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An Exploratory Study of Flora Poaching in Central Appalachia

A thesis

presented to

the faculty of the Department of Criminal Justice and Criminology

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Master of Arts in Criminal Justice and Criminology

by

McKinley Marie Bowers

August 2024

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Keywords: flora poaching, Appalachia, conservation professionals

ABSTRACT

An Exploratory Study of Flora Poaching in Central Appalachia

by

McKinley Marie Bowers

The purpose of this study was to explore perceptions of flora poaching among conservation officers, park rangers and botanists within Central Appalachia. Though some work has sought to understand poaching in other forms, such as animal poaching, little is known regarding the poaching of plants. This is especially true within the Appalachian Region. Several research questions were explored in this study, including the types of flora being poached, the characteristics of poachers, poaching tactics utilized, and deterrence measures that are currently in place. Data were collected through semi-structured interviews with 20 individuals working in the field. Findings contribute to the existing literature surrounding poaching, which can aid conservation efforts across the Appalachian Region.

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ACKNOWLEDGEMENTS

My biggest supporter from the beginning of my time in academia has been my husband. I want to thank him for his constant support and encouragement over the last six years. To my parents, for always being there for me when I needed them. You have always told me I can do anything I set my mind to. I also want to thank my grandmother, Betty, for her unwavering faith in me. I also want to thank any other family members for their support and well wishes while on this journey. To my friends I have made along the way, thank you for always listening. Bella, Britt, Sierra, Alexis, Aliss, Rachel, Gabi, Turner, Trey, and Steven, thank you for the laughter and joy throughout our time in the graduate program.

To my mentors while in the graduate program here at East Tennessee State University. First, I would like to thank my thesis chair, Dr. Dustin Osborne. You have always been so patient, understanding, and always rooting for the success of the students under your tutelage. I also want to thank you for all your insight throughout this project, and for going above and beyond every step of the way. To my thesis committee, Dr. Chris Rush and Dr. Bradley Edwards, thank you for all your guidance and the time you have invested in me. Next, I would like to thank a wonderful mentor for her time, teachings, and faith in me. Dr. Pealer, our time together as a graduate assistant and professor means more to me than you know. I will cherish all I have learned from you. I also would like to say thank you to Christine. Christine, you impact every graduate student that comes into the office more than you think. Christine, you are a shining beacon of a role model. Dr. Miller, I am grateful to have been in the graduate program with you as the department chair. To all the other professors and lecturers, thank you for going above and beyond for me and other students.

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Chapter 1. Introduction

Poaching, defined as the illegal taking of wildlife, is a globally recognized issue (Challender & MacMillan, 2014). To combat it, most countries have focused on efforts such as conservation management and public education. Despite these efforts, poaching is still a prominent issue and occurs in various forms. As such, research on the problem is of great importance to academics, policymakers and environmental stewards. The current study sought to assist in this endeavor by exploring one specific subset of poaching, the illegal taking of flora (i.e., plant life). Flora poaching is understudied compared to the poaching of animals and fish, motivating such an approach. The current chapter will provide an overview of the problem and briefly discuss the issues surrounding it.

The idea of wildlife conservation first originated in Asia under the direction of Kublai Khan of the Mongol Empire during the 13th century (Leopold, 1933). Conservation during this time period focused on game management (Leopold, 1933). Khan created a season to harvest game and prohibited hunting outside of it. These early efforts later influenced practices in European countries, though much of their efforts were primarily focused on protecting the rights of land owners and the upper-class (Eliason, 2012) Though controversial in some ways, similar ideas were eventually embraced in North America, leading to policies regarding “hunting seasons” and “bag limits” designed to ensure that populations remain stable (Adams, 2005; Prendergast & Adams, 2003).

The notion of conservation in the United States first appeared in the early 1800s when Ralph Waldo Emerson wrote the essay *Nature*, which served to popularize the appreciation of nature and all that it has to offer (Brown, 2007). However, conservation was not universally embraced since flora (plant life) and fauna (animals/fish) were considered necessary for survival

and valued for food, medicine, sport, aesthetics, and spiritual and cultural reasons (Brown, 2007).

Similar to the earlier situation in Europe, individuals who owned land and businesses were among the upper class during the 1800s within the U.S. These individuals did not have to rely on hunting and foraging to feed themselves and their families. Thus, sports hunting and the exploitation of native plants were viewed as leisure activities for many of them. In 1844, the first Sportsmen's Club was established in New York, with others soon to follow. Out of self-interest, some wealthy individuals pushed for the creation of the earliest wildlife laws in the country (Brown, 2007). Previously, wildlife and flora belonged to all people, which made it a shared resource, and each state was responsible for their own conservation efforts (Brown, 2007; Prendergast & Adams, 2003). To control the activities of the lower-classes, and further enhance land-owner's rights, new laws recommended closed hunting seasons for select animals (e.g., quail, deer, and trout) (Brown, 2007). This was followed by the call for individuals to enforce those laws, which ultimately took the form of conservation officers.

Maine was the first state to establish the position of game warden (one term for conservation officers) in 1852 (Brown, 2007). This was not popular among many citizens, as they viewed it as infringing upon their natural rights and feared that they would no longer have access to the resources that they depended upon. As mentioned above, natural resources were to that point shared by the community and not viewed as something requiring regulation. Nonetheless, lawmakers stood firm and established a system in which Americans no longer had unrestricted access to publicly controlled lands (Brown, 2013). The success of the first conservation police officers in Maine and other early-adopting states prompted other states to follow in the hopes of protecting their own resources (Morse, 1973). Other positions were also

created to assist in these endeavors, such as park rangers (individuals tasked with monitoring behavior and enforcing laws within defined state or federal park boundaries) (Gerdes, 2021).

Currently, the U.S. Bureau of Labor and Statistics (2022) estimates that there are 6,730 conservation officers employed in the United States (U.S. Bureau of Labor and Statistics, 2022). However, this figure is likely much higher since many states do not submit official employment data. For example, Reaves (2011) suggested that there were approximately 15,000 conservation police officers employed in the United States in 2010, a figure that is likely higher now. With that said, this number is still relatively small compared to the number of people who hunt and fish in the United States. The United States Department of the Interior (2021) notes in its five-year report that 101.6 million people participate in hunting, fishing, and other wildlife activities on an annual basis, leaving these officers with the difficult job of covering large swaths of land with minimal resources.

Policing Wildlife Crime

Research on law enforcement has typically been geared toward traditional policing in the form of urban agencies and their county-level counterparts (Eliason, 2016). From a historical standpoint, the majority of crime in the United States was thought to occur in urban areas such as cities (Foster & Hummel, 1997; Ruddell, 2014). Urban crimes such as rape, homicide, and drug activities are heavily researched topics in the criminal justice field, partially due to researcher access and the location of most large universities. Contrastingly, rural law enforcement takes place in remote areas that are more difficult to venture to. This is unfortunate since rural crime is far from rare, and in some cases exceeds victimization levels seen in more populated areas (Foster & Hummel, 1997; Ruddell, 2014). Some rural crimes require unique enforcement in the form of specialized agencies. This is certainly true of crimes against wildlife, as most states have

created conservation officers, game wardens, or similar positions to address the problems that they experience (Eliason, 2016; Ledford et al., 2021; Marks 2013).¹

Conservation officers and park rangers must enforce laws on a population that is far greater than their own numbers. Moreover, they operate in remote areas that can be difficult (i.e., mountainous) to navigate (Eliason, 2014). The wildlife laws and regulations that they enforce have changed since the first notions of conservation appeared. However, the purpose and intent of these laws are still similar. Current regulations incorporate multiple types of violations and are guided by federal directives in many cases (Musgrave et al., 1993). For example, the Endangered Species Act is the primary law in the United States for protecting endangered species (U.S. Fish and Wildlife Service, 1973). This law was developed to protect critically endangered species from extinction as a “consequence of economic growth and development untampered by adequate concern and conservation” (U.S. Fish and Wildlife Service, 1973). Moreover, the Migratory Bird Treaty Act of 1918 (MBTA) prohibits the killing, capturing, selling, trading, and transporting of protected migratory bird species without proper authorization from the Department of Interior’s U.S. Fish and Wildlife Service (Department of the Interior, 2020). Similarly, The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) spurred further conservation notions in 1975 (U.S. Fish & Wildlife Service 2022). This treaty ensured that national trade in plants and animals did not threaten their survival in their natural habitats.

These laws and treaties were designed to focus on broad concerns. Other laws, primarily implemented at the state level, further guide what is acceptable and unacceptable. Fishing,

¹ There several titles used for conservation officers and park rangers such as game wardens, conservation rangers, wildlife managers, state natural resource police, and law enforcement specialists (Eliason, 2016; Ledford 2019; Marks 2013).

hunting, or harvesting of specific plants without a license or prior authorization is illegal throughout the Nation. Furthermore, each of these wildlife activities is also confined to certain periods within the year (Eliason, 2003). Regulations on the methods that recreationists can use have also been established. For example, hunters can receive heavy fines if they are to “spotlight” animals from their vehicle or harvest a lactating doe out of season. These laws, regulations, and treaties ensure not only a healthy population but also a healthy ecosystem (Eliason, 2003). Each of the aforementioned measures has been developed and passed into law to protect the diverse native flora and fauna of the United States. However, the desired outcome has not been easy to achieve, especially in relation to the poaching of flora.

Flora Conservation and Enforcement

Flora includes plant, bacterial, or fungal life and differs by region in the United States. While measures have been taken to ensure its continued survival, little research has explored threats to it from the criminal justice perspective. In other words, though some researchers have sought to better understand the poaching of fish and animals, almost none have turned their attention to plant life. The poaching of flora is comparable to the poaching of animals and fish in many ways. Certain plants have “seasons” to harvest, or in some cases can be protected year-round (Campbell, 1988). Furthermore, permits may be required and limits may be put into place regarding amounts that can be harvested (Campbell, 1988). Some of these primary targets include (1) American Ginseng (*Panax quinquefolius*), (2) bloodroot (*Sanguinaria canadensis*), (3) black cohosh (*Actaea racemosa*), and (4) galax (*Galax urceolata*) (Young et al., 2011). Ginseng and Galax are both sought after for their financial value (Miller, 2019; Predny & Chamberlain, 2005; Young et al., 2011). Galax is typically harvested in the spring, whereas ginseng is primarily gathered in the fall (Miller et al., 2019; Predny & Chamberlain, 2005). Furthermore,

bloodroot, black cohosh, and ginseng are desired by Asian markets and distributors for use in medications (Miller, 2019; Robbins, 2000). These purposes include gastrointestinal ailments, skin cancer, and reproductive organ ailments (Gurley et al., 2012; Ha et al., 2017; Miller, 2019).

