Caring for Wildlife: Rehabilitation and Sanctuary Care in Robeson County, NC

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Abstract

There are more than 5,000 licensed wildlife rehabilitators as well as other wildlife caregivers at rehabilitation and sanctuary centers in the U.S. In North Carolina, there are 215 state-licensed wildlife rehabilitators with the majority located in the northwestern counties. Currently, there is no separate facility for wildlife care in Robeson County though there are currently efforts to start one. Wildlife rehabilitation and sanctuary care are important to all of us. I analyzed the encounters of veterinary professionals and wildlife rehabbers who cared for wildlife to gain insight into wildlife caregiving and its implications for human-wildlife coexistence. In this qualitative participatory action research project, 4 wildlife rehabbers called rehabbers formed one group and 2 veterinarians and 3 veterinary technicians formed another group called vets. In-depth interviews were conducted using an open-ended protocol. In addition, 2-4 hours of wildlife-human interaction observations were conducted using a modified OHAIRE tool for each participant in the study. Photographs were taken of the wildlife caregiving by the rehabbers. I kept a research journal and recorded observations during workplace visits. The data were analyzed using a qualitative software program in a sequential design with the interviews first followed by the animal observations, photographs, and the researcher notebook. It was found that all participants were dedicated to wildlife care. The following three themes were revealed: Wildlife rehabilitation and sanctuary care provided needed medical attention which was important to the caregivers, caregivers formed bonds with the animals as a result of the human-wildlife interactions, and participants believed that more could be done for wildlife who were often harmed by humans. It is recommended that the following steps be taken to make the goal of wildlife rehabilitation and sanctuary care a reality in Robeson County which includes the establishment of a physical building, funding, and volunteers. Wildlife rehabilitation in Robeson County is currently being done by a group of dedicated licensed individuals who volunteer their time and financial resources. With a more organized effort between veterinarians and the public, more could be accomplished for wildlife in Robeson County.

Keywords: wildlife rehabilitation, sanctuary care, rural, human-wildlife interaction

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Chapter 1: Introduction

Rationale

Wildlife can be defined as non-domesticated creatures that live in nature (Merriam-Webster, 2022). Saving wildlife that is sick, injured, orphaned, or displaced is called wildlife rehabilitation. The purpose of wildlife rehabilitation is to give care and treatment with the release of healthy animals back into the wild. Animals that are unsuitable for release due to physical or mental ailments can be used as ambassadors and/or in reproductive programs in a wildlife sanctuary (Romero et al., 2019). A wildlife sanctuary is a home to injured, abandoned, abused, or deemed non-releasable wildlife. Wildlife rehabilitators (rehabbers) assist government organizations with medical care, and personnel, and provide education to the public. Wildlife rehabilitation satisfies the human need to save animals and compensates for the harm humans cause to wildlife (Wimbereger et al., 2010).

Numerous wildlife rehabilitation centers and sanctuaries are volunteer-based and involve emotional dedication, time, and funding. The centers often consist of volunteers from public programs, after-school programs, and university students (University of Minnesota, 2021). Facilities that exhibit animals to the public must provide care as stated in the Animal Welfare Act and be licensed by the USDA/Animal & Plant Health Inspection Service (Association of Zoos and Aquariums, 2022). Wildlife rehabilitation is challenging and entails various responsibilities such as feeding the animals, inventory, rigorous schedules, cleaning cages, documentation, and laundry. Simultaneously, wildlife rehabilitation and sanctuary care give wildlife the needed support which results in fostering coexistence. Persons providing care develop deep connections with wildlife through kindness, trust, patience, and respect for the animals under their care, which are characteristics also found in human connections (Buijs & Jacobs, 2021; Vucetich et al., 2021). My study examined wildlife caregivers within the

community and veterinary services to obtain an understanding of wildlife care and its effects on wildlife-human cohabitation. I (the researcher) have participated in the care of wildlife; however, I am not licensed to do this alone but have done so in a volunteer capacity for several years. As a result of experiencing firsthand the reality, I have realized the need for wildlife and sanctuary care in Robeson County, NC, where I reside. A part of this participatory research study was to examine what care is currently available for wildlife in Robeson County and to consider ways to expand wildlife rehabilitation in the county where I reside.

Purpose

The purpose of this exploratory study was to answer the following research questions:

1. What are the thoughts and experiences of veterinarians and wildlife rehabilitation specialists regarding care for wildlife?
2. What reasons do veterinarians, and wildlife rehabilitation specialists give as evidence for the support of or hindrances to wildlife rehabilitation and sanctuary care in Robeson County, NC?
3. What types of human-animal interactions can be observed by these individuals?

My research is qualitative and uses participatory action research methodologies. Nine adults were interviewed using an open-ended protocol (Appendix C). The participants were 2 veterinarians, 4 wildlife rehabbers, and 3 veterinary technicians in Robeson County, NC. Since there are currently no standalone centers in Robeson County, these wildlife rehabbers cared for the animals from designated areas of their residence (North Carolina Wildlife Resources Commission, 2022). If wildlife rehabbers are licensed by the North Carolina Wildlife Resources Commission and complete other requirements, they can rehabilitate from their homes in designated areas. The interviews were approximately 60 minutes in duration and were conducted face-to-face where the wildlife was being treated. After the interviews, I observed each participant for 2 to 4 hours using the modified OHAIRE instrument to record the human-wildlife

interactions (see Appendix D). During the observations, I recorded notes in my researcher's journal and took photographs only of the rehabbers. The interviews, photographs and the researcher's notes were coded using MAXQDA to search for themes to answer the research questions. The human-wildlife observations were tallied by the type of care that was being provided or the stage of care using the modified OHAIRE instrument. One case was constructed for each person (veterinarians, veterinarian technicians, and wildlife rehabbers) from the evidence for a total of nine cases. Then these cases were grouped into two groups: wildlife rehabbers and vet services. These two groups are the main individuals servicing wildlife in Robeson County. The two cases were then compared to each other to assess the wildlife needs of Robeson County, NC.

Limitations

This research study had a few limitations. It occurred in one county in southeastern North Carolina of the United States. The sample size was small because few people practice wildlife rehabilitation and sanctuary care currently in Robeson County. The duration of this study was also limited, and a longer and more in-depth follow-up study could reveal more nuances in the data. There is also a lack of similar studies addressing the need for wildlife rehabilitation and sanctuary care and it is difficult in NC to find who is doing what and how current facilities are being funded.

Chapter 2: Literature Review

Introduction

The term wildlife means non-domesticated animals. Some species saved by wildlife rehabilitation are raccoons, squirrels, deer, bears, rabbits, bobcats, birds, opossums, badgers, and otters, just to name a few. In the United States, 13% of families own exotic pets or those considered wild such as reptiles, amphibians, and exotic birds (AVMA, 2022). Carolina Tiger Rescue is a wildlife sanctuary for wild cats that were kept as pets or came from backyard-type zoos (CTR, 2022). In my study, I discuss wildlife rehabilitation and wildlife sanctuaries, but first I offer a distinction between each facility related to its purposes and extent of care for animals. A zoo or aquarium is a facility where wild animals are living in captivity and are seen by the public. A zoo provides many objectives such as public education on wildlife behavior, habitat, and diet, promoting and providing species conservation, and scientific research. A zoo specializes in certain species of animals (elephants, primates, reptiles) and many have a wide range of species under their care. An example of a zoo is the Smithsonian National Zoo and Conservation Biology Institute, in Washington, D.C., and an example of an aquarium is the Steinhart Aquarium, in California. A zoo's wildlife mainly consists of land animals while an aquarium mainly consists of marine animals (Association of Zoos and Aquariums, 2022). All facilities that display animals to the public must provide necessary care as stated in the Animal Welfare Act and be licensed by the USDA/Animal & Plant Health Inspection Service (APHIS) (Association of Zoos and Aquariums, 2022). Zoos are facilities that exhibit wild animals to the public for educational purposes, promote conservation, and properly care for the animals.

In contrast, an animal shelter is a facility that houses stray, quarantined, abandoned, seized, or surrendered animals. An animal shelter is owned, operated, and maintained by a town, county,

animal welfare society, or incorporated humane society (North Carolina General Assembly, 2022). Many of the animals in a shelter would be considered pets or domesticated animals because they had been previously owned and cared for by humans. However, on occasion, an animal shelter does acquire an exotic pet or a wild injured animal that is awaiting transport to a wildlife rehabilitation center. An animal shelter's goals are for animals to be adopted, transferred to rescue facilities, provide spay/neuter vouchers, encourage sterilization of the animal, or return an animal to the owner. Unfortunately, if an animal is very ill, has a severe temperament, is unable to find a home, or the shelter is overcrowded the shelter will often but not always euthanize the animal. An example of an animal shelter is Robeson County Animal Shelter located in Saint Pauls, NC.

A humane society is a group that advocates for the protection, rehabilitation, welfare, and humane treatment of animals (North Carolina General Assembly, 2022). A humane society is typically a 501c3 nonprofit organization that can begin at a private residence and all donations are tax-deductible (Saving Grace, 2022). A humane society operates and relies economically on fundraising, adoption fees, private donations, grants, and volunteers' work. Like an animal shelter a humane society usually houses domesticated animals such as cats and dogs but on occasion will house other homeless pets such as a rabbit, snakes, or birds to name a few. A humane society's goals are to provide medical care, sterilize the animals, send animals to foster families, transfer them to another rescue facility if needed, and conduct post-adoption follow-ups. Two examples of humane societies in North Carolina are Saving Grace and Robeson County Humane Society/Friends for Life shelter (Saving Grace, 2022).

The purpose of wildlife rehabilitation centers is to treat and care for orphaned, injured, sick, and displaced wildlife to release healthy animals back to their natural habitat or the wild

(Wimbereger et al., 2010). This is different from animal shelters or the humane society that place pets with welcoming new human owners. Wildlife rehabilitation can be performed by individual rehabilitators, animal hospitals, or at large facilities designated specifically for wildlife rehabilitation. Wildlife rehabilitation is a useful method for the conservation and protection of wild animals. This method of conservation can provide knowledge of animal behavior and biology along with animal and environmental ethics (Dubois, 2003). Wildlife rehabilitation educates the public on the value of wildlife and its role in ecosystems. Furthermore, wildlife rehabilitators, veterinarians, and other trained professionals monitor the animals for diseases that affect ecosystem health. The National Wildlife Rehabilitators Association and the International Wildlife Rehabilitation Council created a manual for rescued wildlife that provides standards and guidelines for their care and release back into the wild. Guidelines for all aspects of the rehabilitation process are described (Weimbereger et al., 2010). The steps in the rehabilitation process are the acquisition of the animal (admission records), health assessments, treatment of any wounds or illnesses, disease control, housing requirements, release determination decision, and release location (Miller, 2012). This guide has been implemented by the U.S. and Western Australia, which developed these standards (Wimbereger et al., 2010).

An example of a wildlife rehabilitation center is The Raptor Center in St. Paul, MN. The Raptor Center was created in 1974 by the University of Minnesota College of Veterinary Medicine (University of Minnesota, 2021). The Raptor Center's mission is to help wounded and ill raptors by identifying environmental problems linked to raptor health and populations. The Raptor Center is a globally recognized education facility that trains veterinarians and veterinary students from around the globe to develop as leaders in raptor conservation and medicine (University of Minnesota, 2021). The Raptor Center has an affiliate called Partners for Wildlife,

which brings together wildlife rehabilitators and veterinarians to treat and rehabilitate orphaned, ill, and injured wildlife to achieve the best and most humane outcomes such as release or sanctuary care. The Partners for Wildlife (P4W) program currently includes the following states: Wisconsin, Minnesota, North Dakota, Montana, Idaho, Washington, and Alaska (University of Minnesota, 2021). A wildlife sanctuary is a place for wildlife that were abandoned, abused, injured, or captive and as a result deemed non-releasable (Doyle, 2017). There are occasions when wildlife sanctuaries will house domestic animals such as cows, dogs, or donkeys. Animals are non-releasable due to being surrendered by their owner (captive wildlife bought as a pet), imprinting on their caretaker, amputated leg, blindness, or lack of locomotive skills as common causes (Potts, 2016). Exotic animals such as tigers, also can't be released into the wild because they are not native to the U.S., so they pose a threat to native wildlife and humans. As previously mentioned, an example of a wildlife sanctuary is Carolina Tiger Rescue in Pittsboro, NC.

Carolina Tiger Rescue is a 501c3 nonprofit whose mission is to rescue, educate, and advocate for wild cats in the wild and in captivity. Carolina Tiger Rescue saves animals from traveling circuses, private owners, amateur zoos, and other facilities because of being surrendered, abandoned, or seized by authorities across the country. Carolina Tiger Rescue provides a permanent home to all the animals that come there (CTR, 2022). They also educate the public on what they can do to protect all wild cats through summer camps, court-appointed community service, volunteer opportunities, internships, field trips, and tours. Unfortunately, not every county in the U.S. has a wildlife rehabilitation center or a wildlife sanctuary. But caregivers do work together, and wildlife can be transferred between facilities if there is space for them. In summary, wildlife rehabilitation centers that focus on injured animals found in the wild and were not owned by humans have the following goals:

1. Provide care to orphaned, injured, sick, and displaced wildlife.
2. Provide sanctuary for wildlife that are unfit to return to the wild.
3. Monitor rescued animals for disease and environmental contaminants which could indicate issues of concern.
4. Preserve species that are endangered or at risk of being endangered.
5. Educate the public on the value of wildlife, habitats, and the role of wildlife in ecosystems.

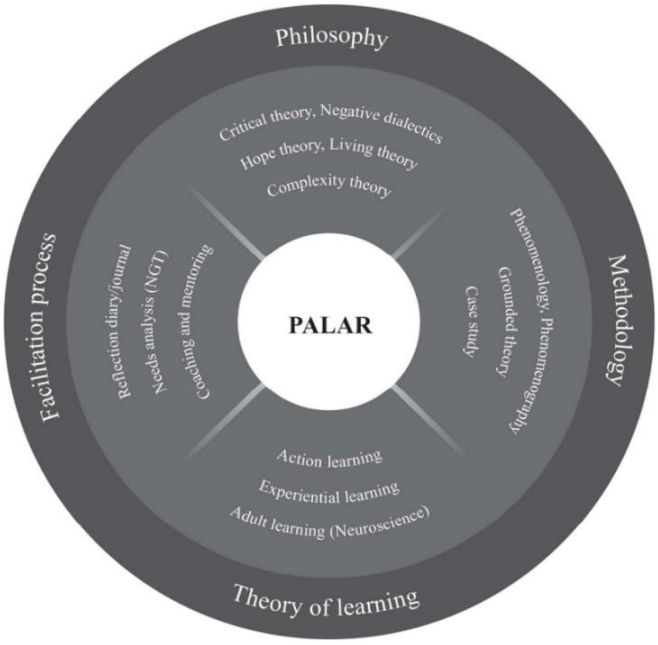
The issues of wildlife rescue and rehabilitation are:

1. Housing for the animals to conduct rehabilitation.
2. Funding.
3. Proper education and training.
4. Personnel who are passionate and compassionate about caring for wildlife in need.
5. Technology and equipment needed to provide care to animals.
6. Support from the community, local, and federal agencies (National Wildlife Rehabilitators Association, 2021).

Theoretical Framework

A theoretical framework is a foundation from which you can conduct research. The theoretical framework used in this study is Participatory action research (PAR). The participatory action learning and action research (PALAR) framework (see Figure 1) is composed of a philosophy, a methodology, a theory of learning, and a facilitation process (Zuber-Skerritt, 2015). PALAR's philosophy is composed of critical theory, negative dialectics, hope theory, living theory, and complexity theory (Zuber-Skerritt, 2015).

Figure 1: PALAR framework pg. 13 (Zuber-Skerritt, 2015)



Critical theory displays humans' negative characteristics that can hinder growth and transformation (Zuber-Skerritt, 2015). Negative dialectics teaches that the complicated and unjust nature of society and education should not be put into classifications but studied by different viewpoints and methods of research (Zuber-Skerritt, 2015). In other words, integrating facets of ambiguity can enhance thoroughness in research (Zuber-Skerritt, 2015). Hope theory uses hope as a form of reasoning to predict welfare. In living theory, the educational influences on someone's learning are explained. Complexity theory has four domains: two ordered (simple & complicated) and two unordered (complex & chaotic) domains (See Figure 1). In complex situations, the right answers can't be predicted, which makes using PALAR beneficial because problem-solving skills are used to achieve an answer (Zuber-Skerritt, 2015). The methodologies in PALAR are grounded theory, phenomenology, case study methodology, and phenomenography. The grounded theory uses qualitative data and analysis to construct theories and empirical knowledge (Zuber-Skerritt, 2015). Phenomenology is the philosophical study of consciousness and subjective perspective. A case study is a thorough study of a specific subject,

such as disease, education, or social issues. A case study involves qualitative methods with some quantitative methods and can consist of one or more observations. Phenomenography studies qualitatively the ways people experience or think about something (Zuber-Skerritt, 2015). PALAR's theory of learning consists of action learning, adult learning, and experiential learning. Action learning is when a person acts to solve a problem and reflects on the results. Experiential learning is when a person learns from their experiences (Zuber-Skerritt, 2015). The facilitation process of participatory action learning and action research is a reflective diary or journal, mentoring and coaching, and needs analysis (Zuber-Skerritt, 2015).

