appendix E

Email to Study Subjects:

Hello!

I am reaching out to you about an opportunity to participate in doctoral level research. My name is Athena Adair, I am currently a graduate student earning my doctorates degree in Educational Leadership. I would be honored if you took the following survey to help me along this journey. The survey is titled: "Wildlife Preservation Behaviors Survey" and should take you less than ten (10) minutes to complete. The survey is completely anonymous and at the end you will have the option to enter your email into a \$200 gift card raffle.

This survey gathers simple information in easy to answer questions regarding your experience with high school environmental education classes and wildlife preservation behaviors. Wildlife preservation behaviors are actions you take to help wild animals, including: using reusable straws, picking up trash, volunteering, etc. Even if you do not do these things your participation is helpful.

There are no academic or personal benefits to you should you participate, but the information gathered may go on to help bolster American high school environmental education classes. If you have any questions regarding this survey before you complete it, please reach out to me at a.adair@snhu.edu.

Follow this link to the Survey:

[\\${1://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${1://SurveyURL}](#)

Follow the link to opt out of future emails:

[\\${1://OptOutLink?d=Click here to unsubscribe}](#)

Thank you,
Athena Adair

Appendix F

Consent Form for Research

This form is for consent to participate in a quantitative dissertation research study being conducted by Athena Adair, a doctoral candidate at Southern New Hampshire University.

I agree to participate in this study exploring the possible relationship between high school environmental education and graduate wildlife conservation behaviors. If I have questions on the nature of this study, the researcher, Athena Adair, the person responsible for this study, will discuss them with me. She is available to contact at (603) 455-7581.

Description of the project:

This study explores the possible relationship between high school environmental education and self-reported wildlife conservation behaviors in high school graduates.

Purpose of the research survey:

The purpose of this study is to provide research which contributes to alleviating human-related behaviors that encourage climate destruction, by examining high school environmental education and wildlife conservation behaviors

What will be done:

Current first year university students will complete a survey consisting of two sections, demographics followed by the Animal Attitude Scale (AAS). A total of eleven demographic questions gathers information on the students experience with high school environmental education classes and wildlife conservation behaviors. The following AAS gathers information on the student's relationship with animals; the AAS consists of twenty statements which students will answer on a Likert scale.

Risks:

There are no potential risks to students participating in this research.

Benefits of this survey:

Students participating in this research, can choose to enter their email address into a raffle for a \$200 gift card. There is no guarantee any specific student will win, this benefit is offered to encourage participation in the survey.

How long will the survey take?

The expected participation time for students taking this survey is approximately 10 minutes. This survey may appear to have many questions, but they are easily answered. This survey is only completed one time and there will not be any follow up with the students.

Confidentiality:

All information and data collected will be kept confidential. All data will be stored on the researcher's personal hard drive, which is password protected. Any printed/physical data or artifacts will be kept under lock and key for the duration of the study and will be destroyed upon completion of the research study. If the results of this study were to be developed for publication, no identifying information will be used.

Decision to quit at any time:

If you do not wish to participate in this study, you may refuse to participate. You may also decline participation at any time during the study.

I have read this Consent Form. My questions have been answered. Please use your mouse or finger to sign below. My signature collected below is voluntary and indicates that I understand the information above and I agree to participate in this study

X _____

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