Flora conservation is difficult to achieve for multiple reasons. First, information on flora conservation needs to be easily accessible and updated regularly in order to keep the public and conservation officers educated on endangered species, harvesting seasons, and other important concerns (Havens et al., 2014). Second, there is a need to alleviate threats that make plants rare or endangered (Havens et al., 2014). Individuals may not realize what they are taking is prohibited from being removed. However, there are those individuals who know certain flora are protected, but still choose to commit these acts out of financial interest (Young et al., 2011).

Third, ample funding needs to be provided to ensure conservation efforts are successful (Havens et al., 2014). Without proper funding, policies and programs may not be as effective when implemented. Thus, the flora that requires protection becomes more vulnerable to poachers. Fourth, and finally, effective communication is essential. Conservation officers are more inclined to have knowledge of flora compared to the public as a result of their immersion in the wilderness setting (Filteau, 2012). Thus, the public would benefit from outreach designed to increase their knowledge on the topic of flora. Unfortunately, each of these requirements has been difficult to achieve, leading to extensive plant poaching in various parts of the United States. As such, it is important to further study the topic in order to assist in disseminating knowledge of the problem and its characteristics.

Current Study

The current study sought to add to the existing literature on plant poaching and conservation by focusing on the issue in Central Appalachia. This Region has many rural areas

that can be isolated from the resources needed for effective conservation efforts. Furthermore, it offers ample opportunities for offending to ample abundance of several commonly-targeted plants. This Region is largely understudied, as is the topic of plant poaching and conservation. Central Appalachia, which encompasses parts of Tennessee, North Carolina, Virginia, West Virginia, and Kentucky, is known for its rugged terrain and rural nature. Additionally, there are numerous national and state parks, in addition to large sections of publicly-owned forest. Part of the Appalachian's attraction is the untouched landscape the Region has to offer. However, the land's beauty does not dissuade crimes from occurring. Specifically, poaching (including plant life) is thought to be quite prevalent. To better understand the problem, this study used semi-structured interviews to question conservation officers and other stakeholders regarding their perceptions of the problem and attempts to deter it.

Chapter Summary

This chapter provided a brief overview of conservation history, conservation officers, modern wildlife laws, and flora poaching. It began with the notion of conservation and its early origins. Next, it discussed conservation police officers, their job duties, and the difficult nature of performing them. Modern wildlife laws were also discussed; specifically, the Endangered Species Act, the Migratory Bird Treaty Act of 1918, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora. These laws and treaties were designed to address the broad concerns of fauna and flora protection. Finally, flora conservation and enforcement were examined. Each of these topics provides a broad, preliminary understanding of the problem.

Chapter Two will provide a literature review that further explores our knowledge of conservation police officers and their changing roles, in addition to previous research about plant

poaching and the efforts to confront it. It will also demonstrate the limited research on plant poaching, poaching techniques, and conservation officer perceptions. Finally, the research questions for the current study will be discussed. Chapter Three will discuss the methodology of the study, including the interview guide and sampling strategy. Chapter Four will discuss the findings that emerged from these interviews. Finally, Chapter Five will serve to discuss how this study contributed to the existing literature, limitations of the work and implications for future studies.

Chapter 2. Literature Review

As discussed in Chapter One, the literature on poaching is relatively small compared to other forms of offending (Musgrave et al., 1993). This is especially true regarding flora poaching in the United States (Campbell, 1988). There have been a few studies that have explored poacher characteristics, typologies, and motivations, but none have directly explored these issues in relation to plants (instead focusing on fish and animals). This chapter seeks to provide an overview of crimes in Appalachia, with a specific focus on poaching. Poacher typologies, characteristics, and tactics will also be covered, as will the role of conservation officials in combatting the problem. In addition, the current chapter will also demonstrate the limited research on flora poaching and why better understanding it is of great importance. Finally, it will introduce the research questions associated with the study.

Appalachia

The Appalachian region is made up of several states including parts of Tennessee, North Carolina, South Carolina, Virginia, West Virginia, Maryland, Pennsylvania, New York, Ohio, Kentucky, Mississippi, Georgia, and Alabama. Within these 13 states, there are 423 counties considered to constitute “Appalachia” that collectively account for 206,000 square miles of land (Regional Appalachian Commission, 2023). Roughly 23.6 million residents live within the region as of 2023 (Regional Appalachian Commission, 2023). Tennessee, North Carolina, Virginia, West Virginia, and Kentucky can be considered to fall within “central Appalachia” (Gleaves, 2020) and constitute the primary focus of the current study. Though several urban areas are located within these states, a significant portion of land is considered rural or semi-rural (CDC, 2022). Furthermore, and as mentioned in the first chapter, they contain numerous parks and large swaths of publicly-owned forest.

Crimes in Rural Appalachia

Rural communities are faced with unique problems such as poaching, illegal dumping and agricultural crimes (Musgrave et al., 1993; Osborne & Swartz, 2021; Tunnel, 2008). These types of crimes are not typically seen (at least to the same extent) within more urbanized areas. Rural areas, especially those in Appalachia, have unique terrain compared to their urban counterparts (Forsyth, 2008). This allows for unique opportunities and the ability to avoid detection. These problems are further compounded due to a lack of available law enforcement resources (Eliason, 2011). Not only are municipal and-county level departments typically understaffed, a lack of funding and low salaries are also common issues for conservation agencies (Eliason, 2011).

Wildlife Crime

Crime against wildlife, one unique type of offending and the central focus of this study, is essentially restricted to more rural areas. Though understudied, some work has explored various aspects of wildlife poaching as it relates to the targeting of animals and fish in these locales. Musgrave et al. (1993) estimated that roughly \$200 million was earned each year (in the early 1990s) in the United States from the poaching of wildlife. The United States, the largest consumer of wildlife in the world, was also estimated to earn \$1 billion annually in live wildlife and wildlife products during that time period (Musgrave et al., 1993). More recently, Hughes (2021) suggests that trade in wildlife products are worth billions annually via commercial fishing (\$180 billion), timber (\$227 billion), and fashion (\$2.5 billion). Though recent work has not explored the percentage attributable to poaching behaviors, it is likely to be significant.

The poaching of fish and animals in the United States naturally attracts the attention of conservationists. For example, the hunting to near extinction of bison has received much

publicity over the years and resulted in significant efforts to re-establish their population (primarily in western states) (Lueck, 2002). Similar efforts have more recently occurred in relation to the elk population in Appalachia (Cox, 2011). Another recent initiative, The Voyageurs Wolf Project, has focused on re-establishing wolf populations in Minnesota and has involved collaboration between researchers, universities, state agencies and conservation groups (Voyageurs Wolf Project, 2023).

While each of these efforts has featured success, other species that are more prevalent are also regularly targeted by poachers (due to fewer restrictions and/or less severe punishments). As an example, white-tailed deer are commonly poached within the Appalachian Region and across other parts of the Country (Martinez et al., 1997). Regulations that restrict deer hunters to certain seasons, methods, and limits, while established, are not always followed. Similarly, black bears are targeted across the United States (Unger et al., 2013). In some areas of the United States, black bears have regulated harvest comparable to white-tailed deer. However, smaller populations of black bear face threats of habitat loss and poaching (Unger et al., 2013).

In the Western United States, the abundance and variety of wildlife make trophy poaching a significant problem (e.g., mule deer, whitetail deer, elk, moose, bison, pronghorn antelope, bighorn sheep, mountain goats, black bears, grizzly bears, mountain lions, wolves) (Eliason, 2012). In addition, marine wildlife has also been found to be attractive to poachers in the United States. One example target is the bull trout, which is native to North America and Canada. Other offshore examples of targeted marine life include lobsters, hard clams, snooks, and snappers (Mattson et al., 1985; McMullan & Perrier, 2002; Ray et al., 2019). The decline in these populations due to poaching has led to the establishment of fisheries and other conservation efforts nationwide (Zymonas, 2011).

Poaching of Flora

While our knowledge of the poaching of animals and fish is somewhat established, there is very little research solely focused on flora poaching, its characteristics, and the individuals who commit these crimes. In the United States, approximately one-third of native flora is considered threatened (Havens et al., 2014). In other words, these plants have been over-harvested and are at risk of becoming endangered. Some efforts have been put into place to curb the problem, including the establishment of The Plant Conservation Alliance (PCA), which consists of 10 federal agencies and 300 nonfederal cooperators (Havens et al., 2014). The PCA has worked to implement plant conservation at the macro and micro levels, with efforts beyond the activities of conservation officers. Collaborations with academia, botanists, biologists, and others make up the framework of the Alliance. While these efforts have led to some successes, Havens et al. (2014) identified how the lack of human and financial resources limited the PCAs overall influence. Similar problems exist across government sectors tasked with flora conservation, including environmental agencies (Havens et al., 2014), rendering front-line enforcement officers (e.g., conservation officers) with the primary task of addressing the problem on a daily basis.

As discussed in the initial chapter, there are a number of plants being poached throughout the United States. The problem is especially severe within the Appalachia Region, with (1) American Ginseng (*Panax quinquefolius*), (2) bloodroot (*Sanguinaria canadensis*), (3) black cohosh (*Actaea racemosa*), and (4) galax (*Galax urceolata*) being four of the most common targets (Young et al., 2011). Of these, American Ginseng is most recognizable. It is a wild-growing, native plant that grows well in shady portions of forest land and historically has been found in abundance in Appalachia. Further, it is considered to be the most valuable, non-timber

natural resource harvested in the Region (Young et al., 2011). Dried ginseng varies in value by year, but typically sells for approximately \$550 per pound (West Virginia Division of Forestry, 2020). A pound of green or “wet” ginseng is valued somewhat less, at nearly \$160 per pound (West Virginia Division of Forestry, 2020). Bloodroot can also be sold for a high amount, with recent estimates at \$90 per pound (Davis & Greenfield, 2020).