Participatory action learning and action research are important because they promote informal and collaborative problem-solving. The research and development are organized and performed with, for, and by the individuals who are affected by the issue, decisions made, and the solution. Participatory action learning and action research are done in real-life situations. Participatory action learning and action research are different than traditional learning. Traditional learning is teacher-centered and curriculum-based. Traditional learning is done in a classroom and focused on competition. Traditional learning is rigid and not very open-minded when compared to participatory action learning and action research. The traditional development strategies and research used today are not sufficient for sustainable development and problem-solving because the world is constantly evolving. To keep up with the changing world, those methods need to be accompanied by a shift in mindsets, creative innovations, transformational learning, and dialectic thinking. The purpose of this change is to strive for personal courage, democratic and non-hierarchical practices, help others, and value all people and what they have to offer no matter their status (Zuber-Skerritt, 2015). Participatory action learning and action research should be used in small groups of people who are doing research with, for, and by the people concerned

while using qualitative research methods. The goal of participatory action learning and action research is to recognize, address, and solve multifaceted issues for a specific community or group with a change in learning, the intention of a greater understanding of the situation, and social justice (Zuber-Skerritt, 2015). Participatory action learning and action research should not be used in large groups, by people researching another group of individuals, simple problem solving, or for large-scale surveys to study national trends, using quantitative statistics and methods (Zuber-Skerritt, 2015). The advantages of using participatory action learning and action research are they promote equality, self-sufficiency, teamwork, and inclusion. This is done by using a self-directed and learner-centered approach by learning from experience, from, and with one another. Participatory action learning and action research work for people who are dedicated and eager about making a change. Participatory action learning and action research give individuals the tools to work independently, with others, and the ability to address and solve problems (Zuber-Skerritt, 2015). The disadvantages of using participatory action learning and action research are:

1. Universities don't see participants in research as co-creators of knowledge and co-researchers. If universities are open to Participatory action learning and action research approach, they usually lack experience and knowledge which can result in reverting to old ways.
2. Community members avoid the idea of participating in research because they feel they lack the skills and knowledge.
3. Wrong choice of project.
4. No support from superiors.
5. Not enough time.
6. A poor blend of participants and participation.
7. All action but no learning.
8. Incapable leader (Zuber-Skerritt, 2015, p. 16).

In brief, the participatory action learning and action research (PALAR) framework is composed of a philosophy, a methodology, a theory of learning, and a facilitation process (Zuber-Skerritt, 2015). Participatory action learning and action research develop fundamental ideas that

determine their action learning enabling successful results. Key components of participatory action learning and action research are project and process-based, problem-oriented, aimed at social justice, interdisciplinary, real-world application, accessible to all, self-directed learning, reflection, and collaboration with others (Zuber-Skerritt, 2015). Participatory action learning and action research involve community members in research and help them see their value within society. Participatory action learning and action research in academics can produce research results that are effective and accurate along with being community-related and collaborative which makes it sustainable. However, researchers must learn new methods of qualitative and collaborative research for participatory action learning and action research to be effective in academic research (Zuber-Skerritt, 2015). I will be participating in this research by interviewing and shadowing the participants as a co-partner in the rehabilitation of wildlife in Robeson County.

History of Wildlife Rehabilitation in the US

Since the early 1930s in the U.S., wildlife rescue and rehabilitation have been done in people's homes without formal training (Haas, 2022). Wildlife rehabilitation has also taken place through some institutions such as Trailside Museum in River Forest, IL, which has rehabilitated wildlife since 1939 (Haas, 2022). In the 1960s and 1970s, nature centers and museums became involved in wildlife rescue and rehabilitation which relied on volunteers and private resources. Over time, wildlife rehabilitation centers became established, and they began educating each other in wildlife handling, management, behavior, restraining techniques, and nutrition. Another example of a wildlife rehabilitation center during this time is the Lindsay Wildlife Experience (formerly Lindsay Museum and Wildlife Hospital) in Walnut Creek, CA, which has cared for injured and orphaned wild animals since 1968 (Haas, 2022). The Lindsay Wildlife Experience is

the first wildlife hospital, zoological society, and educational museum to specialize in California's native wildlife. A few years later in 1972, The International Wildlife Rehabilitation Council (IWRC) was founded in California by individuals worried about the welfare and preservation of native wildlife (IWRC, 2022). The International Wildlife Rehabilitation Council founders' purpose was to establish an organization where wildlife rehabilitators could share resources and have access to current scientific information to enhance the care of injured wildlife. The International Wildlife Rehabilitation Council has supported approximately 16,000 wildlife rehabilitators with training and resources (IWRC, 2022). In 1982, the National Wildlife Rehabilitators Association (NWRA) was formed by wildlife rehabilitators as a national organization to share information, create standards for the care of wildlife, and protect ecosystems (NWRA, 2022). Like the International Wildlife Rehabilitation Council, the National Wildlife Rehabilitators Association provides wildlife rehabilitators with orientation, training, and networking. The National Wildlife Rehabilitators Association also represents members and the profession to provincial, federal agencies, state, and other related organizations (NWRA, 2022). The Association shares information through peer-reviewed publications (which include their open-access journal called *Wildlife Rehabilitation Bulletin)*, annual symposiums, web and in-person training in veterinary medicine and wildlife rehabilitation (NWRA, 2022). Papers published by the NWRA are cross-disciplinary with the subjects of wildlife rehabilitation, conservation, wildlife ecology, veterinary medicine, and One-Health (National Wildlife Rehabilitators Association, 2021). One-Health is a multisectoral and cooperative approach to achieve the best health effects by recognizing the connection between nature and people. Currently, there are 252 Wildlife Rehabilitation Bulletins published online to support the work of wildlife rehabilitation (National Wildlife Rehabilitators Association, 2021). In 2021, there was a

total of 1,362 members in the National Wildlife Rehabilitators Association (National Wildlife Rehabilitators Association, 2021). Why the increased interest in wildlife rehabilitation over time? The first important reason for wildlife rehabilitation is human-animal conflicts. As the United States has become more urban, this has negatively impacted wildlife through habitat loss and increased human interaction. Some examples of human-animal conflicts are collisions with structures, domestic animal attacks, road kills, and environmental contamination (Long et al., 2020). Environmental disasters caused a need for government and industry involvement in wildlife rehabilitation. For example, marine oil spills have become more common. According to National Oceanic and Atmospheric Administration (NOAA, 2022), there are three of the largest oil spills in the United States. The first was in 1969, when an offshore platform off the coast of Santa Barbara, California, spilled more than four million gallons of oil. The second was in 1989, when the *Exxon Valdez* oil tanker ran ashore in the Prince William Sound in Alaska, spilling more than 11 million gallons of oil (NOAA, 2022). The third and largest marine oil spill in U.S. history was on April 20, 2010, when there was an explosion on the *Deepwater Horizon* drilling platform in the Gulf of Mexico that killed 11 people. It took three months for the oil leak to be stopped and about 134 million gallons of oil had spilled into the ocean. In 2016, an $8.8 billion settlement with BP for restoration was obtained, which is continuing today (NOAA, 2022). Oil spills damage marine life in two ways, which are oil toxicity and fouling (oiling). Oil consists of various toxic compounds that can cause serious health complications like stunted growth, compromised immune system, heart damage, and death (NOAA, 2022). The understanding of oil toxicity stemmed from studying the impacts of the 2010 *Deepwater Horizon* oil spill. Fouling or oiling occurs when oil physically damages an animal or plant. Oil can coat the wings of birds leaving them unable to fly, and it can deteriorate the insulating

properties of a sea otter's fur, which leaves them vulnerable to hypothermia. The extent of oil exposure influences the animal's chance of survival (NOAA, 2022). On December 26, 1976, a major oil spill occurred when the Liberian tanker Olympic Games ran ashore in the Delaware River. Since there was little knowledge on how to help oiled wildlife, thousands of animals perished even with the help of many people. In 1977, the Tri-State Bird Rescue and Research were established to save future wildlife by discovering ways to successfully treat animals and study the effects of oil on avian species (NOAA, 2022). The Tri-State Bird Rescue and Research have made great advances in wildlife rehabilitation and oiled wildlife responses. The organization gained an international reputation by working together with government agencies, colleagues, commerce, and dedicated volunteers. The organization's Wild Bird Clinic is one of the largest of its kind in the United States and handles the rehabilitation of birds from across the United States with the goal of release. The organization operates under multiple state and federal permits and is staffed with volunteers, biologists, and veterinary personnel. The Tri-State Bird Rescue and Research care for over two thousand birds annually, provides training for affiliate and local personnel from other agencies, publishes papers, and has an Oil Spill Response team that is on call 24/7 to aid oiled wildlife in the United States and internationally (NOAA, 2022).

In summary, environmental disasters have brought attention to the need for saving and rehabilitating wildlife, but also much-needed funding for wildlife rehabilitation. When a natural disaster such as floods, fires, tornados, oil spills, or hurricanes occur, animals need assistance just like people. With climate change, it is predicted that there will be an increase in catastrophic natural disasters (NASA, 2022). As a result, it has become more apparent that each state in the

U.S. will need an emergency wildlife response and rescue system ready for when these disasters happen.

Wildlife Rehabilitation and Biodiversity

A second significant reason for wildlife rehabilitation is the protection of biodiversity. As a result of human impact on the environment and climate change, species biodiversity is declining worldwide. According to the global Living Planet Report of 2020, the Living Planet Index (LPI) reveals a 68% decline in vertebrate species populations from 1970 to 2016. According to Almond and others (2020), evidence was collected on 4,392 species from 20,811 populations. It is now more important than ever to preserve biodiversity in which wildlife rehabilitation, sanctuary care, and zoos play a major role (Molina-López et al., 2017). The preservation of biodiversity is important for humans because biodiversity provides pollinators such as bees and birds that help produce the food we eat. Vegetation cleans the air by absorbing carbon dioxide, slowing down soil erosion, and absorbing water we use to drink. Marine life and vegetation provide coastline protection, raw materials for products, as well as food. Biodiversity also provides raw materials used in medicines and to make products such as antivenom and rubber (Society, 2022). Biodiversity is the array of life forms in an ecosystem such as fungi, bacteria, animals, plants, and people (Almond et al., 2020). Wildlife rehabilitation not only saves wild animals, but it provides evidence on wild species for conservation efforts as well. Wildlife rescue and rehabilitation along with research can serve as a tool for habitat preservation by acting as a measurement of environmental health (Dubois, 2003). Each rescued animal is represented by documenting sex, age, size, species, and other factors at a certain date, time, and location. Data collected during encounters provide information on population biology, behavior, physiology, and nutrition (Dubois, 2003). An inflow of released animals into a population may affect the

population's genetics, size, disease, and evolution, especially when animals are moved between populations. This can affect the conservation and management of source and receiving populations (Pyke & Szabo, 2018). Wildlife rehabilitation not only affects individual survival but also supports the conservation of diverse plant and animal populations.

Post-release findings in wildlife can help determine the effectiveness of wildlife rehabilitation. For example, in the state of Oregon, wildlife professionals believed that deer fawns were difficult to raise and release back into the wild because they typically did not survive or successfully reproduce. As a result, when young deer were brought to the local state offices they were euthanized. Moreover, some people believed that they knew how to raise deer fawns, but unfortunately, they caused fawn deaths due to acclimatization to people or poor husbandry (Cheatham & Allbritten, 2015). Researchers Cheatham and Allbritten (2015) performed a 15-year investigation to record the breeding, behavior, and mortality of post-released fawns. The researchers were granted permits to raise, mark, and release fawns on an unfenced 40-acre rural site located in Douglas County, Oregon. In their findings, the data indicated that rehabilitated white-tailed and black-tailed fawns had a better or equal survival probability than wild-reared fawns. Cheatham and Allbritten (2015) found that even though there were fewer white-tailed fawns admitted to the study than black-tailed fawns, the white-tailed fawns produced almost as many fawns post-release as the black-tailed ones. Rehabilitated black-tailed fawns displayed a survival rate of 56%. Cheatham and Allbritten for six months (2015) followed wild-reared, radio-collared, white-tailed fawns who had a survival rate of 62% when compared to a 57% survival rate of rehabilitated white-tailed fawns who were followed for 12 months. Post-release rehabilitated does of both species survived to 2–13 years of age and effectively raised more than 50 wild fawns. Although variations in food supply, habitat, and weather conditions influenced

fawns' survival from year to year overall, these studies showed that wildlife rehabilitation was an important part of habitat and wildlife management. Post-release wildlife did form natural bonds with wild-reared animals, produced offspring, and flourished. Therefore, with proper methods, equipment, and research it is feasible that wildlife rehabilitation can be effective in overall conservation efforts for all species.

Wildlife Rehabilitation Ethics and Laws

Ethics is the sense of right and wrong. Some people respect and believe all living things have a right to live. Conservation ethics embraces the idea that life in the non-human world should be treated with ethical consideration, and it focuses on how people should relate to nature (Vucetich et al., 2021). Many states regulate the rehabilitation of wildlife by requiring individuals to be licensed by the U.S. Fish and Wildlife Service or their state Department of Natural Resources. The licensing requirements of each state differ, but many require applicants to exhibit the ability and readiness to rehabilitate wildlife (Michigan State University, 2022). Most permits are valid for two to three years, after which a permit holder must apply for a renewal. Some states require existing permit holders to exhibit the ability and readiness when renewing their permit (Michigan State University, 2022). Many states require wildlife rehabilitators to be familiar with each species they care for such as its diet, habitat, and behavior. Formal education is usually not required, however, because most wildlife rehabilitators begin their careers as volunteers or interns. There are wildlife rehabilitators who have veterinarians that provide care for wildlife at a reduced or no cost (Michigan State University, 2022). Some veterinary institutions partner with wildlife rehabilitators so veterinary students can gain experience working with animals. Some states require wildlife rehabilitators to provide a letter from a veterinarian saying they will provide medical and professional help as needed. In many states, it is illegal to possess a wild

animal unless you are a licensed wildlife rehabilitator. Unlicensed individuals rescue and care for wildlife in secret for fear of criminal punishment. Wildlife rehabilitators need to be careful when responding to calls to rescue an animal. Two concerns are trespassing on private property and working with wildlife can pose a risk of injury and/or disease to an individual. Since rules and policies vary from state to state, wildlife rehabilitators and clinics must be aware of the regulations in their area (Michigan State University, 2022).

We must also ask ourselves what causes animals to become sick, injured, and orphaned. The reason is human interaction impacts wildlife through intrusion and zoonotic disease transmission. Zoonosis is an infection or disease that is naturally transmissible from vertebrate animals to humans or from humans to animals. Zoonotic diseases are produced by a broad range of pathogens such as viral, bacterial, or parasitic pathogens to name a few. These organisms can enter the body by one or more of six routes, which are inoculation (direct contact via a pre-existing opening in the skin), ingestion, inhalation, genital tract (contaminated instruments or coitus), transplacental (mammals only), and across the umbilicus (yolk) (Rahman et al., 2020). Zoonotic diseases are produced by a broad range of pathogens. Based on etiology, zoonoses are classified into viral zoonoses (rabies, avian influenza, etc.), bacterial zoonoses (salmonellosis, Lyme disease, etc.), fungal zoonoses (ringworm), mycoplasma zoonoses (Mycoplasma pneumoniae infection), parasitic zoonoses (trichinosis, giardiasis, etc.), rickettsial zoonoses (Q-fever), chlamydial zoonoses (psittacosis), protozoal zoonoses, and diseases caused by acellular non-viral pathogenic agents (transmissible spongiform encephalopathies and mad cow disease) (Rahman, 2020). Wildlife rehabilitation can monitor disease, contribute to the tracking and control of disease in wild populations, and track transmission to domestic populations and even

to humans. Disease monitoring and observation systems are an important part of public health for all communities.

Examples of human impacts are birds colliding with windows, being struck by vehicles, domestic animal predation, land development and usage, human-caused traumatic incidents, and anthropogenic (humans' influence on nature) sources of ecological contamination (Long et al., 2020). Schenk and Souza (2014) conducted a study to find out the causes for admission and outcomes of wildlife cases presented to the wildlife clinic at the University of Tennessee Veterinary Teaching Hospital between 2000 and 2011. The researchers found that one-third of the cases were due to indirect (domestic animals) or direct anthropogenic causes (vehicles or trauma inflicted from one) (Schenk & Souza, 2014). Direct interactions were less common than indirect interactions (14% of which were due to cats and 6% due to dogs). Other factors such as land development, environmental pollution, and zoonotic disease also inflicted illness and death on wildlife.

Coexistence with Wildlife

A third significant reason for wildlife rehabilitation is to ensure coexistence. Coexistence with wildlife is essential to preserve the environment for all life on earth and future generations. Coexisting with wildlife means people and animals live amongst each other in balance. Human-wildlife coexistence is cultivated when people live in balance and harmony with nature. When people work with nature it forms a deeper understanding of the environment (Perry & Averka, 2020). Wildlife rehabilitation and sanctuary care can provide this insight through community education and interaction. Animals that come into the wildlife rehabilitation and sanctuary center often have suffered an anthropogenic event such as being hit by a vehicle, electrocution or being shot while foraging for food (Perry & Averka, 2020). Wildlife rehabilitators provide the animals

the care they need, which in turn fosters coexistence. People develop deep meaningful connections with wildlife because a relationship is created through compassion, trust, patience, and respect just like human relationships. Wildlife rehabilitation and sanctuary care provides people with purpose and fulfillment by helping animals return to the wild, sanctuary within a facility, or transition to a peaceful death (Perry & Averka, 2020). People realize that they are not that much different from other animals through deep connections. Buijs and Jacobs (2021) emphasized the psychological benefits of human and wildlife interactions and named this "a positive psychology of human-wildlife relationships" (pg. 281). Human-wildlife interactions were shown to induce human happiness through positive emotions and feelings from wildlife encounters and to an overall decrease in stress. They further explained that being with wildlife in nature is peaceful and the enjoyment of nature reduced isolation. For the engagement pathway, feelings of interest, amazement, and beauty have been seen as regularly occurring wildlife experiences, indicating that intimate relationships between wildlife and humans contribute to human well-being. Human-wildlife relationships also promote engagement by providing a sense of identity and place or community (Buijs & Jacobs, 2021).