The Ginseng root is primarily sought after for medicinal purposes and is exported to countries around the world, especially China (Anderson et al., 2002; Suits et al., 2003; Young et al., 2011). Galax is also popular in East Asian markets and commonly used for similar medicinal purposes. Galax is typically harvested in the spring, whereas ginseng is primarily gathered in the fall (Miller et al., 2019; Predny & Chamberlain, 2005). Furthermore, bloodroot, black cohosh, and ginseng are desired by Asian markets and distributors for medicinal purposes such as gastrointestinal ailments, skin cancer, and reproductive organ ailments (Gurley et al., 2012; Ha et al., 2017; Miller, 2019; Robbins, 2000).

More recently, there have been reports of increased poaching of slippery elm tree bark in the Appalachian region (Jafari, 2006). The lining of the slippery elm’s bark has been used in Appalachia for its medicinal properties, including to sooth coughs, treat skin irritations and address gastrointestinal issues (The New York Times, 2006). Coincidentally, the poaching of native flora, such as the slippery elm, has received more media attention since herbal and holistic medicinal practices have received a resurgence in popularity over time. Therefore, the demand has increased, as it is no longer just Appalachian natives who seek out these plants for their healing properties. Although the harvesting of all native plants within national parks (and in other areas by season and/or amount) is illegal, flora poaching remains a management and conservation challenge (Young et al., 2011). For example, Young et al., (2011) is the only study

addressing flora poaching in any form, found that (5%) of the land area in Shenandoah National Park had an elevated risk of plant poaching and (33%) of the land area in the park had a moderate risk of any type of poaching. The locations of previous flora poaching incidences were in or near the identified higher risk areas of the national park (Young et al., 2011). Since it is apparent that this form of offending is a problem, it is important to understand what may motivate individuals to commit the act.

Poacher Motivations and Typologies

There may be numerous motivations for poaching. There are certainly financial gains that can be achieved by harvesting certain plants. However, not all poachers feature just this motivation. Some research has explored the topic in relation to those who poach animals and/or fish. For example, Muth and Bowe (1998) sought to understand the various motivations that might influence someone to take part in poaching activities by performing a content analysis on existing poaching literature. Ten (10) separate motivations were identified in their work: (1) commercial gain, (2) household consumption, (3) recreational satisfaction, (4) trophy poaching, (5) thrill killing, (6) protection of self and property, (7) poaching as rebellion, (8) poaching as a traditional right, (9) disagreement with specific regulations, and (10) gamesmanship. The first motivation, commercial gain, is the illegal harvest or sale of animal, fish, and plant species for economic benefits, such as selling what has been harvested (or some component of it) to others. The second, household consumption, simply entails individuals poaching for the purposes of acquiring food and/or medicine.

Poaching for recreational satisfaction is simply the notion that some individuals enjoy the hobby of hunting/fishing and seek to do so regardless of regulations that may exist (Muth & Bowe, 1998). Trophy poaching is somewhat similar (as a motivation), but more specifically is

thought to bring about feelings of accomplishment and pride when harvesting highly-sought-after wildlife (such as bighorn sheep or large elk) (Muth & Bowe, 1998). Poaching to protect one's self or property was also identified as somewhat common. This motivation occurs when the poacher feels their property or other wildlife on their property are threatened (Muth & Bowe, 1998). One example would be a land-owner killing a protected wolf or bear in order to prevent it from hunting cattle, sheep or some other animal that they raise. Next, poaching as rebellion occurs when an individual is disenfranchised by governmental regulations and seeks to act out in an attempt to express their displeasure. This is somewhat related to the notion of poaching as a traditional right. Many individuals (especially in rural areas) have anti-government mindsets and believe that any laws related to conservation go against the laws of nature. The last motivation identified by Muth and Bowe (1998) relates to the concept of gamesmanship. Essentially, this entails someone taking pleasure in the "game of wardens and poachers" seeking to outwit law enforcement and prove that they are more capable than those attempting to stop them.

Eliason (2008) further explored the topic by noting that interviews with game wardens and poachers revealed that both habitual and opportunistic motivations were present. Eliason (2008) defined *habitual poachers* as individuals who have been caught by conservation officers in the past, but they adapt their skills to continue their poaching career. This type of poacher is also more private about their endeavors and committed to the act of poaching. These individuals seldom share their activities with others in an attempt to avoid detection (Eliason, 2008). In contrast, the *opportunistic poacher* is an individual who takes advantage of an opportunity to poach as it arises (Eliason, 2008). For example, an opportunistic poacher may notice a white-tailed deer grazing in the field outside of the defined season and decide to harvest it despite the

illegality of the act. Of note, this type of poacher is also more likely to be caught due to the lack of planning involved (Eliason, 2008).

In a separate project, Eliason (2013) expanded on the knowledge of perceived motivations by focusing on typologies of trophy poachers in Montana. Interviews and surveys with conservation officers (n=22) revealed that several categories of poachers existed: 1) poachers who work alone, 2) those who hunt on private property and behind locked gates, and 3) poachers who have been caught before. Poachers that worked alone were found to be difficult to apprehend and were described by game wardens as “loners” (Eliason, 2013). Poachers who hunted on private property and behind locked gates were found to be calculating in their endeavors and made the work of game wardens difficult (due to a lack of routine patrol in these areas). Those who had previously been caught (the third category) were deemed to be motivated to improve their tactics (as a result of the learning process involved in being apprehended at least once) (Eliason, 2013).

Other studies have offered insight into how poachers go about committing their acts. Forsyth (2008) interviewed game wardens to gain a better understanding of the types that they regularly come into contact with, and the factors that work to impact poacher success. The first aspect identified was the success of those who poached alone (similar to the work described above). Poachers that operate independently are less likely to get caught according to the study’s participants, as they do not have to worry about potential witnesses or indiscretions (such as others openly talking about the activity) (Forsyth, 2008).

The second factor discussed by game wardens related to experience (Forsyth, 2008). Individuals who have been poaching for many years were deemed less likely to be caught. The “old timers,” as they were called, knew the terrain very well. If they suspected a game warden

was present, they could easily evade them. Related to the first point, those who never openly talked about poaching activities were also thought to be difficult to apprehend (Forsyth, 2008). Primarily, the lack of discussions with others meant that game wardens could not use informants to assist in building cases.

The next factor discussed by the participants was that poachers who remained mobile tended to have a greater chance of avoiding detection (Forsyth, 2008). This element relates to the amount of experience a poacher was perceived to have. For instance, a successful poacher must know the terrain he or she is traveling in and routes that will allow them to evade game wardens. Poachers who hunted in areas they knew well were more difficult to locate than those who were opportunistic in nature.

Of interest, work has also been done regarding the perceptions that poachers have of conservation officers and their attempts to prevent their actions. Filteau (2012) examined poacher's perceptions via interviews of both conservation officers and poachers in Maine. Results indicated that poachers typically had negative views of conservation officers. This was regularly perceived by conservation officers as well, who indicated that two types of interactions typically occur: compliance or defiance (Filteau, 2012). Filteau (2012) noted that the defiant poacher featured more frustration towards conservation officer, thinking that they unfairly targeted them and/or impeded on their natural rights (Filteau, 2012). Alternatively, poachers that were compliant were aware of the illegality of their acts and understanding of the game warden's responsibility (Filteau, 2012). The compliant poacher tended to accept their punishment without disagreement.

Poacher Characteristics

Though the above-mentioned studies provide some insight into poacher motivations and typologies, little knowledge exists regarding their characteristics. To date, only one study has explored demographics and the role that they may play. Crow et al. (2012) completed a quantitative analysis of 15,657 logged instances of wildlife crime in Florida. Their results indicated that the typical poaching offender was white (81.2%) and the majority were male (95.2%). The typical offender was approximately 36 years of age. Crow et al. (2012) also found the racial composition of poaching offenders to vary depending on the region in Florida. Furthermore, individuals identified as Black or Hispanic were cited more often for improper permitting compared to Whites (Crow et al., 2012). The study also found that Black individuals were more likely to be cited for the illegal possession of fish, while White individuals were cited for illegal hunting methods and marine conservation offenses. Crow et al. (2012) noted that the data was potentially not representative of offenders nationwide even with the large sample size due to the uniqueness of Florida's population. Though limited, this study offers valuable insights into poacher demographic characteristics.

Conservation Officers and Park Rangers

As discussed, conservation officers and park rangers are two occupations that are immersed in conservation efforts and management. Conservation officers primarily enforce environmental and conservation laws within their state. Park rangers implement park security measures, and conservation strategies within defined park boundaries (federal and state). Both conservation officers and park rangers are likely to regularly come into contact with poachers while carrying out their various duties.

Eliason (2014) examined the motivations of becoming a game warden through open-ended surveys sent to conservation officers in Montana (N=22). He found that 66.7% of the conservation officers in the study enjoyed their job, wanted to protect natural resources, and would choose the job again given the opportunity. However, one of the participants stated, “Times have changed and our agency is going in somewhat of a different direction” (Eliason, 2014 p. 201). This particular respondent may have been referring to the evolution of conservation officer positions and stress relating to the changes in their roles (Ledford et al., 2021).

These changes have resulted from the expectation that state agencies, including conservation officers, should assist local and federal law enforcement organizations in dealing with traditional crime problems (Ledford et al., 2021). Since this has not been traditionally associated with the field, the impact on officer’s stress levels is likely to be significant (Ledford et al., 2021). Many individuals who choose to work in this field do so because of their passion for protecting the environment, rather than dealing with crimes that are typically associated with urban areas (Eliason, 2016; Ledford et al., 2021). This shift in responsibilities is likely to create a challenging situation for conservation officers, particularly those who are not accustomed to dealing with traditional law enforcement duties (Eliason, 2016; Ledford et al., 2021).

Conservation officers and park rangers often work in secluded, rural areas. Like their urban counterparts, these individuals are aware of the occupational dangers that come with their careers (Forsyth & Forsyth, 2009). Chief among these is the isolation that they experience, oftentimes working alone. This can be a dangerous situation since the lack of backup means that they have to address situations on their own (situations that oftentimes involve armed citizens). Poachers usually carry a firearm to be able to harvest an animal or to protect themselves.

Furthermore, it is impossible (in many cases) to know who will be respectful of the officer's authority. This problem is compounded by the fact that greater numbers of recreationists (including poachers) exist than game wardens (Forsyth & Forsyth, 2009). Game wardens would be hard-pressed to successfully arrest more than one poacher without backup. Even when game wardens call for help, long response times can be a problem (Forsyth & Forsyth, 2009). In addition, conservation officers face similar risks to traditional policing, which entails increased stress. Conservation police officers focus much of their attention on wildlife enforcement and identifying offenders (e.g., poachers) (Calkins 1970; Eliason, 2016; Lawson 2002, 2003; Moreto and Lemieux 2015; Warchol and Kapla 2012). However, their occupation is ever-changing. Recent years have seen it become more similar to the role of traditional police officers, in that they often address urban-spillover crimes such as violence and drug-related offending (Eliason, 2016; Falcone 2004; Morse 1973; Shelley & Crow 2009; Sherblom et al. 2002). Confronting drug and alcohol violators can be dangerous for conservation officers, as can addressing domestic violence or being tasked with drug eradication efforts (i.e., identifying marijuana grow sites).

Further, they are in constant danger, as officers can face injuries (or even death) attributed to gunfire, automobile accidents, aircraft accidents, drowning, and heart attacks (Eliason, 2016). For example, poachers are a constant threat to conservation officers (Forsyth, 2009). Poachers may threaten CPOs with bodily harm through the use of firearms or other handheld weapons, which is a traditional worry among law enforcement officers. Additionally, conservation officers often navigate difficult terrain alone, which could raise their risk of bodily harm (e.g., falls, snake bites).

Poaching Deterrence

Dobson and Lynes (2008) distinguish between incidental and direct poaching. For example, incidental poaching occurs when a driver accidentally hits a deer (Dobson & Lynes, 2008). Although the driver technically poached a deer it was not an intentional act. Conversely, direct poaching is an intentional act in violation of established laws. Research suggests that prevention relies on the detection of these intentional poachers (Dobson & Lynes, 2008; Hilborn et al., 2006). Dobson and Lynes (2008) found that enhanced funding of anti-poaching patrols led to a noticeable decline in poaching activities in targeted areas (Dobson & Lynes, 2008; Hilborn et al., 2006). For example, as the frequency and duration of patrols increased, poachers were less likely to engage in poaching activities. Others have explored whether punitive sentencing laws for poaching and trafficking violations have any added benefit (Wilson & Boratto, 2020). Contrary to expectations, their results show that “tough-on-crime” policies are ineffective, and in some cases harmful (Wilson & Boratto, 2020).

Mayer et al. (2004) investigated the factors that influence the legitimacy of regulations among poachers and explored deterrents to rule-breaking based on normative and traditional regulatory models. The sample of this study consisted of hunters and anglers (n=60) in North Carolina who had previously committed wildlife crimes. Participants were asked to rate the effectiveness of various methods for deterring poaching, such as sanctions, regulation enforcement by wildlife officers, and normative social pressure. Findings indicated that the presence of conservation officers was perceived as the most effective way to prevent poaching. On the other hand, factors associated with normative pressure (pressure of other people that leads others to conform) were rated as the least important. The respondents also considered regulations intended to promote wildlife conservation as the most acceptable, while regulations that promote

fair chase and human treatment of animals were regarded as among the least acceptable justifications for regulations (Mayer et al., 2004).

Current Study

This chapter has covered the existing literature on poachers, their motivations, typologies and activities (Eliason, 2008; Muth & Bowe 1998). It has also addressed our knowledge of poaching targets and the characteristics of those who commit the act. However, much remains to be learned. Specifically, little work has explored the poaching of flora in the U.S. The current study aimed to add to the existing literature by specifically exploring flora poaching in the Central Appalachian Region through interviews with conservation officers, park rangers and botanists. This was achieved by the following research questions:

Research Question One: What types of Flora are being poached in the Appalachian Region, and how prevalent is the problem?

As discussed previously, flora poaching is a severely understudied category of natural resource poaching. To date, no study has focused on flora poaching in the Central Appalachian Region, and little work has discussed the topic overall. As such, it is important to gauge the perceptions of park rangers, conservation officers and botanists regarding the extent and scope of the problem.

Research Question Two: What are the characteristics and motivations of poachers?

As mentioned above, very little research has examined the characteristics of poachers. Crow et al. (2012) constitutes the only work to date that has explored poacher characteristics in the United States. This is problematic since their work only explored wildlife poachers in a single U.S. state (Florida). The current study should serve as a nice supplement and provide a

better understanding of flora poacher characteristics within another region of the Country (central Appalachia).

Research Question Three: What tactics, if any, do flora poachers utilize?

As previously mentioned in this chapter, past research has outlined poaching typologies and tactics. However, this is once again geared toward wildlife or game poaching (Eliason, 2013; Forsyth & Forsyth, 2009) This study sought to gain a better understanding of the tactics related to flora poaching and how they differ from wildlife poacher tactics. Interviewing conservation officers and park rangers served to provide insights into flora poacher tactics and contributes to the existing knowledge base.

Research Question Four: How do conservation officers deter flora poaching in Appalachia?

What role do other agencies play in combatting the problem?

No research specifically examines deterrence measures of flora poaching in the central Appalachian Region. With that said, other studies have focused on the deterrence of fauna poaching (Barichievy et al., 2017; Dobson & Lynes, 2008; Hilborn et al., 2006; Wilson & Boratto, 2020). Conservation officers and park rangers are considered the primary tools to combatting the problem through routine patrol and targeted enforcement (Forsyth et al., 1998). It is likely that they are also the primary source of prevention for flora poaching, which should be revealed through the current work.

Chapter Summary

This chapter provided a review of the literature on crime in rural Appalachia, with a specific focus on poaching. It also provided a review of the characteristics and typologies of poachers that has been gained from previous research. Further, it discussed the flora that is targeted in the Appalachian Region and discussed the roles of conservation officers and park

rangers in combatting crimes against wildlife. Finally, the chapter provided an overview of the research questions that this study sought to answer. The next chapter will discuss the methodology for the study, which entails the target population, interview guide, data collection, and sampling strategy.

Chapter 3. Data and Methodology

The previous chapter provided a literature review of the research encompassing poaching in the United States. It also discussed the Appalachian Region, conservation officers, and the lack of literature concerning flora poaching. The current chapter will outline the methods used to address the research questions that were previously discussed, the target population, the sampling approach, and the interview guide.

Current Study

The sample for the current study was collected from the central Appalachian Region. The states included Tennessee, Kentucky, West Virginia, Virginia, and North Carolina. The researcher reached out to conservation agencies in these states via email and phone to provide a brief overview of the study's purpose. The researcher asked permission from the agency head to interview willing participants following a semi-structured interview guide. Additionally, the researcher utilized a snowball sampling strategy, which relies on a participant's knowledge of other contacts to recruit new interviewees. Specifically, those who agreed to participate in interviews were asked if they could provide the researcher's contact information to others who may want to talk about their experiences and perceptions.

The initial contact list for conservation agencies included the following agencies: Kentucky Department of Fish and Wildlife Resources (KDFWR), Tennessee Wildlife Resources Agency (TWRA), West Virginia Division of Natural Resources (WVDNR), Virginia Department of Wildlife Resources (VDWR), and North Carolina Wildlife Resources Commission (NCWRC). A similar approach was taken with park rangers, which sought participation from agencies such as the Tennessee Park Rangers Association (TPRA), Kentucky State Parks, West Virginia State Parks, Virginia State Parks, and North Carolina State Parks.

Since this was an exploratory study, data was gathered through semi-structured interviews. This involved approaching each interview with a predetermined list of questions, while still being willing to deviate from the list if interviewees have additional information to offer. Such an approach allowed for more depth in the data collection (Harrell & Bradley, 2009). Other data collection techniques such as surveys and structured interviews would not offer the same flexibility or depth and are not well suited for exploratory research topics (such as plant poaching).

Additionally, participants received a document before the interview that will outlined the goals of this study, as well as information regarding informed consent. The researcher sought verbal consent from each participant for their involvement in the study prior to beginning the interview. Each participant's obtained information was kept confidential. Names and other identifying information were not stored after interviews were completed. Each participant was asked for permission to record the interview. After the data were collected and transcribed, all recordings were deleted in a timely manner to ensure confidentiality. Furthermore, all participants were assigned anonymous identifiers (e.g., Conservation Officer 1; Park Ranger 2) to ensure that any quotes could not be traced to a specific individual.

Sample

The sample consisted of conservation officers (N=17), park rangers (N=2), and one botanist (N=1). The overall sample (N=20) had a varied range of experience in the field of conservation (Min = 7 years; Max = 35 years). Participants for the study were gathered from five states in the Central Appalachian Region, which included Tennessee, Kentucky, Virginia, West Virginia, and North Carolina. The sample provided a variety of professional conservation

backgrounds to achieve insight into poaching characteristics, targets, motivations, tactics, and deterrence measures.

Interview Guide

The interview guide was created to answer the four primary research questions detailed at the end of Chapter 2 (and reiterated in Table 1 below). Questions were grouped by thematic topic into five separate sections. The interviews began with a series of questions (Section 1) designed to capture the individual's demographics. This section consisted of questions about age, biological sex, job title, number of years in the field, and number of years in their current position. These questions provided the researcher with an understanding of the interviewee's characteristics and provided background information that was useful in further questioning.

Table 1

Research Questions

Research Question One: What types of Flora are being poached in the Appalachian Region, and how prevalent is the problem?

Research Question Two: What are the characteristics and motivations of poachers?

Research Question Three: What tactics, if any, do flora poachers utilize?

Research Question Four: How do conservation officers/park rangers deter flora poaching in Appalachia? What role do other agencies play in combatting the problem?