Another means of promoting happiness in the human-wildlife relationship is by assigning spiritual meaning to these interactions. There is something to feeling like being a part of something much bigger than yourself or being connected to your environment in a deep and meaningful way. There is satisfaction in volunteering to assist with wildlife being released "back home" and returning to their own families and in doing so influencing future generations. Coexisting with wildlife is not just tolerating one another, it is instead living together in harmony with each other through caring, nurturing, love, and respect. Buijs & Jacobs (2021) provided a framework by which to study positive interactions between people and wildlife. One way to

measure Human-Animal Interaction (HAI) is the Observation of Human-Animal Interaction for Research (OHAIRE) (Guérin et al., 2018). The OHAIRE tool is used to code behavior. OHAIRE was created to depict the behavior of humans interacting with peers and animals in natural settings. A natural setting is where subjects are not asked to do certain tasks and are free to interact with others (Guérin et al., 2018). The OHAIRE behavioral categories are communication behaviors with others, emotional displays, control objects or behaviors to animals, and inhibiting behaviors (Guérin et al., 2018). OHAIRE was used to code 2,732 minutes of video by 14 coders in four studies with a total of 201 participants (aged 5 - 18 years). These studies had an animal intervention with three species (horses, guinea pigs, and dogs,) and three groups (attention-deficit hyperactivity disorder, autism spectrum disorder, and developing children) involved in a group therapy program, therapeutic horseback riding program, school, and hospital setting (Guérin et al., 2018). In the studies, the OHAIRE-v3 reached outstanding levels of dependability, restricted associations with caregiver report surveys of interfering and social behaviors and offered a dependable human-animal interaction subscale (Guérin et al., 2018). In a study by Perry and Averka (2020), the researchers used observational notes to observe the human-animal interactions and associated behaviors during wildlife caregiving. They observed 197 human-wildlife interactions with 44 different wild animals of which the majority were birds. The 15 rehabilitators who participated in the study were interviewed. These rehabbers described their effort as having conservation and animal welfare in mind. They expressed a need to contribute to the broader understanding of human-wildlife coexistence and to educate the public about the importance of wildlife and conservation.

In summary, each state regulates the rehabilitation of wildlife by requiring individuals to be licensed by the U.S. Fish and Wildlife Service or their state Department of Natural Resources.

The licensing requirements of each state differ, but many require applicants to have the knowledge and tools needed to rehabilitate wildlife (Michigan State University, 2022). The International Wildlife Rehabilitation Council and National Wildlife Rehabilitators Association in the U.S. designed a guide for rescued wildlife that provides standards and guidelines for their care and release back into the wild (IWRC, 2022). Wildlife rehabilitation rescues animals that have encountered human interaction through intrusion and zoonotic disease. Wildlife rescue and rehabilitation serves to educate the public on the value of wildlife, habitats, and the role of wildlife in ecosystems. Coexistence with wildlife preserves the natural world through the coexistence of humans within the natural environment.

Wildlife Rehabilitation in N.C.

Wildlife rehabilitation centers care for a variety of animals, such as mammals, reptiles, birds, and amphibians. In some cases, the animal may or may not be native to the area. In North Carolina, a Captivity License for Rehabilitation is required to house native animals and birds with the intent to rehabilitate and release them back to their natural environment (North Carolina Wildlife Resources Commission, 2022). To apply for a Captivity License for Rehabilitation, an applicant must be age 18, know about wildlife rehabilitation, and be able to provide suitable care for the animals. Knowledge about wildlife rehabilitation can be obtained through veterinary assistant training, workshops, seminars, or experience as a wildlife rehabilitation assistant. Permits are issued to individuals at a specific location, and they are allowed to have volunteers to assist at the licensed location under the guidance of the permittee (North Carolina Wildlife Resources Commission, 2022). Captivity License for Rehabilitation is issued at two levels based on experience which is apprentice level and rehabilitator level. The apprentice level is for an individual who has never held this license in North Carolina or a similar license in another state.

The apprentice shall appoint a mentor with a valid captivity license for rehabilitation in North Carolina and has held that license for two years or more. An apprentice must complete one year of supervised rehabilitation activities under a licensed rehabilitator before they can apply for a Captivity License for Rehabilitation. An apprentice license only permits the possession of rabbits, opossums, and squirrels. The rehabilitator level is for an individual who has had an apprentice license for a year in North Carolina or a similar license in another state. The individual must submit a mentor upgrade form from the appointed mentor with their application. Wildlife rehabilitators relocating from another state must include a copy of their out-of-state wildlife rehabilitation license with the wildlife rehabilitation license application. Once the individual completes either a Captivity License for Rehabilitation (apprentice) or Captivity License for Rehabilitation (rehabilitator) application they must submit it to the North Carolina Wildlife Resources Commission. The license has a $10.00 application/renewal fee plus a $2.00 transaction fee (North Carolina Wildlife Resources Commission, 2022).

A Wildlife Captivity License permits an individual to retain wild animals for educational, exhibition, or scientific. In North Carolina, an individual cannot have a wild animal as a pet, for companionship, or amusement reasons. A Captivity License for Holding is issued to one person, 18 years or older, to approve the custody of lawfully taken or obtained native wild animals for exhibition, scientific, or educational purposes. Individuals requesting to hold wild animals for exhibition, scientific, or educational purposes need a permit from the U.S. Department of Agriculture and must attain it before applying for a Captivity License for Holding. No Captivity License for Holding will be given, and no wild animals can be obtained until the applicant has adequate animal housing that fulfills standards defined in 15A NCAC 10H .1404 and the facility has been verified by a representative of the NC Wildlife Resources Commission or if the person

can show a concurrent, applicable, and valid USDA license or exemption from USDA licensing requirements. License holders with wild animals utilized for exhibition or education outside of their facility, must keep records of exhibition and education activities and preserve records for one year after the expiration of the license. Individuals wanting to acquire a Captivity License for Holding for migratory birds must have and present a concurrent, applicable, and valid federal permit from the U.S. Fish and Wildlife Services. A Captivity License for Holding will not be distributed for threatened, endangered, or special concern species as defined in 15A NCAC 10I .0102- 0105. Custody of these species needs an endangered species permit from the NC Wildlife Resources Commission (North Carolina Wildlife Resources Commission, 2022).

Records on every animal at the rehabilitation center are required. The information documented includes the species of animal, date of procurement, where the animal was obtained, identification of the problem, final disposition of the animal, and date of final disposition. In North Carolina, wildlife rehabilitation centers are permitted to possess all native wildlife species, except for raccoons, skunks, foxes, black bears, bats, deer, and coyotes due to concerns over rabies. Authorization is required for any threatened or endangered species. The Wildlife Resources Commission is the only organization in N.C. that can rehabilitate black bear cubs. For individuals to rehabilitate deer fawns, they must have a separate permit. Unfortunately, many animals are admitted to wildlife rehabilitation centers due to encounters with human activities such as vehicles, traps, hunting, and cruelty (Schenk, 2014).

There are some wildlife sanctuaries and rehabilitation centers in the state of North Carolina. These wildlife rehabilitation centers were started in the late 1980s, 1990s, and early 2000s and some specialize in raptors (birds), mammals, marine animals, and just to name a few. Some of the wildlife sanctuaries and rehabilitation centers in North Carolina are:

1. NC Zoo Wildlife Rehabilitation Center in Asheboro
2. May Wildlife Rehabilitation Center at Lees McRae College in Banner Elk
3. SkyWatch Bird Rescue in Castle Haynes
4. Animal Rehabilitators of the Carolinas (ARC) in Charlotte
5. Carolina Raptor Center in Charlotte
6. Possumwood Acres in Hubert
7. Carolina Waterfowl Rescue in Indian Trail
8. Outer Banks Wildlife Shelter (OWLS) in Newport (Wildlife Rehabilitators of NC, 2022)

To conclude, wildlife rehabilitation centers care for a variety of animals. In some cases, the animal may or may not be native to the area. In North Carolina, a Wildlife Rehabilitation Permit is required to provide care and release native species back into the wild (North Carolina Wildlife Resources Commission, 2022). Records must be kept for at least three years, submitted quarterly, and must be available for inspection by an officer of the U.S. Fish and Wildlife Service and/or Wildlife Resources Commission.

Wildlife Rehabilitation in Robeson County, N.C.

While there are individuals who are licensed and practicing wildlife rehabilitation in Robeson County, they are operating from designated areas from where they reside. There is no standalone building or a facility for wildlife rehabilitation in the county. The advantage of establishing a wildlife rehabilitation center and sanctuary in Robeson County, NC would be:

1. There are no wildlife sanctuaries and rehabilitation standalone centers to serve the county and surrounding areas without having to drive one to two hours away.
2. To provide care to injured, sick, orphaned, and displaced wildlife.
3. Provide sanctuary for wildlife that cannot be returned to the wild.
4. Statistics of wildlife admission and outcomes be kept.
5. Rescued animals can be monitored for disease and environmental contaminants.
6. Preserve species that are endangered or at risk of being endangered.
7. Educate the public on wildlife, habitats, and the role of wildlife in ecosystems.
8. Can provide therapeutic benefits for individuals.
9. Wildlife rescue and rehabilitation can provide opportunities such as internships, fellowships, research, and volunteer work.

The obstacle to establishing a wildlife rehabilitation center and sanctuary in Robeson County, NC would be:

1. Funding.
2. Proper education and training.
3. Housing for the animals and conducting rehabilitation.
4. Enough personnel and people who are passionate about caring for wildlife in need.
5. Support from the community, local, and federal agencies.
6. Technology and equipment that are needed to provide care to animals.

According to Wimberger (2010), most rehabilitation centers were financed using the rehabilitators' money. Money from private donors, corporate sponsorships, and public donations accounted for less than 12% of the operating costs. Most of the money was spent on food for animals, animal housing (lights and electricity), housing repairs, equipment, and veterinary procedures. The least amount was spent on post-release monitoring, the release of animals (transport), and post-release support (food/shelter). To conclude, the resources needed to sustain a wildlife rescue and rehabilitation are funding, education, personnel, technology, equipment, and support from the community, local, and federal agencies.

Summary

Wildlife rehabilitators are assisting governments with the medical care of rescued wildlife, providing personnel, and educating the public regarding the responsibilities of citizens towards wild animals. Wildlife rehabilitation satisfies the natural human need to rescue animals in distress and counterbalance the damage that humans have inflicted (Wimbereger et al., 2010). Rehabilitating wildlife is not easy and requires many tasks such as documentation, cleaning cages, inventory, strict schedules, laundry, and feeding animals. However, wildlife rehabilitation and sanctuary care provide animals the care they need which in turn fosters coexistence. People develop deep connections with wildlife because the relationship is created through trust,

patience, compassion, and respect just like human relationships. My study examined the experiences of wildlife caregivers such as wildlife rehabbers and veterinary professionals in Robeson County, NC to increase understanding of wildlife care and its effects on wildlife–human coexistence. Understanding the needs of those who care for wildlife in Robeson County, N.C. facilitates an understanding of those the best way to support these efforts.

My research questions for my study were as follows:

1. What are the thoughts and experiences of veterinarians, veterinarian technicians, and wildlife rehabilitators with wildlife rehabilitation and sanctuary care in Robeson County?
2. What types of human-animal interactions are observed during care?
3. What reasons do veterinarians, veterinarian technicians, and wildlife rehabilitators have for providing support for or what hindrances exist to wildlife rehabilitation and sanctuary care in Robeson County, NC?

Chapter 3: Methodology

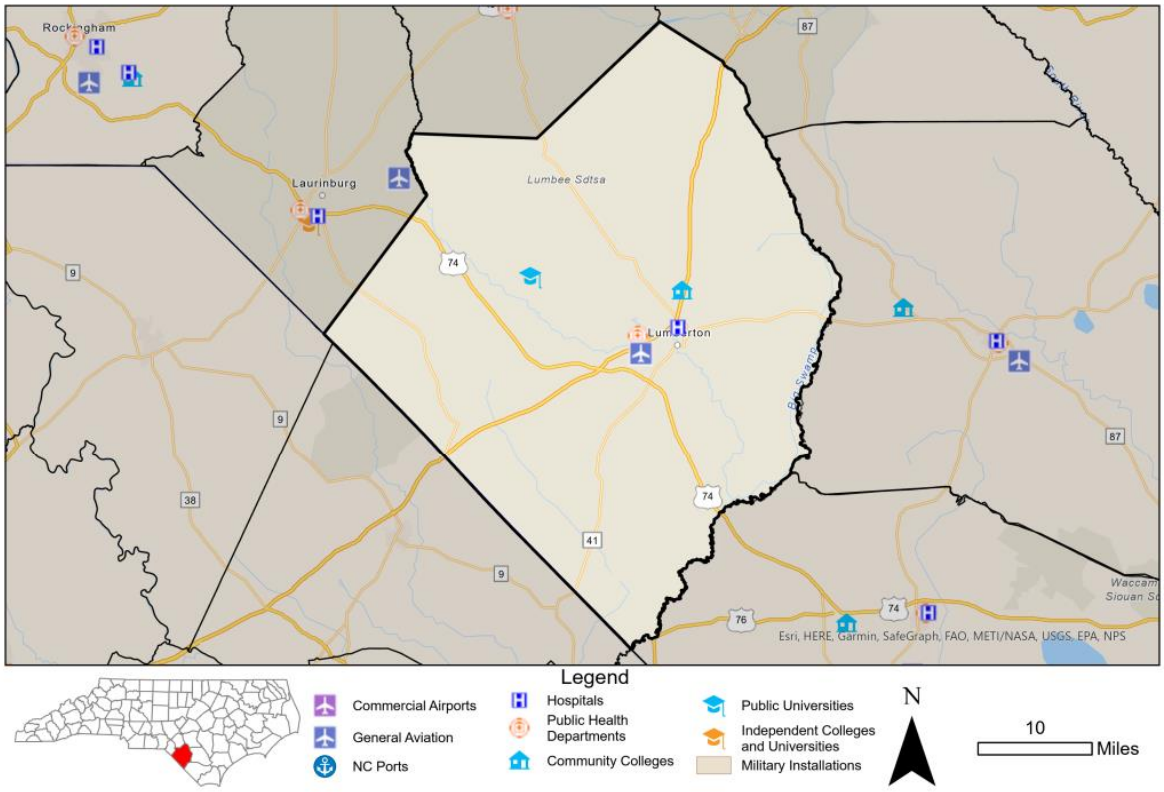
Setting

The study took place in Robeson County, North Carolina. This county has a population of about 116,328 according to the US Census 2021, and the county is in the southeastern part of the state with coordinates of Latitude: 34° 38' 24.00" N and Longitude: -79° 06' 36.00" W (North Carolina Department of Commerce, 2022). A map of Robeson County is shown in Figure 2 below. The demographics of Robeson County are as follows in Table 1 below:

Table 1: Demographics of Robeson County, N.C. (North Carolina Department of Commerce, 2022)

Race	Hispanic/ Latino	Black/African American	American Indian	White/Caucasian	Asian/ Pacific Islander
Percent	9.2%	23.6%	42.3%	24.7%	0.2%

Figure 2: Map of Robeson County, N.C. (North Carolina Department of Commerce, 2022)



Participants

Participants were recruited via email and phone calls (see Appendix A). This is a sample of convenience since the participants had to currently be supporting the care of wildlife in Robeson County. After the nine individuals, of which four were rehabbers from one facility and five were vets from two different vet clinics, were selected and agreed to participate, they signed informed consent (see Appendix B). The participants ranged in age from 33 to 67 and had an average of 16 years of experience (Table 2). Participants chose pseudonyms for their names and facility locations (Allen & Wiles, 2016).

Table 2: Participant Demographics

Role and Name	Gender	Race	Profession	Age	Education	Wildlife Care Experience	Facility Name
Rehabber Moonshine	Female	Caucasian	Veterinary Assistant	35	High School	3 years	Sweet Haven Rehab
Rehabber Snakeman	Male	Caucasian	Disability	56	MS Herpetology	2 years	Sweet Haven Rehab
Rehabber Millie	Female	Caucasian	Piano Teacher/ Stay at Home Mom	39	Masters in Communication Disorders	5 years	Sweet Haven Rehab
Rehabber Sunshine	Female	Caucasian	Business owner	59	Masters in Orthotics and Prosthetics	30 years	Sweet Haven Rehab
Vet. Tech. Taylor	Male	Native American	Registered Veterinary Technician	46	Associate in Veterinary Medical Technology	28 years	Animal Clinic
Vet. Tech. Snow White	Female	Caucasian /Native American	Veterinary Technician	67	Associate in Veterinary Medical Technology	30 years	Animal Clinic
Veterinarian Dr. Simone	Female	Black	Veterinarian	33	Doctor of Veterinary Medicine	3 years	Animal Clinic

Veterinarian Dr. Volleyball	Male	Caucasian	Veterinarian	58	Doctor of Veterinary Medicine	30 years	Vet Hospital
Vet. Tech. Coovana	Female	Caucasian	Lead Registered Veterinary Technician	56	Associate in Veterinary Medical Technology	13.5 years	Vet Hospital

Data Collection

This is a qualitative research study using participatory action research methodologies. I conducted nine in-person open-ended interviews using a protocol (see Appendix C). Some of the interview questions used to help guide my interview were from a study conducted by Perry & Averka (2020) (see Appendix C). The participants were asked to offer a schedule that was convenient for them for the interviews and the human-animal observations. I gave the participants the consent forms (see Appendix B) to review and complete before the interviews started. I showed participants the OHAIRE scale for the animal observations before the observations occurred. I asked the participants what was most convenient for them regarding the observations. I took photographs of the wildlife rehabbers only as they treated and cared for the wildlife. No photographs were taken at the vet clinics due to patient confidentiality. All photographs were member-checked and any photographs that were deemed insensitive or harmful to the animals or rehabbers were removed. I had a researcher's notebook to record information during my study. This methodology was chosen to reduce stress and to be sensitive to the busy schedules of the participants in the study.