The second section consisted of questions designed to answer the first research question (*What types of Flora are being poached in the Appalachian Region, and how prevalent is the problem*). The initial question in this section directly asked what types of plants conservation officers/park rangers commonly see being poached in their area. Research has identified five plant species that are at known risk of poaching in the Appalachian Region: (1) American Ginseng (*Panax quinquefolius*), (2) bloodroot (*Sanguinaria canadensis*), (3) black cohosh (*Actaea*

racemose), (4) galax (*Galax urceolata*) and (5) Slippery Elm Bark (*Ulmus rubra*) (Jafari, 2006; Young et al., 2011). The initial question allowed the participants to give a brief description or an in-depth answer to their observations of plant poaching. The next question sought to determine what problems (related to plant poaching) interviewees commonly heard about from coworkers in other areas within the Region. This was followed by inquiring about the extent of plant poaching within individual jurisdictions, and whether it differed depending on the type of plant.

Section 3 was comprised of questions designed to answer research question two (*What are the characteristics and motivations of poachers?*). The initial question in this section concerned the demographics of poachers, including age and gender, and whether any commonalities were perceived to exist. Crow et al. (2012) examined poaching characteristics and demographics among wildlife poachers in Florida. The goal of this study was to extend this work by examining characteristics of plant poachers in Central Appalachia. The next question addressed the motivations of poachers. Specifically, it asked interviewees which motivations they perceived to be at play, with a specific focus on financial rewards, survival, psychological fulfillment, excitement, and socialization. Muth and Bowe (1998) and Eliason (2013) identified several motivations for poaching, which provides a solid foundation for the structure of this research question. The next question was designed to explore whether interviewees perceived poachers as being worried about being caught, and/or whether they think that the act of poaching is wrong (in line with the work of Filteau, 2012).

The fourth section of the interview guide consisted of questions that aimed to answer the third research question (*What tactics, if any, do flora poachers utilize?*). This section was comprised of five sub-questions that better captured the tactics of poachers. Specifically, the following were addressed: (1) *Do plant poachers have specific poaching tactics?* (2) *How do*

they accomplish the act of poaching based on what you see and hear? (3) Do you think they are opportunistic, habitual, or both? (4) How do they avoid detection? (5) Are they typically in groups or operating alone? Eliason (2008) defined *habitual* and *opportunistic poachers*, which aided in answering research question three by providing a definitional framework to provide interviewees. Eliason (2008) also discussed typologies and tactics of poachers, which guided the interviewer's approach in terms of prompts and probes.

Finally, the last section of the interview guide was comprised of questions designed to answer research question four (*How do conservation officers/park rangers deter flora poaching in Appalachia? What role do other agencies play in combatting the problem?*). The section began with a question that sought to understand what measures are in place to combat poaching. Specifically, interviewees were asked about deterrence options that are currently being implemented by their agency. This was followed by asking whether there are any barriers to implementing deterrence measures, such as funding, legal challenges, and geography. The last question of this section attempted to determine whether other agencies aid in combatting poaching in the Appalachian region (*Are there any other agencies or organizations that assist in combatting the problem, or that you think should be assisting with it?*).

Data Analysis

The interviews were transcribed using available software. Once the data was compiled, the researcher assessed the interviews through content analysis. This process was guided by the established research questions. Quotes were placed into categories based on their applicability to each of the questions. Themes and commonalities were then identified, providing a framework for understanding the information that is gained.

Chapter Summary

This chapter provided an overview of the research methods used for this study. The chapter sought to address each of the four research questions that pertain to flora poaching in the Central Appalachian Region. The interview guide was also discussed, specifically its relevance to each of the established questions. Three groups (conservation officers, park rangers, and botanists) were interviewed to collect data. As previously mentioned, both direct contact and snowball sampling, were utilized this study. Participants were asked to participate in semi-structured interviews that took place over the phone or in person. The responses were analyzed through a content analysis process. The next chapter will discuss the findings related to each of the key research questions.

Chapter 4. Results

The purpose of this study was to explore the perceptions of flora poaching in the Appalachian Region through qualitative interviews with conservation officers, park rangers, and other similar conservation professions. The first two chapters discussed the history of wildlife and natural resource regulations, current laws and regulations, and past-related research. Chapter 3 discussed the purpose of the current study as well the methodology associated with it. A content analysis was conducted to answer the research questions presented in Chapter 2 and Chapter 3. The research questions are reiterated in Table 2 for reference. Results are discussed in relation to each of the four research questions. First, a brief description of the sample characteristics is provided.

Table 2

Research Questions

Research Question One: What types of Flora are being poached in the Appalachian Region, and how prevalent is the problem?

R1_a: What types of plants do you see being poached in your area?

R1_b: Do you hear from other conservation officers regarding these problems in their areas? Is it perceived to be a serious problem?

R1_c: How extensive is plant poaching in your area? And does that vary depending on the plant in question?

Research Question Two: What are the characteristics and motivations of poachers?

R2_a: In your experience, do plant poachers share similar demographics? Such as age, race, and gender?

R2_b: What do you think motivates them? Is it solely money, or do you think that other factors play a role.

R2_c: Do you think that they are worried about being caught? Do you think they perceive it as wrong?

Research Question Three: What tactics, if any, do flora poachers utilize?

Table 2 continued

R3_a: Do plant poachers have specific poaching tactics? How do they accomplish the act of poaching based on what you see and hear?

R3_b: Does it seem like they focus on specific areas?

R3_c: Do you think they are opportunistic, habitual, or both?

R3_d: How do they seem to go about avoiding detection?

R3_e: Are poachers typically in groups or solo based upon what you have seen and heard?

Research Question Four: How do conservation officers/park rangers deter flora poaching in Appalachia? What role do other agencies play in combatting the problem?

R4_a: How do you combat plant poaching in your area? Please explain?

R4_b: Do you have any deterrence measures currently in place?

R4_c: What barriers are there to implementing deterrence measures?

R4_d: Are there any other agencies or organizations that assist in combatting the problem, or that you think should be assisting with it?

Demographics and Conservation Experience

As discussed, participants were drawn from several states: Tennessee (N=11), North Carolina (N=4), West Virginia (N=3), Virginia (N=1) and Kentucky (N=1). The overall sample (N=20) was diverse in terms of overall experience, ranging from seven years in the field of conservation to approximately 35 years. Conversely, little diversity was present in terms of gender, as 19 of the participants identified as male. Most had been in their current role for a substantial period of time, which gave them an extensive amount of knowledge regarding the problems faced within their areas.

Research Question One: Poaching Targets

The first research question sought to understand what flora are being poached in the Central Appalachian Region. A brief list of flora examples was provided to facilitate conversation at the beginning of the interview (e.g., ginseng, golden seal, black cohosh, galax, and trees). A wide variety of flora was discussed by participants, as 18 total plants/trees were identified (it should be noted that all trees, regardless of type, were included in a single category). The most commonly mentioned plant was the ginseng plant (N=20), which all participants reported being a commonly targeted item. The second most mentioned target was trees or “timber theft” (N=10), closely followed by moss (N=9). Galax, golden seal (yellow root), and mushrooms were each discussed by five total participants (N=5), closely followed by black cohosh, muscadine grape vines, and ramps (N=4). Rhododendron was identified by a few participants (N=3), as were bloodroot, ferns, and laurel (N=2). Lastly, may apple, trillium, hydrangea, yellow lady slipper, fairy wand, and venus fly traps were each mentioned by a single participant (N=1).

Some variation existed by state, with participants in Tennessee and North Carolina mentioning the widest variety of plants. The plants identified in Tennessee included ginseng, ramps, moss, hydrangeas, rhododendron, grapevine (muscadine grapevines), black cohosh, bloodroot, ferns, laurels, may apple, and trillium. Mushrooms were also identified, specifically reishi and morel mushrooms. The category trees or timber theft was also identified. This category included silver pines and oak trees. In addition, the plants identified in North Carolina included ginseng, moss, galax, bloodroot, rhododendron, ramps, laurel, fairy wand, yellow lady slippers, and several types of trees. The categories of trees or timber theft included yellow poplar trees, locust trees, Fraser firs, slippery elm trees, cherry bark, and white oaks. Next, plants

identified in Virginia consisted of ginseng, oak trees, and curly maple trees. Plants identified in West Virginia included ginseng, but also golden seal and black cohosh. Last, ginseng was the only common target mentioned by the officer in Kentucky.

Poaching Extensiveness

To understand the general extensiveness of flora poaching in the Appalachian Region, the interview guide queried the participant's perceptions of poaching prevalence. Specifically, they were asked whether they perceived poaching to be extensive in their area and if that varied depending on the plant in question. Their respective responses are outlined below based on their professions: conservation officers, park rangers, and botanist.

Conservation Officers. Based on the interview responses the majority of conservation officers (N=15) in the sample perceived plant poaching to be extensive, or at least an issue of concern. For example, Conservation Officer Six stated "Ginseng poaching is rampant in my area. Rhododendron and laurels are also common." As previously discussed, ginseng was identified by each participant (N=20) in the study as a targeted plant by poachers. Similarly, Conservation Officer Seven stated "Plant poaching is extensive in the area and it is mainly moss and ginseng." The idea of plant poaching being extensive was further expressed by Conservation Officer Sixteen, who was located in West Virginia:

"I would say half or a little more than half of all ginseng sold in this area has been harvested illegally. The season comes on September 1st. People will start digging in when ginseng starts coming up in April. So, these people have about 5 months to dig it illegally."

Conservation Officer Seventeen, who was located in North Carolina, had similar sentiments of illegal harvesting, sharing the following:

“I would definitely say it is an extensive problem. We are not catching even 20% that are poaching. We are catching the ones that are bad at it. I think we see it more because the federal government does not give permits for ginseng. You would have to have written permission from landowners. Since there are not permits for ginseng, it is automatic poaching if you are digging in the national forest.”

Other officers noted that plant poaching extensiveness depends on the state of the economy. For instance, Conservation Officer One in Virginia stated:

“So, you have to realize this is a commodity. Just like oak and the curly maple, and ginseng. They are up and down. So, it would become a problem as the price increased. You would never hear about stolen timber when the housing market is down. And then when the housing market is up and there is a great need for hard wood and cabinets – you would see the price of one solid oak tree go from \$400 to \$3,000. Then you would start to hear more amongst the officers, seeing more timber theft. It is the same thing with ginseng. It is a worldwide commodity and sometimes is useless and sometimes it’s expensive. It is supply and demand. So, I think that fluctuates with the price.”