The veterinary professionals requested that I interview them on the days they were working. I completed the veterinary professionals' interviews and observations on one day because they were all working in the animal clinic that same day. The veterinary professionals at the Animal Clinic stated that the wildlife they received were deer, owls, squirrels, opossums, and

birds (see Table 3). When the Animal Clinic received a wild animal, they collected information, stabilized the animal to the best of their ability, and called the rehabbers to pick the animal up. I observed these individuals for four hours. The veterinary professionals at the second location called Vet Hospital stated that the office treats 12 to 15 wildlife a year. The wildlife they usually see in their office were squirrels, birds of prey, opossums, otter, and raccoons (see Table 3). When the Vet Hospital receives wildlife, they see them in the mornings before their 9 am appointments. The veterinary professionals stated they don't turn down any animal. I observed these individuals for 2.5 hours.

I met the rehabbers in a public location of their choice. After my interviews with the rehabbers, we set days and times for the human-animal observations. Since the rehabbers don't have a physical establishment for wildlife rehab and sanctuary care they do this from designated areas (garage or separate building) in their homes. I met with Moonshine on April 21, 2022, at 5:50 pm for the observations. Moonshine was rehabbing squirrels, opossums, cottontails, and a flying squirrel. I watched how she fed and held the animals. She demonstrated how she transferred the animals from cages, the food the animals ate, and the materials she used to care for the animals. I observed Moonshine for about 2 hours. After observing Moonshine, I met with Snakeman later that same night at 8:10 pm to conduct his observation. When I arrived, Snakeman was on his way to release a mother opossum and her babies and asked if I would like to come and I accepted. Snakeman said a woman from his neighborhood called saying there was a mother opossum and babies stuck on her fence and she did not want them to get hurt. Snakeman said he picked up the mother and 9 babies and after an evaluation, they were healthy and ready to be released. Snakeman released the opossum family in the woman's backyard per her request. The woman wanted the animals to be safe. While releasing the opossums Snakeman

got called to pick up a baby bird from another residence. Snakeman introduced us and had the individual complete an intake form. After everything was completed, we left with the bird. When we arrived back at Snakeman's residence, he showed me the animals he was currently caring for in his garage which included squirrels, opossums, and cottontails. He demonstrated how he held the animals, told me the background of the animals, how he transfers the animals from cages, how he reads animal behavior, and the materials used to euthanize an animal. I observed Snakeman for 2 hours. I met with Millie and Sunshine on April 22, 2022, at 2:50 pm for observations. Millie was caring for a flying squirrel, owls, a redtail hawk, and domestic rabbits found in the wild. Sunshine came to Millie's residence to help her care for the wildlife. I watched how they fed and held the animals. They demonstrated how to remove an owl from the cage and administer medications. Millie demonstrated how she cut up deceased chicks and fed them to the owlets. Millie transferred the care of the cottontails to Sunshine so she could release them. I also watched Sunshine and Millie receive ducklings that a transporter brought to them from a member of the public. I observed Millie and Sunshine for about 3 hours.

The interviews, photographs, and researcher's notes were transcribed and analyzed using the qualitative software program MAXQDA 2022 (VERBI Software, 2021) to search for themes and codes (Creswell, 2011) (see Appendix E). The OHAIRE behavioral instrument (McCune, 2014) was modified (see Appendix D) and used to observe the human-animal interactions, which include verbal, facial, and physical interactions. Only a part of the OHAIRE instrument was used. Usually, the OHAIRE instrument is used in social settings such as with therapy animals to record all humans involved. In this study, it was used to record observations regarding the human's interaction with the animals in their care and the animals' reactions to them in return. I observed nine human-animal interactions with eleven species (see Table 3) at the two veterinary

hospitals and three home-based rehabilitation operations that were a part of one facility. Observation sessions ranged from 2 to 4 hours as the researcher shadowed them during the day or in the evenings when animals were designated for care. The checklist of behaviors was marked every minute and percentages were calculated for the behaviors that were observed during the time.

Table 3: Species Observed during Human-Animal Interactions

Birds	Mammals
Red-Tailed Hawk (*Buteo jamaicensis*)	Virginia Opossum (*Didelphis virginiana*)
Barred Owl (*Strix varia*)	Eastern Cottontail (*Sylvilagus floridanus*)
Unknown Ducks	Southern Flying Squirrel (*Glaucomys volans*)
Unknown Songbirds	Gray Squirrel (*Sciurus carolinensis*)
	Rabbits found in the wild
	Canines (*Canis lupus familiaris*)
	Felines (*Felis catus*)
	Raccoon (*Procyon lotor*) *Not observed

Data Analysis

The researcher's notes, photographs, and interviews were coded for themes using MAXQDA 2022 (VERBI Software, 2021). A parent code was given to each interview question using keywords from the question to make it easier to distinguish from the subcodes. After designating the parent codes, subcodes were given using words seen repeatedly in the interview responses. After completing the coding for the interviews, I assigned codes to all the researcher's notes and interview responses. The photographs were coded using MAXQDA and the same subcodes

established in the interviews. If a new theme or subcode arose, it was added to the key words. However, no new subcodes became apparent during the coding. The photographs were compared to the researcher's notes and used as supportive evidence for the rehabbers' human-animal interactions. I took all the photographs myself using my cellphone so they could be uploaded to my computer. After the photographs were uploaded and the captions attached, I sent them to the rehabbers to make sure the information in the captions was correct. If the rehabbers requested the photographs to be removed, I deleted them from the data. There was a total of 36 codes (18 parent codes and 18 subcodes) assigned using MAXQDA. After completing the analysis, I ended up with 1,429 coded segments from 83 documents that were in three document groups (researcher notes, photographs, and interviews). I used 45 photographs out of a total of 62 photographs. I used a two-case model analysis in MAXQDA to compare the codes from the two cases, rehabbers and vet professionals. The analysis recorded the similarities and differences between the two cases. Cases were constructed based on the analysis. Results were reported using a case study design where a case for each of the two types of stakeholders (veterinary professionals and rehabbers) was constructed and then compared to each other to gain insight into supports for or hindrances to wildlife rehabilitation and sanctuary care in Robeson County, NC. The data sources and analysis can be seen below in Table 4.

Table 4: Data Sources and Analysis

Data Source	**Qualitative/ Quantitative**	**Research Questions**	**How Collected?**	**Analysis**
Interviews	Qualitative	What are the thoughts and experiences of veterinarians, and wildlife rehabilitation specialists about caring for wildlife? What reasons do veterinarians, and wildlife rehabilitation specialists give as evidence for the support of or hindrances to wildlife rehabilitation and	Open-ended interviews	MAXQDA coding

		sanctuary care in Robeson County?		
Behavior Observations Modified OHAIRE instrument	Quantitative - Categorical	What types of human-animal interactions can be observed by these individuals?	Two to four hours in length	Percentages
Research Journal and photographs of wildlife care	Qualitative	What are the thoughts and experiences of veterinarians and wildlife rehabilitation specialists about caring for wildlife? What reasons do veterinarians, and wildlife rehabilitation specialists give as evidence for the support of or hindrances to wildlife rehabilitation and sanctuary care in Robeson County? What types of human-animal interactions can be observed by these individuals?	Regular basis during research	MAXQDA coding

Summary

This study was completed to determine the hindrances to or support of wildlife rehabilitation and sanctuary care in Robeson County, N.C. The interviews revealed the experiences of wildlife caregivers in community-based rehabilitation and sanctuary care and veterinary services. The modified OHAIRE observation tool and photographs measured human behavior when interacting with animals. The results from the interview questions and OHAIRE observation tool allowed for an understanding of wildlife care and its effects on human-animal coexistence. Through interviews, researcher's notes, observations, and photographs (only rehabbers) of nine caregivers from two groups (rehabbers and vets), case study methodologies were used. Two cases were created, one for each group, and then the two cases were compared to each other.

Chapter 4: Results

This study investigated the encounters of wildlife caregivers called rehabbers and veterinary professionals (veterinarians and veterinary technicians) to obtain insight into wildlife care and its impacts on human–wildlife interactions in Robeson County, North Carolina. From the evidence two cases were created and then compared to each other.

Case One: Veterinary Professionals

The first research question was what are the thoughts and experiences of veterinary professionals about wildlife care in Robeson County? Based on the answers to the interview questions, the veterinary professionals indicated that they felt a closer bond with the animals they treated regularly for their clients which were domestic animals such as dogs and cats. The vet professionals believed this was because they did not treat wildlife as often as non-wildlife or pets. Working in veterinary services showed vet professionals the importance of animals and that their lives are precious. Treating wildlife in their vet clinics and hospitals gave them new experiences which made them value being a part of helping and releasing wildlife. For example, Dr. Simone stated, “If you are persistent things will generally work out.” Dr. Volleyball stated, “Working with wildlife has made me more aware of wildlife through seeing, hands-on, and observing.” The vet professionals got involved with wildlife care through their careers in medicine and their personal lives. The vet professionals indicated that they felt more comfortable treating wildlife with the help of the rehabbers. The vets appreciated how each animal was unique and mentioned how rewarding it was to hear that the wildlife was able to be released. Dr. Volleyball shared a particularly meaningful experience about an otter named Olive. She was an adult otter that was hit by a car and brought in by the wildlife rehabbers. She had some broken teeth that were pulled before releasing her to the wildlife rehabbers. Unfortunately, she wasn’t releasable, so she was sent to a sanctuary

in North Carolina. Taylor shared a particularly meaningful experience about a fawn that had a broken leg that he took home, bottle-fed, and gave fluids but unfortunately it did not survive. Taylor stated, “That it’s hard and you can’t save them all, but you still try your best to do so.” A surprising statement Snow White made was “humans are horrible. Humans don’t care about wildlife. This work showed the importance of the creatures in our world.” It was clear from the interviews that the vets cared deeply for their clients and for the wildlife they treated in their clinics.

To answer the second research question regarding what types of human-animal interactions were observed during care, the results showed that the veterinary professionals spoke softly, made kissing sounds, and spoke baby-like to the animals to try and calm them down (researcher’s notes). They avoided sudden movements and touched the animals in a non-threatening manner (researcher’s notes). However, sometimes the vets talked in a normal calm tone of voice. When an animal was aggressive it was noted that they tried to keep their distance as a safety measure and joked to make light of the situation (researcher’s notes). Most of the animals at the veterinary clinics were happy as shown by the wagging of tails, licking the vets, wanting to be petted, or by an overall calm demeanor (researcher’s notes). Some animals were anxious, aggressive, leaving, or trying to isolate themselves. This was displayed by whining, hissing, growling, leaving, isolation, or swatting at the leash (researcher’s notes). During the veterinary professionals’ observations, I was not allowed to take photographs to support the evidence from the modified OHAIRE observation tool due to client confidentiality. Shown below in Table 5 are the results from the modified OHAIRE observation tool for the Vets.

Table 5: Vets and Animal Interactions		
Observations	**Vet Professionals**	**Animals**
Smile	17%	7%
Negative (Frown, Cry, Whine, Pain)	**	37%
None	81%	56%
Positive (VED)	34%	**
Negative (VED)	**	27%
None (VED)	64%	66%
Talk	80%	35%
Touch	89%	**
Affection	68%	**
Aggression	**	11%
Anxiety	**	56%
Leaving	**	40%
Other (e.g. Biting, Scratching, Whining, Hitting, Teasing, Shouting)	**	45%

* Verbal Emotional Display (VED); ** No results.

The third research question asked what reasons did the veterinary professionals offer as evidence for the support of or hindrance to wildlife rehabilitation and sanctuary care in Robeson County, N.C. The results showed that the vets felt if wildlife needed help, then do so but if not leave them alone. For example, Snow White stated “we’re all on this earth together. It’s just not our world it is theirs too. Coexistence. Safety, health, and foreword living (extending their life) of the animal. The hindrances are humankind because there is no room for animals to live.” Coovana stated “I think it’s very important for them to be saved and released to their natural habitat. They support the ecosystem. The main goal is to release them into the wild to join siblings and species. The hindrances would be animals become attached and become not

releasable." Dr. Volleyball stated "The main goal is to get the animals introduced back to the wild healthier than before. They're not meant to be in captivity. The hindrances would be, are we intervening with natural selection? Wildlife rehab is important because we need to help animals big or small. There are times that wildlife needs us. We also have to ask ourselves do they actually need us? Humans encroach on wildlife's territory and what we can do is take care of them better. This is opening doors to see different species. We need more vets to do this work. We also must ask ourselves should we be doing this? Doing too much, are we doing any good, but humans are the reason wildlife needs our help. Wildlife rehab is not a hobby because it is dear to you and meaningful. Society must care. It's not about money. You have to support what you love in life." In summary, the vets said that they believed that wildlife is important and that this is their home too. They are dedicated to doing what they can to help them.

Summary

It is evident from the interviews, observations, and researcher's notes that veterinary professionals overall cared deeply about all the animals in their care. They were eager and careful to give each animal the best care possible. However, when caring for wildlife there were differences in the degree of care, they believed was necessary. While they agreed that humans had interfered with the habitat of the wildlife, causing some of these problems, they were unsure about what could be done or how much should be done. Even though the veterinary professionals assisted the wildlife rehabbers, they were unsure exactly how the rehabbers cared for the wildlife. Their overall response was that more veterinary professionals are needed to address this challenge. This is interesting since the veterinary professionals did not ask what more they could do nor did not indicate that they planned to become more involved in the future, but they did

express concern for wildlife in general and that more could be done to support the efforts of the rehabbers.

Case Two: Rehabbers

The rehabbers stated that they treated wildlife daily. Rehabbers treated 100-200 wildlife per year individually and collectively (all four rehabbers) about 1,000 animals per year. Since the rehabbers don't have a physical establishment for wildlife rehabilitation and sanctuary care they do this from designated areas (garage or separate building) of their homes (researcher's notes). The wildlife they indicated that they received were squirrels, possums, cottontails, otters, flying squirrels, mice, owls, hawks, vultures, songbirds, waterfowl, turtles, and snakes. There are occasions when the rehabbers received domestic (ducks and rabbits) and exotic (reptiles) animals that were left in the wild (researcher's notes). When the rehabbers received a wild animal, they completed an intake form, assessed the animal, took the animal to the veterinarian if needed, provided treatment as needed, and settled the animal as quickly as possible to decrease stress (researcher's notes). Rehabbers isolated the animals when needed but tried to put them together, if possible, especially if they had babies. Rehabbers provided daily feeding, cage cleaning, and medical care as needed. Rehabbers monitored for improvements and signs of being ready for release. If injuries were too severe then euthanasia was required. Euthanasia may also be required if the patient fails to make improvements. If the rehabbers did not have the proper caging for an animal, they transferred the animal to a rehab facility that specialized in that species' care and release (researcher's notes).

The first research question was what are the thoughts and experiences of wildlife rehabilitators with wildlife rehabilitation and sanctuary care in Robeson County? The results showed that like the veterinary professionals, they had a close bond with the wildlife for which

they provided daily care. The rehabbers became involved in wildlife rehabilitation and care since childhood except for Snakeman. Snakeman stated “I realized there are many more people who care about wildlife than I previously thought. It has taught me many different diets and care needs for wild animals. I have gone away with a much better respect for animal care.” The rehabbers all agreed that wildlife rehab was time-consuming and difficult on you both physically and emotionally but truly worth it, especially upon release back into the wild. They believed that it was a calling. The rehabbers mentioned exotic domestic animals that were dumped in the wild. Millie shared a particularly meaningful experience with an otter named Olive. “I rehabbed a North American River Otter named Olive. As an adult coming into rehab, she should have been very aggressive towards me, but she kept her distance and curiously watched me clean her cage and put food out. She eventually would come to sit by me for several minutes at a time. She would also come to the door for food.” Millie also stated “The birds of prey are my favorite along with otters and flying squirrels. I love their personalities.” Another rehabber Moonshine stated opossums were her favorite animal to rehab because of their unique personalities and amazing abilities. Sunshine shared a particularly meaningful experience about a squirrel she and her husband (licensed as well) rehabbed. Sunshine stated “We caught an adult squirrel that had been shot with an arrow. The Vet had him put under anesthesia and removed the arrow, treated him with antibiotics, kept him in rehab 2 weeks, and finally returned him to his original home.” Sunshine also stated “I generally feel sad for the animals because so often, their interaction with a human can cause them harm. There are exceptions of course, as humans can also find and save wildlife. I feel that my commitment to wildlife care helps me care for the other animals we have in our care. I understand the needs of animals overall.”

To answer the second research question regarding what types of human-animal interactions were observed during care, the results showed that the rehabbers displayed a positive demeanor such as smiling and laughing. The rehabbers spoke softly, baby-like, and made kissing sounds to the animals to try and calm them down (researcher's notes, observations, photographs). They did not make sudden movements and touched the animals in a non-threatening manner. For baby animals, the rehabbers were even more gentle towards them, touching them more often than the adults. For the baby animals, some didn't mind being cuddled even though they were startled at first. Other baby animals were scarred, aggressive, leaving, or trying to isolate themselves (researcher's notes and observations). This was displayed by chirping, showing teeth, stomping, making sounds, leaving, or isolation. To support the evidence from the modified OHAIRE observation tool, photographs were taken during the rehabber observations. The photographs showed animals in rehabilitation, enclosures, documentation, rehabbers performing medical procedures, feeding, and tools used to aid rehabbers in wildlife rehabilitation. There are a total of 47 photographs that can be viewed in Appendix F. Shown below in Table 6 are the rehabbers' results from the modified OHAIRE observation tool.