Similarly, Conservation Officer Eight stated “I would say it is extensive. I think it goes with the ebb and flow of the economy.” Only one participant, Conservation Officer Nine, indicated that they did not receive many reports of poaching: “I do not get a lot of reports and most of those I mentioned [within the interview] were with other officers.”

Park Rangers. The two park rangers in the study had differing perceptions of flora poaching extensiveness. Park Ranger Two shared similar statements to many of the conservation

officers mentioned above. They stated “I would say it is the most extensive in the United States. For ginseng, I doubt anyone exports as much as this area. Personally, the most ginseng roots I have seized were 500 roots.” Contrastingly, Park Ranger One discussed plant poaching as something that occurred in more rural areas and in the past tense:

“There are kind of different levels of seclusion. So, the ginseng folks were kind of like one level back even from us if that makes sense. So, it was not too extensive, but it was something that you heard about. Every now and then you would meet somebody who would say “I used to hunt ginseng” or “I knew a guy that did”. But it was not everybody doing it, you know? I think you would have to go way back in the holler to see that.”

Botanist. Botanist One also revealed they perceived plant poaching as a market. When queried regarding prevalence, they stated “I would think it ebbs and flows depending on the price or market. Young people aren’t getting out to the woods like they used to. My gut says it is declining, but I do not fully know.” This sentiment is similar to those discussed by Conservation Officers Eight and Nine above.

Perceptions of Colleagues

The participants in the study were asked if they heard from other professionals in the field regarding plant poaching in their areas as well as if it was perceived to be a serious problem by their colleagues. Seventeen (N=17) participants indicated that they regularly heard about problems from other conservation officers or other professionals in their surrounding areas. For example, Conservation Officer Seven stated “Yes. Other conservation officers experience the same poaching issues, and it is considered a serious problem.” Similarly, Conservation Officer

Seventeen shared: “Yes. I have five cases in court currently. Four of those five cases came from other game wardens. I work with [them] a lot...”

Sharing cases and information can build relationships with other professionals in the field. Park rangers share information with coworkers and other professionals just as conservation officers share information with their coworkers. For example, Conservation Officer Seven stated, “Yes, other conservation officers experience the same poaching issues...”, which was in response to whether they hear from other conservation officers in the field. Botanist One also shared that they do hear from other professionals in their area, and that they universally agree that poaching of plants and trees is a problem.

The few participants who did not indicate regularly hearing from colleagues provided broader explanations. For instance, Park Ranger One, when asked stated:

“A little bit. There is a relatively new park called Rocky Fork. I believe it is the largest wilderness area that is a state park in Tennessee. I could be wrong about that, but it is huge. It is very secluded. They do not have anything as far as the historic stuff. It is more of a nature park like mountainous trails and that kind of thing. They deal with that a fair bit. Mostly ginseng and probably a little bit of trillium.”

Park Ranger One was hesitant to confirm that it was a common occurrence (to hear from others) since their experience indicated that only certain places in their area dealt with such issues. Moreover, Conservation Officer Four was also somewhat hesitant, indicating that some in their area dealt with ginseng poaching and timber theft, but not all. Lastly, Conservation Officer provided the following:

“Well, no, we wouldn’t talk about any more than we would talk about any other crime... You got to realize as well, that most conservation police officers are policing as specific geographic region. The type of conservation officer I was, we only dealt with what was within the boundaries of our park... We would only respond within the property we were overseeing... So, the officers that worked there with me would talk about it occasionally.”

Based upon the above quotes it appears that even participants who didn’t regularly hear about problems admitted that they existed within certain parks or geographic areas.

Research Question Two

The second research question sought to identify perceptions of the demographics, characteristics and motivations of poachers, as well as their perceived fear of apprehension. The participants generally provided similar thoughts on these topics. Each will be discussed in some detail below.

Poacher Demographics

All the participants in the study, with the exception of the Botanist (who indicated they had little experience directly dealing with poachers), suggested that the age of plant poachers can vary significantly depending on the target in question, while race was rather consistent (primarily White). For example, Conservation Officer Eight stated:

“It is all across the board.... So, like teens all the way up to the 50s. Ginseng is mostly middle-aged, white males. I have seen younger individuals and females digging ginseng as well. Timber theft seems to be middle-aged, white males as well.”

Conservation Officer Nine stated “Race would be white. Typical age runs the gambit. They are probably 18-50 years old.” Similarly, Conservation Officer Two shared, “I see a lot of predominantly white males. They can be anywhere from early twenties all the way up to their seventies. That is a pretty broad range.” Conservation Officer Six echoed this perception: “They are predominantly white males. They are 18 to 60 years of age. I have never encountered a woman illegally digging ginseng. A female may wait in the vehicle or drop them off.”

In total, the majority of interviewees (N=15) reported seeing predominantly white, male plant poachers in Central Appalachia. However, the remaining five participants identified other racial backgrounds. For example, two participants reported seeing Hispanic plant poachers, who typically target grapevines, moss, and galax when poaching. Moreover, Conservation Officer Thirteen shared:

“Race tends to be either Native American or White and they go after ginseng. I have personally not charged anyone who was African American. Specifically, with Galax and moss, we see a number of Hispanics digging those. It is also either male (60%) or female (40%) when it comes to sex. It is usually a couple in a relationship that are digging together when females are involved.”

Park Ranger Two was the only participant to identify the role of Koreans in the problem. They stated that, “Consumers of ginseng are typically people of Korean descent that travel here from north Georgia. They know we have a lot of ginseng here as well as other plants.” Moreover, four participants stated seeing female poachers or accomplices of poaching. However, men (N=15) were seen far more frequently than women (N=4). Lastly, African Americans were not identified by the participants as commonly involved in plant poaching in the Central Appalachia Region.

Characteristics

The participants also mentioned other characteristics and commonalities between poachers they have seen while in the field. Almost half of the interviewees (N=9) shared descriptions of characteristics other than age, race, or gender. For example, Park Ranger One suggested that physical fitness, a lack of employment opportunities and drug addiction were all common traits:

“Because again you have to be pretty physically fit to be hiking around all day. It is also often guys who do not have a lot of employment options. They might have a history of petty crime, alcohol, or drugs. They just don’t have a lot of good prospects in life.”

Similarly, Conservation Officer Five shared “... [they] come from low economic backgrounds. They seem to share a common theme in that they are involved with methamphetamine.” Addiction to prescription pills was identified as well. Conservation Officer Sixteen provided a broad description of the typical plant poacher:

“I would say they all fit into one mold. They are culturally more outdoors in these rural areas. They typically do not hold a steady job. They are typically low-income individuals. There is typically substance abuse involved. Prescriptions pills such as hydrocodone were big with these individuals when I first started. Now it has drifted to heroin and methamphetamine users. These people will dig, sell it for cash, and then support their addiction.”

Other interviewees also pointed to the perception that many offenders were “outdoors types.” For example, two used the description of “mountain men” or “mountain-men-like” to describe plant poachers they have encountered. Park Ranger Two stated:

“People that are very knowledgeable of the woods and resources who have jobs that allow them time to go out and hunt for these plants. It can be someone who is in the trade who can take a week off and hunt for these plants. These individuals are “mountain men-like” for lack of a better term.”

Conservation Officer Seventeen shared a similar description, saying: “I see what people would call “mountain folk” often... It is almost like heritage/tradition to them.

Motivations

Another component of research question two sought to identify commonly perceived motivations of plant poachers. The participants in the study identified four common motivations, including financial gain, gamesmanship (i.e., excitement), addiction to illicit drugs, and traditional practice. Financial gain refers to the desire to sell the stolen plants for profit. Gamesmanship, on the other hand, entails the simple excitement derived from poaching and avoiding conservation officers or park rangers. In relation to drugs, some poachers are perceived to desire to use plant poaching to support their addiction. Lastly, some flora poachers are motivated due to it being a traditional practice that has been passed down from generation to generation. These are discussed in greater detail below.

Financial Gain. The most popular perceived motivation of plant poachers was identified as financial gain. The vast majority of participants in the study (N=18) identified financial gain as a key motivator. Conservation Officer Six shared, “They are looking for quick cash... Those people are usually digging out of season. So, cash is a motivator because it is untraceable and is untaxed.” Quick, untraceable, and untaxed money provides the poacher with potential “under the table” income. Similarly, Park Ranger Two further said, “A primary motivation is tax-free money. If it could not be sold for money then there would be no motivation.” Moreover,

Conservation Officer Eleven shared, “I think it is easy money for them. They can dig day or night in remote areas.”

Illicit Drugs. It is important to note that illicit drugs and financial gain are co-occurring in some instances, as several participants identified how the money gained from selling poached plants is usually used for their purchase. Overall, the motivation to obtain illicit drugs was the second most mentioned (N= 11) by interviewees. For example, Conservation Officer Five shared, “It is also drugs. Sometimes, they will harvest mature plants and will sell them for cash. Other times they will dig up immature plants, that are illegal to harvest, and go to unregistered buyers and trade the roots for drugs.” Similarly, Conservation Officer Sixteen shared, “Drugs, for the vast majority, are their primary motivation. There may have been a time when it was used as supplemental income, or it was a way of life. Now, it is mostly used for drugs in the area where I work.”

Traditional Practice. Nearly half of the sample (N=9) suggested that poachers are also motivated by the traditional nature of plant poaching. In other words, it is seen as an activity that is passed down and culturally accepted. For example, Conservation Officer Fifteen shared, “Most of it is traditional. In my area, people used to do it as a family past time because it was not always illegal...I have also heard people say it is their heritage and they do not care if it is illegal.” Similarly, Conservation Officer Four shared, “I do believe ginseng poaching is passed down to later generations as it is the most common. Ginseng is not easily identifiable unless someone else has taught an individual what to look for.” Similarly, Conservation Officer Seventeen stated, “The ginseng individuals seem to have been raised in it like a tradition or heritage practice.”