Table 6: Rehabbers and Wildlife Interactions

Observations	Rehabbers	Wildlife
Smile	37%	**
Laugh	3%	**
Negative (Frown, Cry, Whine, Pain)	**	28%
None	59%	71%
Positive (VED)	91 %	**
Negative (VED)	**	24%
None (VED)	9%	76%

Talk	96%	17%
Touch	86%	**
Affection	61%	**
Aggression	**	23%
Anxiety	**	57%
Isolation	**	49%
Leaving	**	61%
Other (e.g. Biting, Scratching, Whining, Hitting, Teasing, Shouting)	**	6%

* Verbal Emotional Display (VED); ** no results.

Lastly, the third research question asked what reasons did wildlife rehabbers offer as evidence for the support of or hindrance to wildlife rehabilitation and sanctuary care in Robeson County. For the rehabbers, the results showed that the main goal of rehabilitation was to help animals that are orphaned or injured reach maturity and/or become healthy enough to be returned to their homes. Rehabbers tried to provide excellent care for the animals and provided relief to animals' suffering using euthanasia when needed. Wildlife rehabilitators provide medical services to animals that do not belong to anyone and otherwise would not receive medical care when needed and therefore suffer needlessly. Without rehabilitation services, orphaned animals would have little chance of survival. Rehabbers viewed public involvement and education as important aspects of wildlife rehabilitation. Rehabbers made efforts to educate the community on native wildlife in hopes to encourage and promote peaceful living between humans and wildlife. Rehabbers mentioned that it was important to teach the public about wild animals. For instance, Sunshine stated, "I personally try to show children how necessary wild animals are to humans and to show people the beauty of each species and how those species interact with humans and other animals." Moonshine stated, "I've reached out to area vets and given my info. The impact

people have on the environment where wildlife lives is the leading cause of intake and the need to lessen the number of deaths due to cars, tree cutting, and other human activities. Momentarily it can be very difficult to balance what's needed and everything that can affordably be done. Financially I work a 40+ hour a week job to support the wildlife."

Snakeman stated, "Animal rehabilitation is important to help maintain a healthy balance in the planet. Habitat loss and other problems caused by humans has brought about the need for animal rehab." Millie stated, "Wildlife rehabilitation is a means of conservation and helps keep species from being endangered, threatened, or extinct. Human-wildlife interactions should remain limited unless the animal is in need of medical care. They can become habituated and too familiar with humans, especially when they are fed by humans. However, their wild instincts are still very present, and humans are at risk for getting hurt even when animals are habituated." Location is important for the rehabbers for release purposes to keep animals in the same general location and to track possible disease fluctuation. Hindrances that all rehabbers mentioned were inadequate funding, physical establishment, public thinking, such as the public wanting to keep wildlife as a pet, and not enough personnel. Expenses included cages, medication, blankets, towels, gloves, food, and cleaning supplies. The rehabbers worked as volunteers and must solicit donations or used their income (researcher's notes). The rehabbers wanted and needed a center to house wildlife with native vegetation, conduct training, and for the public to visit. They worked together as a team with any wild animal (license providing) or they transported them to a facility that could treat them. The rehabbers did not turn any animals away (researchers notes). By working as a group, the rehabbers indicated that they were able to cover a greater area. The rehabbers believed that they had excellent communication between their network of transporters, volunteers, rehabbers, and other professionals (researcher's notes). Working as a team helped the

rehabbers support each other with information and when needed second opinions regarding care (researcher's notes). Overall, the rehabbers displayed a passion for and knowledge about wildlife to provide the best care possible despite their limited resources and funding.

Summary of Case 2

From the interviews, researcher's notes, photographs, and observations, it is obvious that the rehabbers strived to provide the best services to all the animals they encountered that required help. They were enthusiastic, determined, and adamant about providing each animal excellent care and support along with also providing public education. The rehabbers worked extremely well as a team and were resourceful. They assisted any wild animal in need of care, or they transported the wildlife to a facility that could treat them. However, when caring for wildlife some challenges made it difficult. Rehabbers lacked adequate funding, a physical establishment, personnel, and public involvement. Rehabbers hoped that through their work, they could motivate the public to protect native wildlife and promote peaceful living between humans and wildlife.

Comparison of Case 1 to Case 2

In my study, several themes were consistent between the vets and the rehabbers. Both groups recognized the importance of protecting wildlife and treating them with care and respect. Both groups expressed sadness when an animal had to be euthanized and excitement when the animals were able to be released back into the wild. The veterinary professionals and the rehabbers loved animals and were skilled at caring for them in a kind and compassionate matter. Both groups stated that it was their life purpose to care for animals and that it was upsetting to them to observe the pain and suffering that humans inflicted upon them. However, the differences came

when discussing the value of the life of wildlife and the importance of public education and support. It is noted that veterinary professionals have a different purpose than wildlife rehabbers. Veterinary professionals aided in providing the medical care that rehabbers are not able to provide such as surgery, diagnostics, and medication. Wildlife rehabbers provided the animals with medical aid, tools needed to survive in the wild, habitat protection, public education, animal intake, and release. Wildlife rehabbers funded their services through donations or personal funds, while the vets were paid for their services. However, the vets donated their expertise to care for wildlife just like the rehabbers. Both groups believed that the services provided by the rehabbers were important and meaningful. However, the vets indicated that they lacked the expertise and the time to take care of wildlife. The vets believed that more could be or should be done. The rehabbers indicated that they could use more support as well. One way the rehabbers approached their challenges was to work together as a team to provide the best care possible.

Overall Summary

Participants expressed how important wildlife is and that human interactions should be limited unless the animal needs medical care. Participants expressed sadness when animals passed or had to be euthanized but they viewed it as a relief from suffering. Participants emphasized the importance of support and collaboration between vets, rehabbers, and the public. Lastly, these two groups expressed the importance of educating the public about wildlife and how humans can be more of a positive impact on the biological world.

Chapter 5: Conclusion

My study investigated the encounters of veterinary professionals (veterinarians and veterinary technicians) and wildlife caregivers called rehabbers to achieve an understanding of wildlife care and its impacts on human-wildlife connections in Robeson County in North Carolina. Through interviews, researcher's notes, observations, and photographs (only rehabbers) of nine caregivers from two groups (rehabbers and vets), case study methodologies were used to analyze the results.

Research Questions

My first research question was what are the thoughts and experiences of veterinary professionals about wildlife care in Robeson County? The veterinary professionals stated they felt a closer bond with the domestic animals they treated regularly because they did not treat wildlife regularly. Vet professionals have learned the value of aiding and releasing the wildlife back into the wild from their experiences treating wildlife. The veterinary professionals revealed that they felt more comfortable treating wildlife with the assistance of the rehabbers. They appreciated each animal's uniqueness and how rewarding it was when wildlife was able to be released. It was apparent from the interviews that the veterinary professionals cared deeply for their clients and for the wildlife they treated in their clinics. My second research question was what types of human-animal interactions were observed during care? The findings revealed that the veterinary professionals made kissing sounds, spoke softly, and spoke baby-like to the animals to calm them down (researcher's notes). Veterinary professionals handled the animals in a non-threatening manner and avoided sudden movements (researcher's notes). However, at times the veterinary professionals spoke in a relaxed tone of voice. When an animal was aggressive, they tried to keep their distance as a safety measure and joked to make light of the situation (researcher's notes). Most of the animals at the veterinary clinics were happy and were

displayed by licking the vets, wanting to be petted, wagging of tails, or having an overall calm demeanor (researcher's notes). For my third research question, what reasons do veterinary professionals give as evidence for the support of or hindrance to wildlife rehabilitation and sanctuary care in Robeson County, NC? The findings revealed that the veterinary professionals felt that when wildlife need help, then do so but if not, they leave them alone. Veterinary professionals believed that wildlife is valuable, and they are willing to do what they can to help them because we should coexist with one another. Based on the results of the observations, interviews, and researcher's notes the veterinary professionals overall cared greatly about all the animals in their care. They were careful and willing to give each animal the best care possible. Yet, when caring for wildlife there were differences in the degree of care that they believed was necessary. While they agreed that humans interfered with the habitat of the wildlife, causing some of these issues, they were unsure about how much should or what could be done. Although the veterinary professionals aided the wildlife rehabbers, they did not know how the rehabbers cared for the wildlife. They responded that more veterinary professionals are needed to address this situation. I found this interesting because they did not ask what more they could do nor that they planned to become more involved in the future. However, they did express concern for wildlife and agreed that more can be done to support the rehabbers.

For the rehabbers, the first research question was what are the thoughts and experiences of wildlife rehabilitators with wildlife rehabilitation and sanctuary care in Robeson County? The findings showed that like the veterinary professionals, they had a close bond with the wildlife they cared for daily. The rehabbers were involved in wildlife rehabilitation and care since childhood except for Snakeman. The rehabbers stated wildlife rehab was time-consuming and hard emotionally and physically but worth it, especially upon release day. The rehabbers

believed that wildlife rehabilitation and care were a calling. The second research question was what types of human-animal interactions were observed during care? The findings revealed that the rehabbers presented a positive demeanor such as laughing and smiling. Like the veterinary professionals, the rehabbers spoke baby-like, softly, and made kissing sounds to try and soothe the animals (observations, photographs, and researcher's notes). The rehabbers touched the animals in a non-threatening manner and did not make abrupt movements. For baby animals, the rehabbers were even more gentle and touched them more often than the adults. For the baby animals, some didn't mind being cuddled even if they were startled at first. Other baby animals were aggressive, leaving, scarred, or trying to isolate themselves (observations and researcher's notes). My third research question asked what reasons do wildlife rehabbers give as evidence for the support of or hindrance to wildlife rehabilitation and sanctuary care in Robeson County, NC. The findings revealed that the main goal of rehabilitation was to aid injured or orphaned animals to reach maturity and/or become healthy enough to be released back to their habitat. The rehabbers also revealed that exotic domestic animals were dumped in the wild and therefore came into their care too. In this case, the animal is not released into the wild again and the rehabbers find these animals another home. Rehabbers tried to provide excellent care for the animals and alleviate animals' suffering utilizing euthanasia when needed. Wildlife rehabilitators provided medical services to animals who are owned by no one and otherwise do not receive medical care when needed and thus suffer needlessly. Without wildlife rehabilitation, orphaned animals would have little to no chance of survival. Rehabbers considered public education and involvement as vital aspects of wildlife rehabilitation. Rehabbers made efforts to educate the community on native wildlife in hopes to encourage and advocate for coexistence between wildlife and humans. For the rehabbers, location is important for release purposes, so animals are

in the same general location, and this is used to also track potential disease fluctuations in an area. The rehabbers noted that hindrances to their work in Robeson County were the lack of a physical establishment, funding, personnel, and the public's overall lack of wildlife knowledge. The rehabbers needed and wanted a facility to house wildlife with native vegetation, for public visits, and as a place to offer training.

The rehabbers are responsible for food, blankets, towels, gloves, cages, cleaning supplies, and medication for the wildlife for which they care. The rehabbers are volunteers and must solicit donations or use personal income (researcher's notes). Despite these barriers, they all work together with any wild animal (license-providing) or transported them to a facility that can treat them. The rehabbers do not turn away any animals (researchers notes). The rehabbers work as a group to cover a larger area and had great communication between themselves and their network of resources (researcher's notes). The rehabbers demonstrated passion for and knowledge about wildlife to provide the best care despite limited funding and resources. Based on the results of the observations, interviews, photographs, and researcher's notes it was obvious the rehabbers were determined, passionate, and adamant about providing each animal excellent support and care along with at the same time educating the public and others such as the vets. Rehabbers hoped that through their work, they are encouraging the public to protect wildlife and promote peaceful living between wildlife and people.

Comparison of Veterinary Professionals to Rehabbers

Each group acknowledged the significance of protecting wildlife and treating them with care and respect. Both groups expressed happiness when the animals were able to be released back into the wild and sadness when an animal had to be euthanized. The rehabbers and veterinary professionals loved animals and were skilled at caring for them compassionately and

thoughtfully. Each group viewed caring for animals as their life purpose, and it was distressing for them to witness the pain and suffering inflicted upon animals by humans. Nevertheless, differences of opinion arose when discussing the importance of the life of wildlife and public education and support. It was observed that veterinary professionals had different objectives than wildlife rehabbers. Veterinary professionals facilitated in offering the medical care that rehabbers are not able to provide such as diagnostics, medication, and surgery. Wildlife rehabbers provided the animals with intake, medical aid, tools needed to survive in the wild, release, habitat protection, and public education. Wildlife rehabbers funded their services through donations and/or personal income, while the veterinary professionals were paid by clients for their services. However, the veterinary professionals still donated their expertise to care for wildlife just like the rehabbers. The groups believed that the services supplied by the wildlife rehabbers were meaningful and crucial. However, the veterinary professionals revealed that they lacked the time and expertise to take care of wildlife. The veterinary professionals stated that more could and should be done. The rehabbers mentioned they would appreciate more support as well. Table 7 below compares the verbal emotional display (VED) between veterinary professionals and rehabbers. The verbal emotional display can be represented as positive, negative, or none. Verbal emotional display refers to the type of speech of the participants (Guérin et al., 2018). Results are represented by a percentage and no results are represented with two asterisks (**). From the data, you can see that the animals and the rehabbers were overall more positive toward the wildlife. I can support this assumption by using photographs (only rehabbers). Examples of verbal emotional display (VED) between the rehabbers and animals can be found in Appendix F in photos 1, 3-8, 10-11, 13, 16-18, 23, 25, 27, 30, 36, and 45-47. Photographs of the rehabbers were limited due to maintaining anonymity.

Table 7: VED Comparison of Vet Professionals and Rehabbers		
Observations	**Vet Professionals**	**Rehabbers**
Positive (VED)	34%	91 %
Negative (VED)	**	**
None (VED)	64%	9%

* Verbal Emotional Display (VED); ** No results.

Perhaps because the vets knew their animals and saw them regularly, they were more neutral towards them. Maybe the rehabbers were more enthusiastic about treating wildlife than the vets were about to treat the animals they saw in their offices. Whatever the reason, it is clear that for the vets and the rehabbers, the wildlife caused them to react more positively.

Implications

The participants in this study supported wildlife rehabilitation and sanctuary care in Robeson County, NC. Even though all the participants were not experts in conservation, climate change, biodiversity, human-animal interactions, or ecology they showed an understanding of the importance of the human-to-nature balance. For example, wildlife rehabber Moonshine said, "The impact people have on the environment where wildlife lives is the leading cause of intake and the need to lessen the number of deaths due to cars, tree cutting, and other human activities." Moonshine's statement paves the way for the first important reason for wildlife rehabilitation and that is human-animal conflicts. According to Long et al. (2020), with the United States becoming more industrial and urban, wildlife is negatively impacted by increased human interaction and habitat loss. With climate change, it is anticipated that there will be an increase in catastrophic natural disasters. Natural disasters such as hurricanes, tornados, forest fires, or oil spills also raised awareness of the need for saving and rehabilitating wildlife because animals

need assistance just like humans (NASA, 2022). Another statement made by rehabber Snakeman was, “Animal rehabilitation is important to help maintain a healthy balance in the planet. Habitat loss and other problems caused by humans have brought about the need for animal rehab.”

Another important reason for wildlife rehabilitation is the protection of biodiversity. To support this reason, rehabber Millie stated, “Wildlife rehabilitation is a means of conservation and helps keep species from being endangered, threatened, or extinct.” According to the global Living Planet Report of 2020, the Living Planet Index (LPI) reveals a 68% decline in vertebrate species populations from 1970 to 2016. This information comes from the data of 4,392 species of 20,811 populations (Almond et al., 2020). Another statement providing support comes from vet professional Coovana who stated “I think it’s very important for them to be saved and released to their natural habitat. They support the ecosystem.” Researchers Molina-López et al. (2017) state it is crucial to protect biodiversity in which wildlife rehabilitation, sanctuary care, and zoos can aid in the achievement of this goal. Wildlife rescue and rehabilitation alongside research can serve as a tool for habitat preservation by acting as a measurement of environmental health (Dubois, 2003). To support the findings by Dubois (2003), rehabber Moonshine stated in her interview “It is important to know the location an animal was found for release purposes to keep animal in same general location and to track possible disease fluctuation.” So, wildlife rehabilitation not only affects individual survival but also supports the conservation and health of animal populations. Coexisting with wildlife is not just tolerating one another, it is instead living together in harmony with each other through caring, patience, love, and respect just like human relationships. A supportive statement comes from vet professional Snow White who stated “We’re all on this earth together. It’s just not our world it is theirs too. Coexistence. Safety, health, and foreword living (extending their life) of the animal.” Researchers Perry and Averka

(2020), expressed in their article that wildlife rehabilitation and sanctuary care can provide an understanding of human–wildlife coexistence through public interaction and education. When people work with wildlife it forms a deeper understanding of the environment. Wildlife rehabilitation and sanctuary care can help people find purpose and fulfillment by helping animals return to the wild, sanctuary within a facility, or transition to a peaceful death (Perry & Averka, 2020). An example of this is a statement made by Snakeman, "I realized there are many more people who care about wildlife than I previously thought. It has taught me many different diets and care needs for wild animals. I have gone away with a much better respect for animal care." Dr. Simone stated, "The interaction made me value being able to release them." Lastly, Snow White said, "I appreciate how each are unique in their own way." By interacting with and helping animals people recognize that they are not that much different from animals through these deep connections. Therefore, coexistence with wildlife is vital to preserving the environment for all life on earth and future generations.

Some recommendations I would make for the rehabbers are:

- Promote your organization through the colleges/universities to solicit volunteers in exchange for work experience or research opportunities.
- Possibly establish a Community Volunteer Program or Work Release for inmates of Robeson County, NC to provide personnel for the wildlife rehabbers.
- Perform education and demonstrations with the local veterinary hospitals.
- Hold informational programs on wildlife rescue and rehabilitation within the community.
- Hold informational programs on wildlife rescue and rehabilitation during community events such as the Robeson County Agricultural Fair.
- Promote your services to local businesses.
- Ask for unused/expired medical supplies such as linens, medications, medical equipment, or disinfectant from local hospitals, nursing homes, and EMS services.
- Establish an account with local poultry plants to purchase meat at discounted prices.
- Look for funding to support their initiative.

Some recommendations I would make for the veterinary professionals to move forward are:

- Promote the wildlife rehabbers' services through your veterinary hospital and other networks.
- Set dates of when the rehabbers can come to your facility to hold educational workshops and demonstrations for you and the staff.
- Donate unused/expired medical supplies such as linens, medications, medical equipment, or disinfectant to the rehabbers.
- Encourage other veterinary professionals to provide care and assistance to wildlife and wildlife rehabbers.

Future Research

Observing the process of wildlife rehabilitation from intake to release and as care was provided is a future area of research. Some areas within care of wildlife include offering enrichment, variations in care practices of juveniles versus adults, releasable animals versus those requiring lifelong care, and ways to communicate with other facilities. Another area of research is how the rehabbers involve the community in rescue and release efforts. An example would be use of the local fire department to renest owlets or redtail hawks. Another area of research would be ways to involve the community in wildlife rehabilitation and care through various education programs perhaps with programs in existing organizations such as the university, senior care centers, schools, or other non-profit organizations in the community.

Reflection

I was anxious about doing this study in the beginning due to my lack of experience conducting research. This is my first-time doing research and it is an original topic of study. I did have to modify my research with the guidance of my committee members. The original OHAIRE observation tool needed to be modified to work with my study. Conducting interviews made me a little nervous and I did have a couple of setbacks, but I was able to get back on track. In addition, I had a huge learning curve in figuring out how to use MAXQDA to analyze my

results. With the help of a lot of video tutorials, Dr. Hagevik, and taking a few breathers I was able to learn the fundamentals. I learned so much from conducting my study. From how to write a thesis, conduct research, learn what it takes to have your research published, and how to persevere when life throws you challenges. Research takes time, a lot of patience, discipline, and passion. It also taught me that I want to spend the rest of my life doing what I am passionate about, helping animals.

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Appendix A: Recruitment Email or Phone Call

Good afternoon,

My name is Alexis Luevanos, and I am a Graduate student at UNCP. I am contacting you in the possibility you would participate in my research about taking care of wildlife and the wildlife-human interaction in Robeson County. I am conducting open-ended interviews and shadowing and observing individuals as they interact with wildlife. My goal is to better understand the human-wildlife connection and what is currently being done in Robeson County to care for wildlife. I would like to know your ideas about your experiences with animals and wildlife and what you think needs to be done or is currently being done to care for animals in the County. I would like to interview you at your workplace and observe you in your workplace as you care for animals. The open-ended interviews will take about one hour and I would like to visit you and shadow you while you take care of wildlife for approximately 20 minutes on three different occasions. Your participation is voluntary and confidential. You can withdraw from the study at any time as well. Your name nor the name of where you work will never be used and you will assign a pseudonym for both if you agree to participate in the research study. To verify my purpose, I will provide my Program Director's information below.

Rita Hagevik Ph.D.

Professor, Department of Biology

Director, Graduate Program in Science Education

2244 Oxendine Science Building

University of North Carolina – Pembroke OL Excellence

P.O. Box 1510

Pembroke, NC 28372-1510

Office 910-521-6652

Respectfully,

Alexis E. Luevanos

Appendix B: IRB Letter of Consent

University of North Carolina at Pembroke
Consent to Participate in a Research Study
Adult Participants
IRB Study Number:
UNCP IRB Contact Information: irb@uncp.edu 910-775-4512
Consent Form Version Date:
Title of Study: Caring for Wildlife: Rehabilitation and Sanctuary Care in Robeson County, NC
Principal Investigator Contact Information: Alexis Luevanos; ael014@bravemail.uncp.edu 910-316-9592

Message to Participants:
Thank you for considering participation in the caring for wildlife interview and observations. The interviews and observations will take place at your workplace. The open-ended and in-depth interview will take approximately 60 minutes to complete and all responses, your name, and location will be kept confidential. I would like to come and observe you caring for wildlife on three different occasions for approximately 20 minutes each as well. These will be informal visits in which I will have a checklist to use to make observations of ways in which you interact with the animals and how the animals interact with you as you care for them. The questions and observations will help me learn about your reasoning and thoughts behind wildlife rehabilitation and sanctuary care. I am happy to share with you the interview questions and the observation checklist ahead of time if you would like as well. Participants in this study must be 18 years of age. Participants must have experience and be currently working with wildlife and wildlife rehabilitation.

Participation
You must be 18 years or older to participate in this interview and the observations. There are no right or wrong answers. Participation is completely voluntary. You may withdraw your participation at any time for any reason, without penalty.

Confidentiality
Your information will not be shared at any time; results will only be reported in a cumulative form. Any names and emails used for contact purposes will be kept confidential. The interview will take place in person at your place of work. The interview session will be recorded and transcribed only for data analysis purposes by the principal investigator. You will be offered a copy of this transcript and will have one week to make any amendments you see fit before the data is analyzed. Nobody else will have access to this information and it will be destroyed after the study is complete. You will assign yourself and the place where you work a pseudonym to be used for the duration of the study and for any reporting of the results. Participants will be asked not to use pseudonyms that contain any part of their social media handles (e.g., Twitter, Instagram, etc.). You will be offered a copy of my thesis as well if you would like to review the results of the study too.

Benefits

There are no direct benefits to you as a participant in this research study; however, this research will contribute to the knowledge of the factors that influence wildlife rehabilitation and sanctuary care decisions and hopefully provoke further research in this area. This information along with further research could eventually be used to promote more community involvement in wildlife rehabilitation and sanctuary care.

Risks

There are no risks to the participants greater than what is experienced in everyday life. Risk is limited to breach of confidentiality. Steps will be taken to prevent this by using pseudonyms in the final analysis. Names and emails will not be connected to any results in the study and will only be used for contact purposes only; this information will be destroyed after all necessary contact is complete.

You may contact the principal investigator at any time with questions or concerns.
Thank you for your participation!

I have read the information provided above. I have asked all the questions I have at this time. I confirm I am 18 years or older. I voluntarily agree to participate in this research study interview and am aware it will be recorded for data analysis purposes only.

I consent to participate in this interview. Yes_____ No_____
I agree to be recorded for this interview. Yes_____ No_____

Signature of Participant:
Date:

Appendix C Interview Questions *Some questions used from (Perry & Averka, 2020)

Demographic Questions

1. What is your name?
2. What is your position and where do you work?
3. How long have you been working in this role?
4. What is your gender?
5. What is your birthdate?
6. What is your ethnicity?
7. What is your race?
8. What would you like your pseudonym to be for this research study?
9. What would you like the pseudonym of your workplace to be for this research study?

Interview Questions

1. How did you get involved in wildlife rehabilitation?

2. Do you have previous experience or education that has prepared you for wildlife rehab? If so, how has it prepared you in wildlife care?

3. What reasons do you have for why animal rehabilitation is important or not?

4. When you have a new animal to care for, how do you get to know that animal?
    a. What sorts of questions are you asking about the animal?

    b. What is important for you to know? How do you go about getting that information?

5. Do you believe that any of the animals that you have cared for recognize you as an individual?
    a. What sorts of behavior make you know that they know you?

6. Can you share any stories about an animal that you felt particularly close to or had a particularly meaningful experience?

7. How has doing this work influenced your views about wildlife and human–animal interactions?

8. How has working with animals and wildlife influenced your views about animal care in general?

9. What are the main goals of wildlife rehabilitation and sanctuary care? What are the hindrances?

10. Do you and how often do you communicate with other facilities (veterinarians, wildlife officials, other rehabbers, organizations, etc.) for guidance? Which facilities?

11. When you receive an animal what is the protocol? How do you decide to rehabilitate the animal, euthanize it, or transfer it to another facility?

12. Who makes the decisions on care and treatment? When does euthanasia need to be done who does it?

13. What do you think your facility is doing that others could benefit from?

14. Can you tell me a little bit about the process you follow for caring for wild animals?

15. How often do you treat wildlife? How many do you treat a year? What types of animals? Which ones are the most interesting to you and why?

16. What resources do you have to support wildlife care?

17. What resources did you wish you had to help wildlife?

18. Is there anything else that you would like to tell me about wildlife rehabilitation or your facility?

19. Would you like to see a transcript of your interview and to read and comment and make changes?

20. Would you like to have a copy of my thesis when it is finished?

21. I would like to discuss with you the human-animal observations next. Do you have a few minutes to give me a few days and times that are convenient for me to come and shadow you as you care for wildlife? I will be making observations using a modified OHAIRE instrument. Would you like to see it and discuss it?

22. I will make observations every one minute during our informal time when I will observe and shadow you interacting with animals for approximately 20 minutes total. This will help me to better understand the human-animal bond that is established by caring for animals and of course, is an important part of wildlife rehabilitation.

23. Would you like to see the results of the human-animal observations when I am finished?

24. Thank you so much for your time and your commitment to wildlife and animals.

Appendix D Modified OHAIRE Instrument

The observation tool to measure Human-Animal Interaction (HAI) is the Observation of Human-Animal Interaction for Research (OHAIRE) (Guérin NA, 2018). The OHAIRE is a behavior coding tool created to capture the behavior of humans when interacting with animals The OHAIRE behavioral categories captured are communication behaviors with animals, emotional displays, behaviors directed toward animals, and interfering behaviors (Guérin NA, 2018). The OHAIRE uses interval behavior coding (also one-zero sampling) to note the presence or absence of a behavior. The frequency or duration of behaviors within the interval are not coded (Guérin et al., 2018).

Facial Emotional Display	**Human**	**Wildlife**	**Notes**
Smile	☐ Yes ☐ No	☐ Yes ☐ No	
Laugh	☐ Yes ☐ No	☐ Yes ☐ No	
Negative (Frown, Cry, Whine, Pain)	☐ Yes ☐ No	☐ Yes ☐ No	
None	☐ Yes ☐ No	☐ Yes ☐ No	
Verbal Emotional Display	**Human**	**Wildlife**	**Notes**
Positive	☐ Yes ☐ No	☐ Yes ☐ No	
Negative	☐ Yes ☐ No	☐ Yes ☐ No	
None	☐ Yes ☐ No	☐ Yes ☐ No	

Interactions with Animals	**Human**	**Wildlife**	**Notes**
Talk	☐ Yes ☐ No	☐ Yes ☐ No	
Gesture	☐ Yes ☐ No	☐ Yes ☐ No	
Look	☐ Yes ☐ No	☐ Yes ☐ No	
Touch	☐ Yes ☐ No	☐ Yes ☐ No	
Affection	☐ Yes ☐ No	☐ Yes ☐ No	

Problem Behaviors	**Human**	**Wildlife**	**Notes**
Aggression	☐ Yes ☐ No	☐ Yes ☐ No	

Anxiety	☐ Yes ☐ No	☐ Yes ☐ No	
Isolation	☐ Yes ☐ No	☐ Yes ☐ No	
Leaving	☐ Yes ☐ No	☐ Yes ☐ No	
Overactivity	☐ Yes ☐ No	☐ Yes ☐ No	
Other (e.g. Biting, Scratching, Whining, Hitting, Teasing, Shouting)	☐ Yes ☐ No	☐ Yes ☐ No	

Appendix E: Parent Codes and Subcodes

NC Wildlife Resources Commission
- License, wildlife biologist, NC, captivity, wildlife rehab

Anything Else to Tell About Wildlife Rehab/Facility?
- Cool, amazing, love, goal, center, domestic, emotional, physical, time

Resources You Wish You Had to Help Wildlife?
- Training, money, donations, help, center, caging, facility, vets

Resources You Have to Support Wildlife Care?
- Rehabs, x-ray, medicine, donation, job, bottles, blankets, doctor, cage

How Often You Treat Wildlife? A year? Type?
- Daily,100s, spring, summer, squirrels, possums, otters, snakes, birds

Process You Follow When Caring for Wildlife?
- Collect info, hold, treatment, transport, isolate, cage clean, feed

Your Facility Doing & Others Could Benefit From?
- Team, education, care injured/orphaned, feeding, equipment, network

Decisions on Care & Treatment? When Euthanasia Done/By Who?
- Veterinarian, rehabbers, extent of injury/disease, euthanasia, need

Receive an Animal the Protocol? Rehab, Euthanize, Transfer?
- Vitals, injuries, bloodwork, extent, survive, health, can rehab, cost

Communicate with Other Facilities?
- Wildlife rehabbers, daily, vet, removal, month, animal control

Goals of Wildlife Rehab & Sanctuary Care? Hindrances?
- Rehab, release, educate, healthy, wild, sanctuary, money, pet, afford

Views on Animal Care in General?
- Need, different care, appreciate, hard, understanding, persistent

Views on Wildlife & Human–Animal Interactions?
- Value, precious, help, aware, sad, understand, respect, care, humans

Animal Felt Close To or Had Meaningful Experience?

- Better, found, favorite, otter, squirrel, dog, cold, bottle, abandoned

 Animals Recognize You? How?

- Come, sounds, react, food, hang around, ears up, baby animals, fear

 How Do You Get to Know a New Animal?

- Information, feed, observe, injury, found, weight, temp, rehab, person

 Why Animal Rehabilitation is Important or Not?

- Habitat, conserve, important, return, save, suffer, coexist, love,

 Involved in Wildlife Rehab? Experience/Education? Prepared?

- Work, school, child, friends, volunteer, wanted, rehab, vet

Appendix F: Photographs of Rehabbers Performing Wildlife Care

Photo 1: Millie feeding baby Flying Squirrel using a syringe with nipple attachment.

Photo 2: Red Tail Hawk perching.

Photo 3: Baby cottontails sleeping

Photo 4: Closer image of red tail hawk

Photo 5: How to handle owlet

Photo 6: How to handle owlet

Photo 7: Feeding owlets with very large tweezers

Photo 8: Feeding owlets with very large tweezers

Photo 9: Millie cutting up deceased chicken chicks for owlets. Chicks are purchased from a supplier.

Photo 10: Owlets in laundry basket with blankets to resemble nest

Photo 11: Owlets see Millie preparing their food

Photo 12: Adult barred owl observing us

Photo 13: Millie holding baby flying squirrel

Photo 14: Millie giving injured the barred owl subcutaneous fluids, which consist of lactated ringers mixed with liquid vitamin B complex. Sunshine holds with leather gloves owl to protect him and themselves.

Photo 15: Ducklings brought to Millie by a transporter

Photo 16: Millie demonstrated how to identify a sign of dehydration in an owl. The tacky like strings on the bilateral sides of the owl's mouth.

Photo 17: Millie showing the ear of an owl and the back of the eye is also visible

Photo 18: Millie showing the third eyelid of the owl

Photo 19: Millie administering medicated eyedrops to the owl's eye

Photo 20: Millie distributing the medicated eyedrops into the eye by opening and closing the eyelid

Photo 21: Moonshine's medicine cart

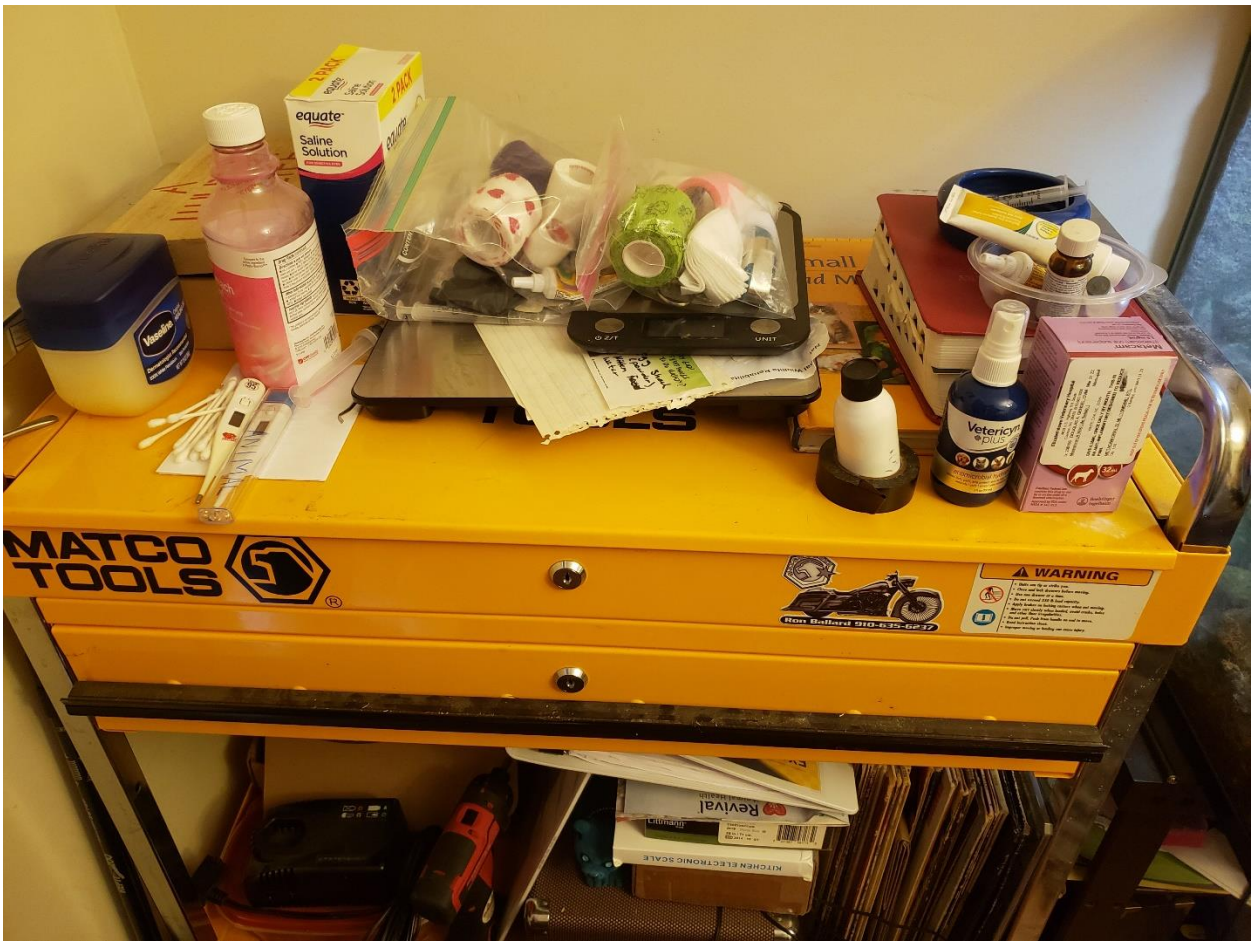


Photo 22: Moonshine's intake station

Photo 23: Baby's opossums with stuffed opossum toy that Moonshine placed with them to make them feel more comfortable