Gamesmanship. Gamesmanship was identified by one participant (N=1) in the study as a motivation of plant poachers. Gamesmanship was also co-occurring with financial gain or money. Park Ranger One stated “Yeah, I think it is enticing. I think money is the main one. I don’t think they hate doing it. It is probably kind of fun and exciting to some degree.” Moreover, Park Ranger One further stated, “I don’t want to stereotype, but that is another element of excitement for these guys. It is kind of like a game.” Based on this observation, the act of illegally harvesting may be exciting to plant poachers due to the risk of getting caught and evading a Conservation Officer or Park Ranger.

Fear of Apprehension

The majority of participants in the sample (N=14) identified that plant poachers fear apprehension in spite of the fact that some do not think what they are doing is wrong. For example, Conservation Officer Thirteen stated:

“They are all worried about being caught. I would say we have seen a change in their tactics. I will say it depends if they believe what they are doing is wrong. We have a lot of people doing it that believe it is a way of life and a right to harvest ginseng regardless of the laws. They often see no harm in digging things like galax and moss because it is common to find.”

Some interviewees indicated that poachers fear apprehension due to the incarceration time they may have to serve. For instance, Conservation Officer Fifteen shared:

“Some believe they are not doing wrong. I do think they all would be worried about getting caught because of the jail time they are facing. One specific case is a good example of this. This duo, father and son, was caught twice. So, this was

their second time in federal court. The judge gave them 1 day each per root. They had 120 roots found in their possession. It has been a good deterrent.”

Contrastingly, a quarter of the sample (N=5) expressed that poachers do not seem to care or worry about apprehension. Conservation Officer Eleven shared that “I would say 9/10 times they will go back to doing it somewhere else.” Similarly, Conservation Officer Twelve shared, “I don’t believe most individuals are worried about getting caught, but I do believe that they know it is wrong for the most part, especially the timber poachers.” In light of these comments, deterrence may be difficult to achieve for many poachers.

Research Question Three

Research question three sought to identify poaching tactics, targeted areas, and behaviors of plant poachers. All conservation officers and park rangers (N=19) identified several common poaching tactics. The participants also provided descriptions of areas poachers targeted in the Central Appalachian Region. Lastly, the participants also provided their perception of poacher behaviors, which are discussed later in this section.

Poaching Tactics

Six different tactics will be discussed at length below so as to better understand a plant poacher’s methods. Additionally, targeted areas and behaviors, specifically opportunistic and habitual behaviors, are discussed.

Backdoor Poaching. Of the participants (N=20) in the study, a little more than a quarter (N=6) identified a tactic referred to as “backdoor poaching” as being common. For example, Conservation Officer One explained in detail:

“Well, you know, most of it involves walking. So, especially with a root (ginseng). Most of them will start on land that they feel they have a reason to be

there and then encroach. They are not going to drive to someone's land and go. But they will search their area and then expand it into someone else's. The people that I have caught will say "I know I'm on public land and I'm not supposed to do that, but I started on my land. I didn't realize I had come over on you (onto other property). So, some of the things state parks do is really step up on the markings, which in part helps us say "Yeah but you walked past a sign that said you were on someone else's land." So, one of the habits that I saw is that they would start either on their land or on their family's land and then keep going. I think that helps them to rationalize to have an excuse of "I just went too far" and that they didn't really set out to do this. So, it is a little bit of cover for them."

Essentially, plant poachers will begin harvesting on land they are legally permitted to be on, and then cross over or use the "backdoor" onto private or national forest land. Similarly, Conservation Officer three shared, "They start on their property and move into someone else's property." Conservation Officer Eleven also shared a similar description, "I have seen ride four-wheelers on the road and go up logging roads. They will also cut through other people's property." Additionally, Conservation Officer Seven also observed noted the backdoor tactic and stated, "Some poachers have specific drop off areas and others go to a permitted piece of land to cross into a restricted area."

For the plant poacher's success, they must not backtrack so as to maximize their yield in harvest, maximize their profits, and better avoid law enforcement. Back door poaching increases the likelihood of success and greater profits for poachers. It also doubles as a way to evade or avoid law enforcement presence in the surrounding area.

Drop-off and Pick-up. The majority of the sample (N=14) identified a “drop-off and pick-up” tactic that poachers regularly utilize. The tactic consisted of another person dropping the poacher off in a location and then picking them up later a separate location. For example, Conservation Officer Eight shared, “They will either get dropped off or park in a secluded area. A lot of them do not want to backtrack so they can continue finding new plants to dig.” Backtracking negatively impacts a poacher’s overall financial gain, since previously covered areas lack prime targets. Further, it appears that this approach helps poachers to avoid detection: “Others will be dropped off and picked up at a separate location. With cell phones and cell service being available in more places, we have seen an increase in drop-offs and pickups (Conservation Officer Thirteen).” Technology, specifically cellphones, have made it easier for poachers and their accomplices to navigate the woods and outmaneuver conservation officers and park rangers. Conservation Officer echoed this sentiment:

“Those who have been educated or caught before will be dropped off so there is not a vehicle left behind. We cannot be everywhere at once, so when they use the drop-off tactic, we do not know they are even in the woods.

Conservation Officer Five further highlighted the difference in a poacher’s experience level:

“They also have people drop them off and pick them up later at an appointed place and time. It varies depending on their experiences of being caught before and their knowledge. Those two scenarios are the main ways. If they are a seasoned ginsenger they will not backtrack or cover the same ground because that cuts in their profit. So, the ginsengers that are dropped off will not be picked up in the same area. They will be picked up several miles away.”

Camouflage and Concealment. Camouflage and concealment relate to how poachers use camouflaged clothing and vehicles to conceal themselves and flora that was illegally harvested. Over half of the participants (N=11) in the study identified tactics that fall under the umbrella of camouflage and concealment. For example, Conservation Officer Fifteen provided:

“They also do counter-surveillance tactics. They do not enter and leave the woods in the same place. They will stop and listen before they come out of their concealment. Some folks will leave a lookout at the vehicle. Before they come out of the woods they will stash what they have poached or wash their hands in the creek to get the dirt off. They will spray paint feed sacks to blend in better with the woods.”

Similarly, Conservation Officer Two shared:

“A lot of them will hide it like they're hiking. In today's world, if you see someone walking on a trail or old road you are patrolling, I can't say make them let me look in their backpack. The officers get sharp about watching these guys and figuring them out pretty quick. If you see a guy walking with really dirty hands, dirt under their fingernails, and their clothing is heavily soiled then you can spot that pretty good. Some of these guys are pretty extreme and will try to avoid people altogether. If they hear a vehicle coming up the mountain, they will step off the trail a few feet and it is so thick that time of year you will never see them. A lot of them wear camouflage like hunters. They know how to avoid. They do not want to trouble. A lot of them on non-violent but some are. It just depends on the person.”

These officers provided observations of multiple forms of camouflage and concealment tactics plant poachers have utilized. Through their detailed descriptions (in addition to comments made by other interviewees), poachers try to 1) conceal their harvest in the woods or in spray painted sacks, 2) try to camouflage themselves as a hiker, 3) wash their hands or change clothes entirely, 4) step off the trail to blend in with the foliage, 5) wear camouflaged patterned clothing, 6) practice their own reconnaissance, and 7) make camp in an area for a prolonged poaching stay. In line with the last item, Conservation Officer Thirteen suggested: “Sometimes we see people have camps. They will go in for a few days at a time and then come back out. Often, they will not bring the ginseng out that time and pick it up next time to avoid getting caught.

Corruption. It is important to note that one participant in the study identified the possibility of corruption among conservation officers and park rangers as contributing to the problem. Park Ranger One shared their perception of corruption:

“There is a lot to that. One thought is that, on some level there is corruption in law enforcement. Wherever you go and to some degree. I heard of cases back when I was younger. The sheriff or game warden would be in on it, because they are out there as well. They might sort of be looking for ginseng. They might have a deal with a ginseng hunter, and they split the profit. The poacher won’t get caught and will make some money and the game warden makes some money. So, it’s a win/win. So, there is corruption to some degree. I like to believe it is not as bad as it used to be, but who really knows? There is also only one time of a year that is it good to get ginseng. They can’t really plan too many tactics around that because they are stuck to that time frame.”

Groups or Solitary Hunting. Of the participants in the study, 75% of the sample (N=15) reported observing poachers in groups. Conservation Officer Fifteen stated “I would say 60% groups, 40% solo...The solo ones are more difficult to catch because they are the ones being dropped off.” It was common for participants to observe both solo and group tactics in the field. Similarly, Park Ranger Two stated “It is common that they are in groups of two. I have seen groups of three and quite a few that were solo. I would say it is 50/50.” Conservation Officer Seventeen shared a similar statement as the quotes listed above, sharing, “I would say 50/50. I see a lot of 2-3 sized groups. I have seen a lot of solos as well.” Additionally, Conservation Officer Three shared, “Some of times they dig in small groups. They will have a buddy. Others will go by themselves. We are working it as if it were drugs. We have buyers, sellers, trustees. These roots are like currency in the mountains.”

The participants identified observing solo plant poachers often. Of the participants in the study (N=20) 18 participants or 90% of the sample identified the solo poaching tactic. Park Ranger One stated:

“A lot of times they are either solo or just two guys. But again, it is such a lucrative practice, I think it is most often solo from what I have seen. People don’t want to share, you know? You have all this money and think you can do it yourself or “I don’t need my buddy’s help”.

The motivation of financial gain is one reason a poacher might choose to poach solo. Similarly, Conservation Officer Four shared, “I have mostly witnessed solo poachers, but have found two individuals working together. Poachers typically split up to cover more ground even if they arrived together.” Splitting up or going solo ensures they can cover more ground or potentially alert one another of law enforcement presence.

Opportunistic or Habitual Behaviors

Another component to research question three sought to identify the behaviors of plant poachers. Specifically, the behavioral component of research question three examined opportunistic versus habitual poaching behaviors. Many of the participants in the study (N=10) saw both behaviors while working in the field. However, of the participants in the study, 19 participants identified observing habitual poaching behaviors. Conservation Officer One shared an example of habitual poaching:

“I think most I saw had planned exactly what they were going to do. You know, the people who were taking the curly maple or the American chestnut and sometimes even white or red oak depending on the commodity price. You would have to take a chainsaw with you. When you need tools or in the case of timber when you need somebody to help you, or you need a vehicle to haul it out. Those things are pretty well planned, so I don’t think I ever saw anyone ever spontaneously do that.”