Photo 24: Squirrel enclosure with toys, blankets, and food/water bowls

Photo 25: Squirrel enclosure with toys, blankets, and food/water bowls

Photo 26: Squirrel enclosure with toys, blankets, and food/water bowls

Photo 27: Squirrel eating a raspberry

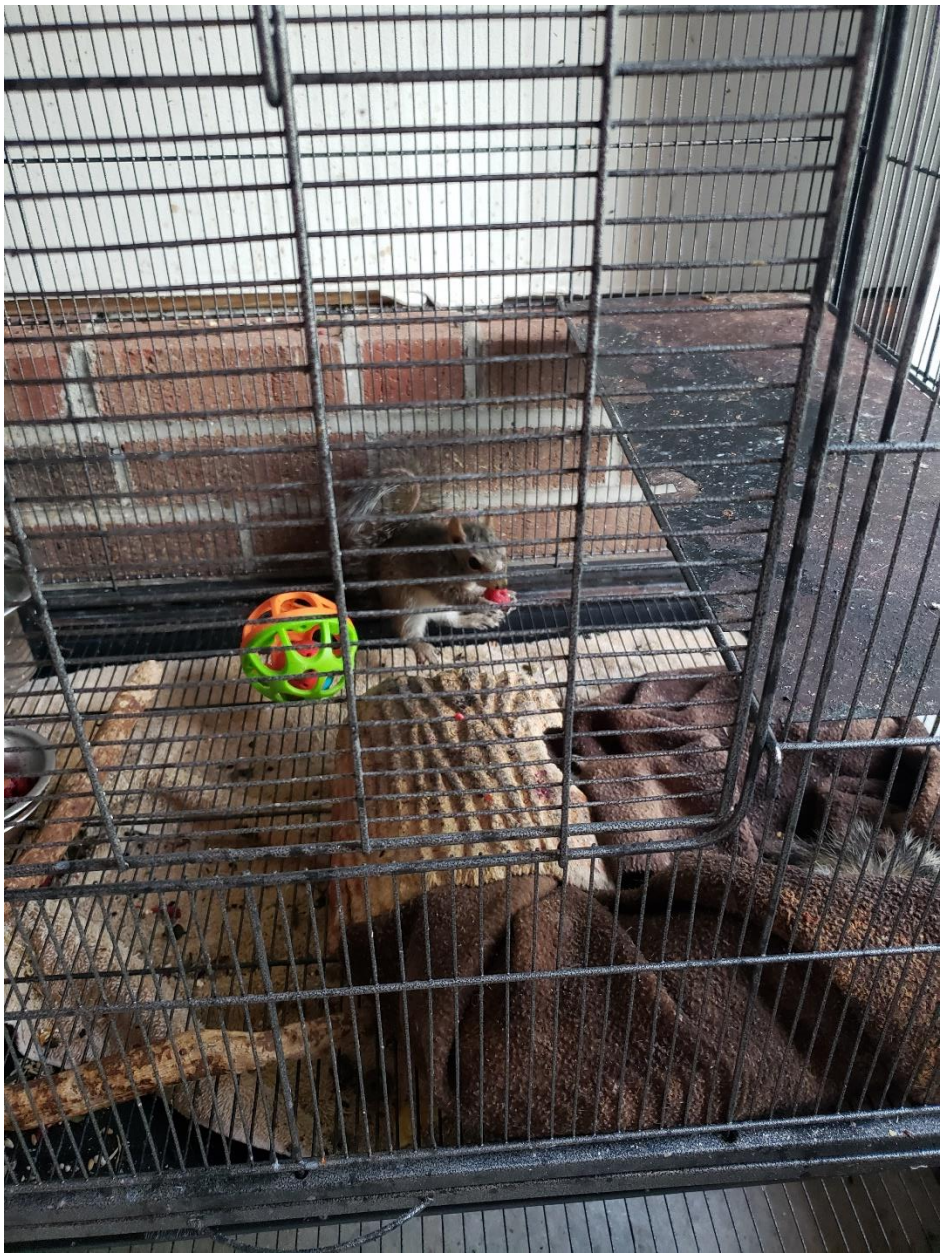


Photo 28: Squirrels in enclosure

Photo 29: Baby cottontails being transferred from one rehabber to another

Photo 30: Baby cottontails being transferred from one rehabber to another

Photo 31: Nutrition supplement for the animals

Photo 32: Nutrition supplement for the animals

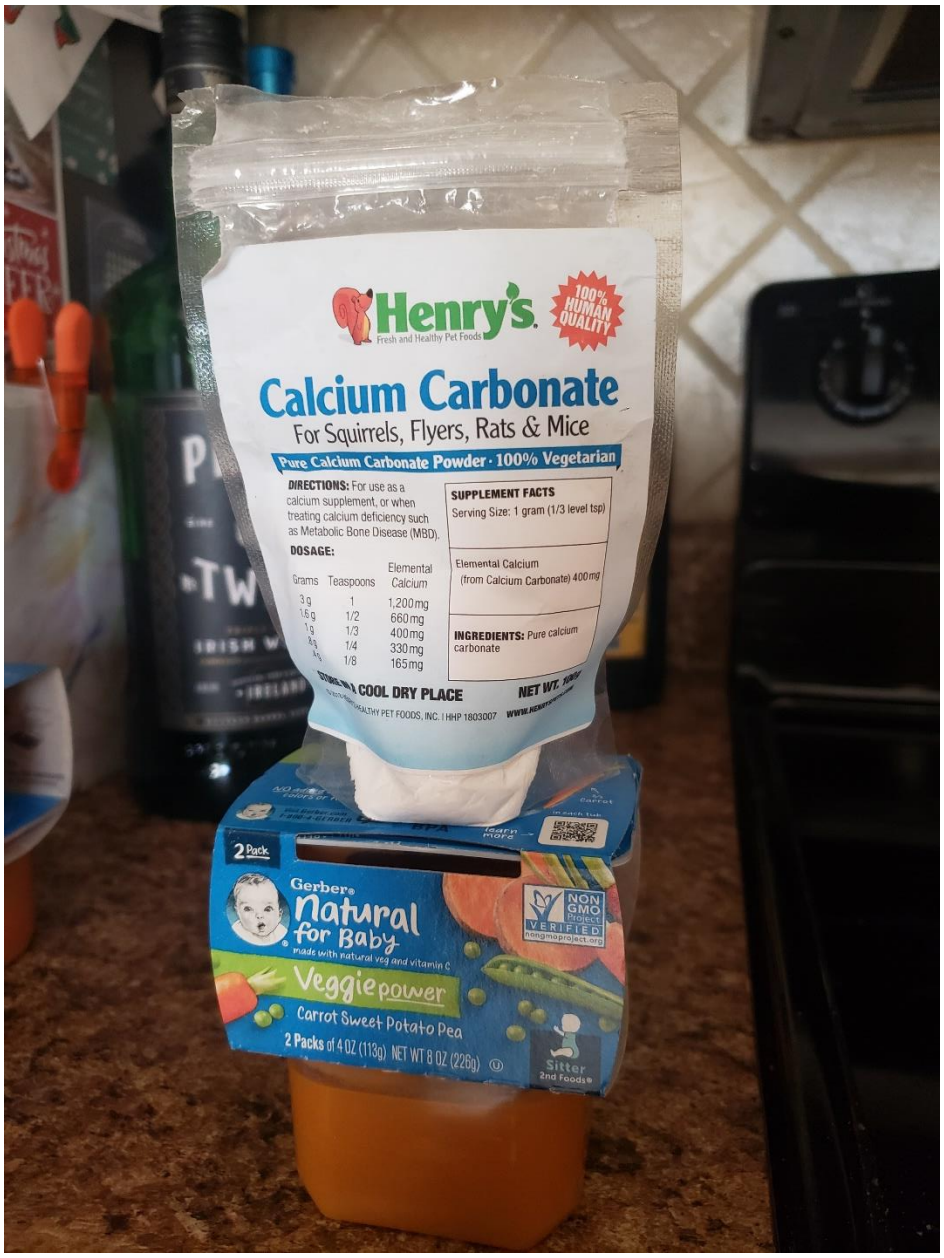


Photo 33: Fox Valley Animal Nutrition are powdered formulas for baby opossums. The rehabbers order them from Fox Valley Animal Nutrition.

Photo 34: Fox Valley Animal Nutrition are powdered formulas for baby squirrels. The rehabbers order them from Fox Valley Animal Nutrition.

Photo 35: Fox Valley Animal Nutrition are powdered formulas for baby eastern cottontails, squirrels, and opossums. The rehabbers order them from Fox Valley Animal Nutrition.

Photo 36: Squirrel enclosure with toys, blankets, and food/water bowls

Photo 37: Equipment used for feeding. Nipples, syringes, and tubes for feeding come from a variety of places. We often order them from Amazon, Miracle Nipple, or from our veterinarian office.

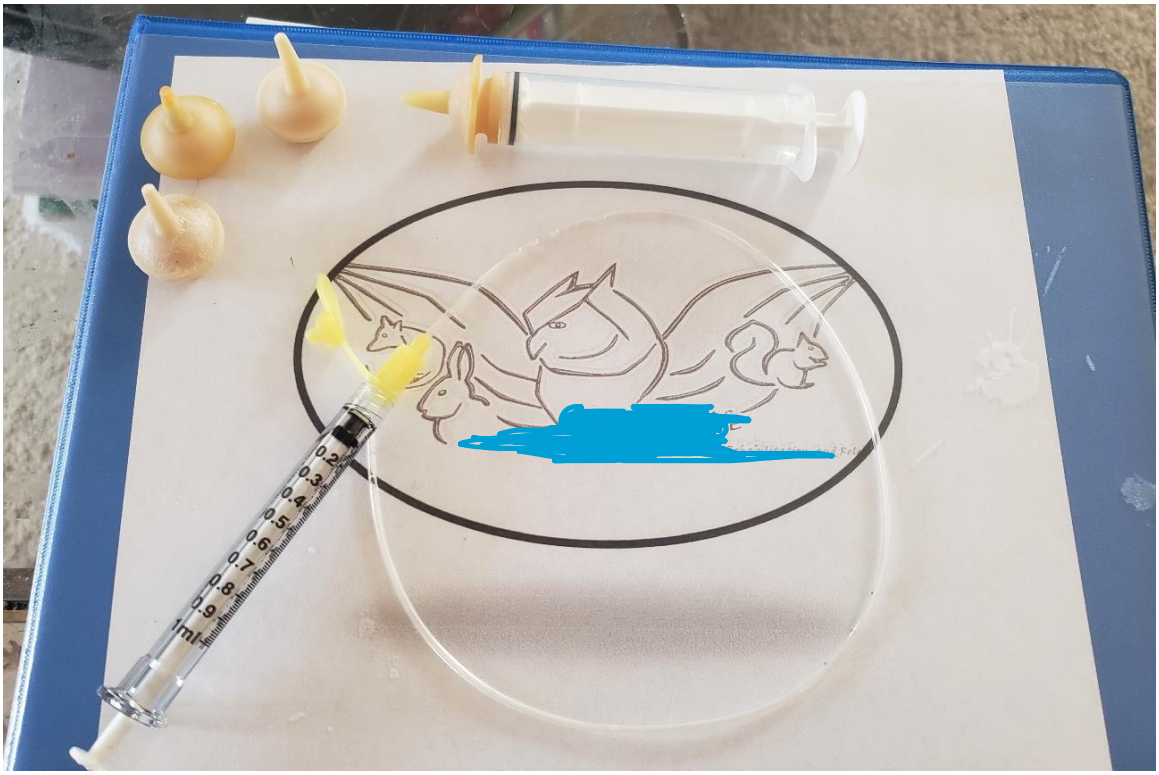
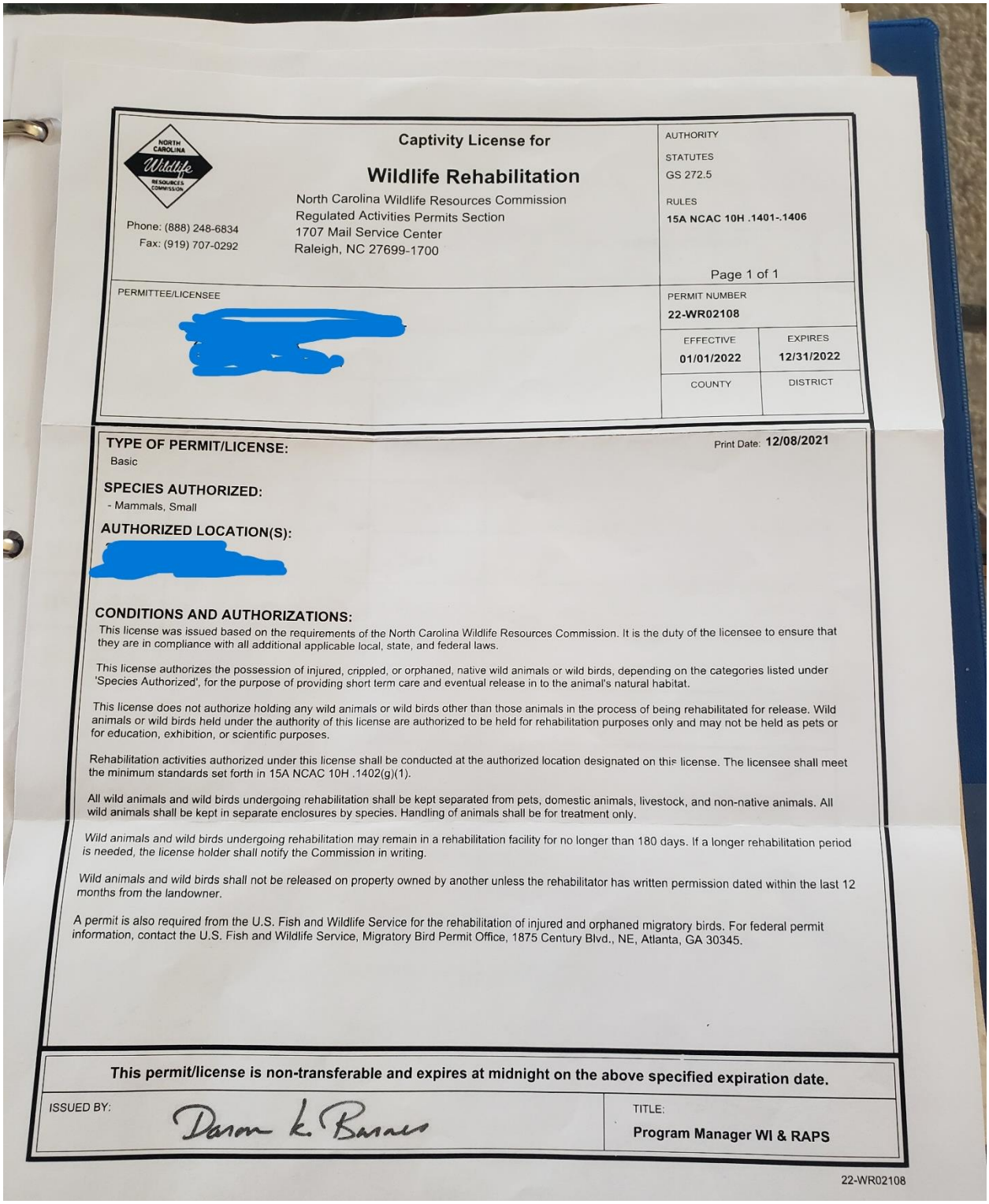


Photo 38: Captivity license for wildlife rehabilitation



Captivity License for

Wildlife Rehabilitation

North Carolina Wildlife Resources Commission
Regulated Activities Permits Section
1707 Mail Service Center
Raleigh, NC 27699-1700

Phone: (888) 248-6834
Fax: (919) 707-0292

AUTHORITY
STATUTES
GS 272.5
RULES
15A NCAC 10H .1401-.1406

Page 1 of 1

PERMITTEE/LICENSEE
[redacted]

PERMIT NUMBER
22-WR02108

EFFECTIVE	EXPIRES
01/01/2022	12/31/2022

COUNTY	DISTRICT

Print Date: 12/08/2021

TYPE OF PERMIT/LICENSE:
Basic

SPECIES AUTHORIZED:
- Mammals, Small

AUTHORIZED LOCATION(S):
[redacted]

CONDITIONS AND AUTHORIZATIONS:

This license was issued based on the requirements of the North Carolina Wildlife Resources Commission. It is the duty of the licensee to ensure that they are in compliance with all additional applicable local, state, and federal laws.

This license authorizes the possession of injured, crippled, or orphaned, native wild animals or wild birds, depending on the categories listed under 'Species Authorized', for the purpose of providing short term care and eventual release in to the animal's natural habitat.

This license does not authorize holding any wild animals or wild birds other than those animals in the process of being rehabilitated for release. Wild animals or wild birds held under the authority of this license are authorized to be held for rehabilitation purposes only and may not be held as pets or for education, exhibition, or scientific purposes.

Rehabilitation activities authorized under this license shall be conducted at the authorized location designated on this license. The licensee shall meet the minimum standards set forth in 15A NCAC 10H .1402(g)(1).

All wild animals and wild birds undergoing rehabilitation shall be kept separated from pets, domestic animals, livestock, and non-native animals. All wild animals shall be kept in separate enclosures by species. Handling of animals shall be for treatment only.

Wild animals and wild birds undergoing rehabilitation may remain in a rehabilitation facility for no longer than 180 days. If a longer rehabilitation period is needed, the license holder shall notify the Commission in writing.

Wild animals and wild birds shall not be released on property owned by another unless the rehabilitator has written permission dated within the last 12 months from the landowner.

A permit is also required from the U.S. Fish and Wildlife Service for the rehabilitation of injured and orphaned migratory birds. For federal permit information, contact the U.S. Fish and Wildlife Service, Migratory Bird Permit Office, 1875 Century Blvd., NE, Atlanta, GA 30345.

This permit/license is non-transferable and expires at midnight on the above specified expiration date.

ISSUED BY: Daron k. Barnes

TITLE: **Program Manager WI & RAPS**

22-WR02108

Photo 39: This book provides wildlife rehabilitators information on biologics and pharmaceuticals available to use in wildlife rehabilitation

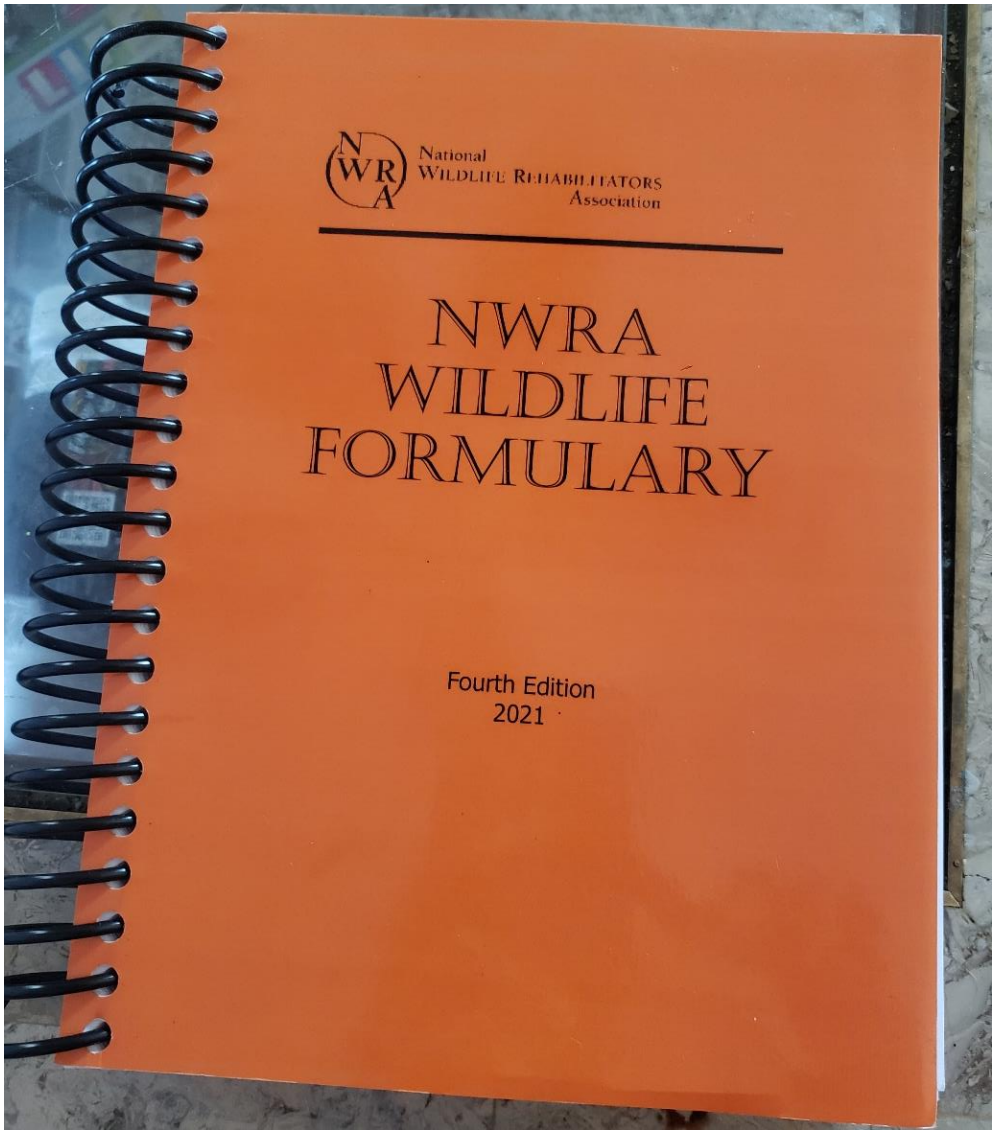
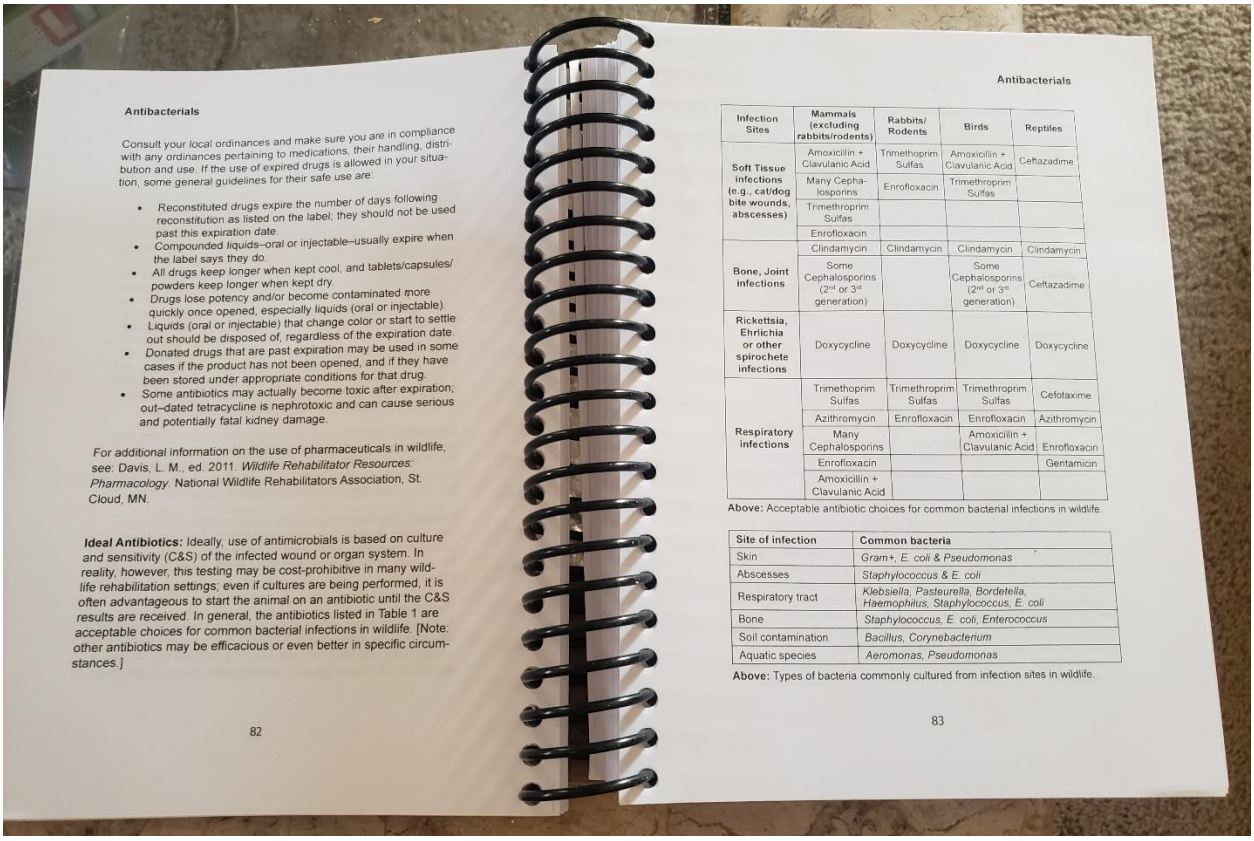


Photo 40: These are pages from the NWRA wildlife formulary on the topic of antibacterials



Antibacterials

Consult your local ordinances and make sure you are in compliance with any ordinances pertaining to medications, their handling, distribution and use. If the use of expired drugs is allowed in your situation, some general guidelines for their safe use are:

- Reconstituted drugs expire the number of days following reconstitution as listed on the label; they should not be used past this expiration date.
- Compounded liquids–oral or injectable–usually expire when the label says they do.
- All drugs keep longer when kept cool, and tablets/capsules/powders keep longer when kept dry.
- Drugs lose potency and/or become contaminated more quickly once opened, especially liquids (oral or injectable).
- Liquids (oral or injectable) that change color or start to settle out should be disposed of, regardless of the expiration date.
- Donated drugs that are past expiration may be used in some cases if the product has not been opened, and if they have been stored under appropriate conditions for that drug.
- Some antibiotics may actually become toxic after expiration; out–dated tetracycline is nephrotoxic and can cause serious and potentially fatal kidney damage.

For additional information on the use of pharmaceuticals in wildlife, see: Davis, L. M., ed. 2011. Wildlife Rehabilitator Resources: Pharmacology. National Wildlife Rehabilitators Association, St. Cloud, MN.

Ideal Antibiotics: *Ideally, use of antimicrobials is based on culture and sensitivity (C&S) of the infected wound or organ system. In reality, however, this testing may be cost-prohibitive in many wildlife rehabilitation settings; even if cultures are being performed, it is often advantageous to start the animal on an antibiotic until the C&S results are received. In general, the antibiotics listed in Table 1 are acceptable choices for common bacterial infections in wildlife. [Note: other antibiotics may be efficacious or even better in specific circumstances.]*

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Infection Sites	Mammals (excluding rabbits/rodents)	Rabbits/ Rodents	Birds	Reptiles
Soft Tissue infections (e.g., cat/dog bite wounds, abscesses)	Amoxicillin + Clavulanic Acid	Trimethoprim Sulfas	Amoxicillin + Clavulanic Acid	Ceftazadime
	Many Cephalosporins	Enrofloxacin	Trimethoprim Sulfas	
	Trimethoprim Sulfas			
	Enrofloxacin			
Bone, Joint infections	Clindamycin	Clindamycin	Clindamycin	Clindamycin
	Some Cephalosporins (2nd or 3rd generation)		Some Cephalosporins (2nd or 3rd generation)	Ceftazadime
Rickettsia, Ehrlichia or other spirochete infections	Doxycycline	Doxycycline	Doxycycline	Doxycycline
Respiratory infections	Trimethoprim Sulfas	Trimethoprim Sulfas	Trimethoprim Sulfas	Cefotaxime
	Azithromycin	Enrofloxacin	Enrofloxacin	Azithromycin
	Many Cephalosporins		Amoxicillin + Clavulanic Acid	Enrofloxacin
	Enrofloxacin			Gentamicin
	Amoxicillin + Clavulanic Acid			

Above: Acceptable antibiotic choices for common bacterial infections in wildlife.

Site of infection	Common bacteria
Skin	*Gram+, E. coli & Pseudomonas*
Abscesses	*Staphylococcus & E. coli*
Respiratory tract	*Klebsiella, Pasteurella, Bordetella, Haemophilus, Staphylococcus, E. coli*
Bone	*Staphylococcus, E. coli, Enterococcus*
Soil contamination	*Bacillus, Corynebacterium*
Aquatic species	*Aeromonas, Pseudomonas*

Above: Types of bacteria commonly cultured from infection sites in wildlife.

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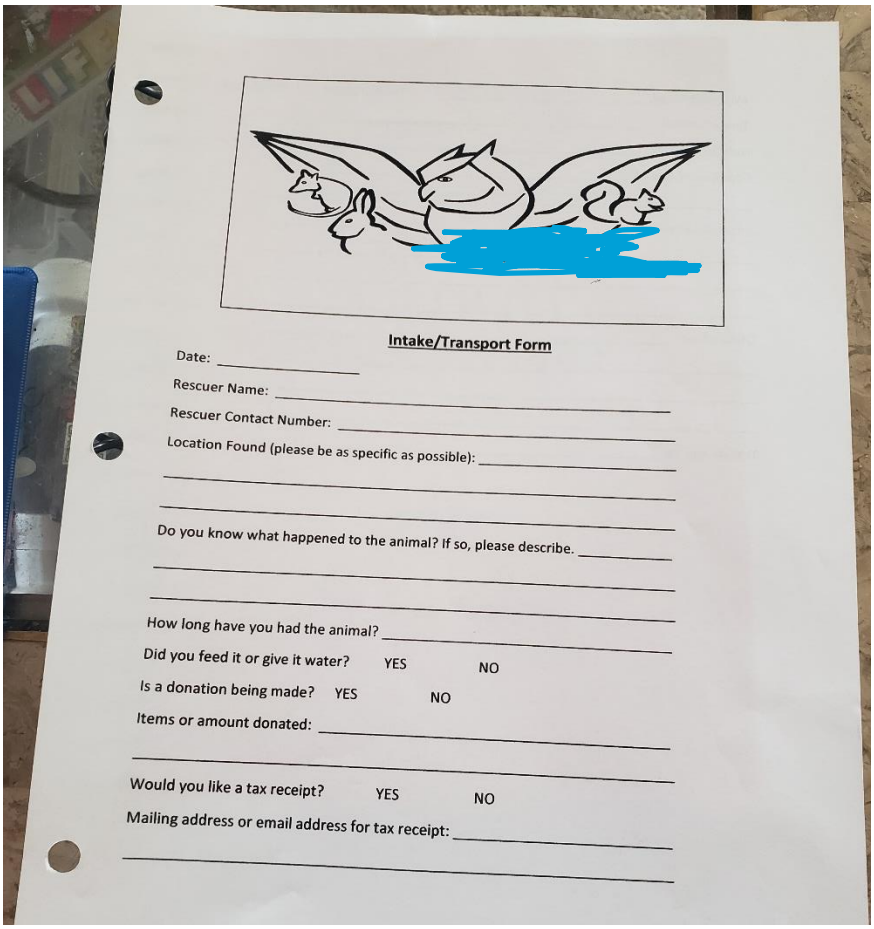
Photo 41: The rehabbers intake/transport form



Intake/Transport Form

Date: _____

Rescuer Name: _____

Rescuer Contact Number: _____

Location Found (please be as specific as possible): _____

_____

_____

Do you know what happened to the animal? If so, please describe. _____

_____

_____

How long have you had the animal? _____

Did you feed it or give it water? YES NO

Is a donation being made? YES NO

Items or amount donated: _____

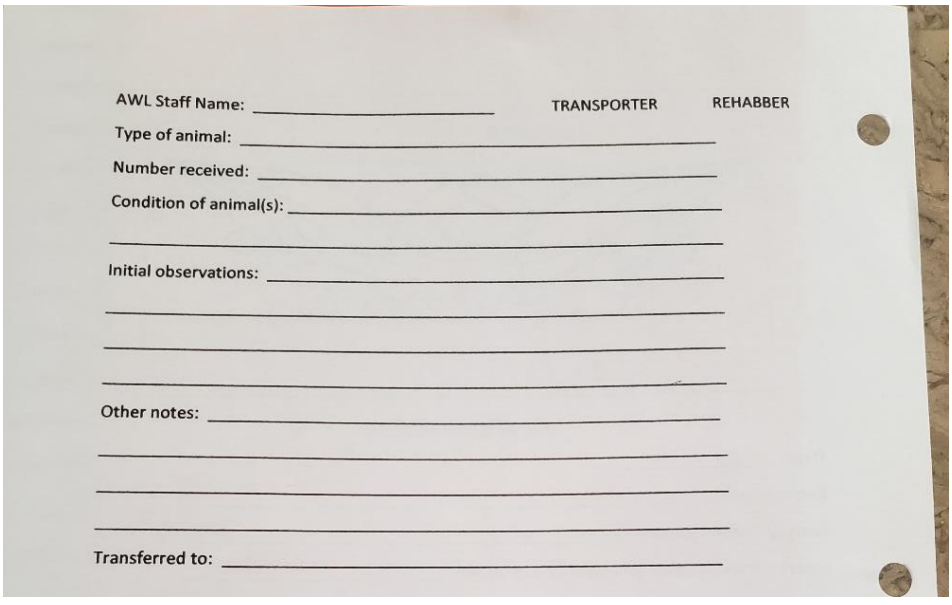
_____

Would you like a tax receipt? YES NO

Mailing address or email address for tax receipt: _____

_____

Photo 42: The rehabbers intake/transport form cont.



AWL Staff Name: _____ TRANSPORTER REHABBER

Type of animal: _____

Number received: _____

Condition of animal(s): _____

_____

Initial observations: _____

_____

_____

_____

Other notes: _____

_____

_____

_____

Transferred to: _____

Photo 43: Cottontail and squirrel babies together in enclosure (can't always do)

Photo 44: Cottontail and squirrel babies together in enclosure (can't always do)

Photo 45: Male opossum that sustained a head injury from a vehicle