The example provided by Conservation Officer One was centered on timber theft or timber poaching. Timber poaching is more labor intensive depending on how the poacher intends to harvest the tree. If the poacher must fell the tree, the poacher(s) will need equipment such as a chainsaw, ropes, vehicle, trailer, and potentially other tools. Therefore, timber theft or timber poaching would be a pre-planned, purposeful, and habitual in those cases.

Other habitual behaviors noticed by conservation officers or park rangers was potential booby traps. The presence of these traps is a demonstration of planned “protection” of ginseng grows in the following example. Conservation Officer Two shared:

“One of our officers who was in “blank county” at the time found a booby trap. That had placed a PVC pipe, a board, and a rat trap that was set up on the back it to a charge to set off a buck shot charge in the pipe. That would have killed somebody. They will also do stuff like that on these ginsengs grows. They will hang fishhooks. They will take fishing line and hang fishhooks down about chest to eye level so you will walk right into it. You can’t see them in the woods. That is a common thing these people use to keep trespassers out of their property.”

Conservation Officer Four shared similar perceptions of “pre-planned” behaviors, “I believe most poachers are habitual in their pursuits. Most areas where poaching occurs are well off the beaten path, so the individuals have likely made plans to travel there for that specific purpose.”

Additionally, a large portion of the sample (N=14) also observed opportunistic behaviors.

Park Ranger One shared a specific scenario of opportunistic poaching:

“They are probably pretty hard up for money. I think it can be addicting to be honest. I think it’s opportunistic in the sense that, if it has been a hard year and they need the money – they are going to do more of it.”

Moreover, Conservation Officer Six stated, “I would say all of the above. They are always going to do it, but if they see an opportunity, they will do it then as well.” Financial gain was a motivator discussed above and applies to the opportunistic poacher. Conservation Officer Seven also shared, “It is usually opportunistic as a way of obtaining money, but it is habitual at times.” Plant poachers become more opportunistic poachers when there is a greater financial need to be met. However, poaching behaviors can easily become habitual poaching as previously discussed.

Targeted Areas

The potential for poachers to target specific areas was also examined in the interviews to better capture where poachers travel to poach flora in the Central Appalachian Region. A common theme identified by conservation officers and park rangers was that a secluded, less travelled area was most likely to be targeted. Conservation Officer One provided a few reasons why poachers search for secluded areas, sharing:

“Yeah well, in my experience, when I say remote try to keep in mind that Central Appalachia is all remote for the most part. Like a burglar would...Where could I reduce my chances of getting caught? So, most of the times when they are caught, I never caught anyone doing it near cemeteries. They were afraid families would be there. Just like any criminal they would try to find places that would give them cover. Where are people going to be? Because I am going to go somewhere else. One, they would reduce their chances of getting caught. Two, they also knew where people frequent so they know what they’re looking for would not be there anyways. The more remote they could get, the better. You are not going to find ginseng anywhere near a trail. If it was there, it is “low-hanging fruit”. They want to go where no one else has been.”

Conservation Officer One made it clear that poachers do not want to be near people, due to the potential exposure or the potential for law enforcement to be notified. In addition to avoiding people in general, secluded areas also mean it has been mostly or completely untouched. Therefore, poachers are more likely to find the plant they are looking for, potentially in abundance, in secluded areas.

Additionally, the participants identified geographic characteristics that plant poachers, especially “ginsengers”, seek out when scouting for new target areas. Conservation Officer Two stated, “These guys that have been doing it for several generations know where they are going to go. They go to a north-facing slope on the mountainside and know where to find ginseng in the area.” The attractiveness of north-facing slopes was also identified by other participants in the study. For example, Conservation Officer Three shared, “They like to dig on the northeast ridges, swags, hollows, and sides of the mountain. It will be kind of shady.” Similarly, Conservation Officer Five shared “They will target areas that others frequent that do not know what ginseng is and areas where they can blend in. Any place that has a northern or eastern-facing slope will be targeted.”

Two other unique observations were identified by two separate participants in the study. First, Conservation Officer Eleven shared, “Secluded areas, or land that does not have someone watching over it closely [would be more attractive].” In other words, secluded areas or land that lacked the presence of a capable guardian are at a greater risk of poaching. Second, Park Ranger Two stated, “They are kind of poaching wherever or anywhere they can find it.” Park Ranger Two’s perception is unique in that it was not a specific example like the other participants in the study. Park Ranger Two did not observe specific areas that poachers targeted, but noted poachers will be “anywhere” they can find the plant they want to harvest.

Research Question Four

Research Question Four sought to understand deterrence measures against flora poaching, barriers conservation officers and park rangers face, and agencies involved with poaching cases. Various deterrence measures are discussed below, as well as the multiple barriers conservation officers and park rangers encountered. Frequent barriers conservation

officers and park rangers face consist of manpower issues, funding, and legal challenges. Lastly, agencies that assist in plant poaching cases are noted.

Deterrence Measures

There were several deterrence measures identified by the participants in the study. First, over half of the sample (N=12) identified patrols or visual presence as a deterrent against plant poaching. For example, Conservation Officer Five stated, “We patrol and look through violations through that. Our physical presence is a deterrence.” Moreover, Conservation Officer Four stated, “Most plant poaching tends to occur during the spring and summer, so we patrol known areas more frequently during that time.” Increased, routine patrols and presence is a deterrent method most of the sample utilized in the field.

Second, two of the participants in the study identified public information and education as a form of deterrence. Education on native Appalachian plants, their purposes, and their historical importance can potentially spread the notion of conservation. Park Ranger One shared:

“The patrols, signs, and interpretation are a big part of my job. Interpretation is pretty much education and inspiration. Through education and inspiration, you can spur people onto the idea of conservation. They understand how precious resources are. Hopefully, that would make them less likely to poach.”

Conservation Officer Fifteen also shared that “talking to folks, like public information” is a way to spread information about the harvesting seasons and where they can legally harvest. They further stated that, “The spread of information on our sentencing for harvesting illegally is a great deterrent.”

Third, three participants in the study identified marking programs to deter ginseng poachers specifically. Park Ranger Two shared a detailed description of two marking programs they have worked with:

“We have a large marking program for ginseng. We mark it multiple ways with a proprietary marker that is a powder. So, you would expose the plant or the top part of the root. Then spray it with a tree marking paint and put the powder on it. The plant then absorbs the powder and will glow under a black light. I have personally seen it last up to 5 years. The scientist tells me it can last longer. We also have an RFID program. It is a technology that is kind of like walking out of a store with a tag on it with a UPC number. We have that technology to use for deterring.”

The next participant knew of the practice of marking ginseng roots but made note of the fact they do not use that specific deterrence method where they are located. Conservation Officer Six stated, “I know of a dye that you put on ginseng roots to identify them if they are harvested illegally. You can see the dye under UV light. That was implemented to catch those buying from people who poach. That is not done where I am at.”

Fourth, two participants in the study identified the use of cameras as a deterrence method. Conservation Officer Twelve stated, “We have some trail cameras in use in our public areas.” Similarly, Conservation Officer Thirteen shared:

“We also use trail cameras. For example, if there is an area that is being consistently dug but we have not been able to catch them, we will often set up trail cameras. We can use trail cameras on private property as long as we have consent from the landowner.”

The use of cameras can be the eyes of law enforcement when they cannot be physically present to catch poachers. This is a deterrent measure in that cameras are an extra form of surveillance for the conservation officers.

Next, three participants in the sample identified sentencing information or imposing harsh sentences as a deterrence method. Park Ranger Two shared:

“Another way we deter ginseng poaching is the U.S. District Court. They are aggressive in their prosecution of ginseng poaching. It can result in up to half a day incarcerated per root taken. I have seen people sentenced up to the maximum which is six months. We use everything at our disposal to deter plant poaching.”

Maximum sentencing has been used as a deterrence method in other offenses across the United States, and now it is applied to flora poaching. Conservation Officer Seventeen shared, “The judge we have currently does not like ginseng poaching. This judge will use the full extent of the law. On the federal side, these poachers are looking at jail time instead of a fine.”

Last, one participant identified a unique method, which entailed replanting seized plants if they were freshly harvested. Conservation Officer Seventeen stated, “When we seize ginseng that is freshly dug, we will replant it so we can save the plant.” It is important to note, however, that such a tactic would only apply in certain situations since in many cases seized plants are no longer viable.

Barriers

The participants in the study identified several barriers they face, which include: 1) manpower issues, 2) funding, 3) legal challenges, 4) remoteness/terrain, 5) public perception, and 6) a learning curve. First, over half of the participants in the study (N=12) identified lack of manpower as a barrier. Conservation Officer Twelve stated, “Our lack of manpower is the

biggest barrier at this time.” Additionally, Conservation Officer Seventeen stated, “I cover about 300,000 acres by myself.” Conservation officers and park rangers commonly face manpower issues, which could impact their investigations or their ability to effectively apprehend plant poachers. Conservation Officer One also stated:

“Number one you know, understanding if we had plenty of conservation police officers. Maybe you could even have one just assigned to flora, one to fauna, and somebody else assigned to public information issues, or Facebook posting. The mere fact is sometimes you don’t even have one officer for a county. You have one officer for every four counties.”

Second, about a quarter of the sample (N=4) identified lack of funding as a significant issue. For example, Conservation Officer Seventeen further posited, “Having a bigger budget to get cameras would help us out a lot. However, that would need to be a lot of money to buy the number of cameras we would need.” An increase in funding would aid conservation officers and park rangers in implementing marking programs, and installing cameras to catch plant poachers and illegal buyers. Conservation Officer Four identified a manpower issue and funding issue together. Conservation Officer Four shared, “Manpower is our biggest barrier against fighting the poaching of plants in our areas. We do not get any funds from the resale of ginseng in Tennessee which could help with resources.” If conservation officer received a percentage of the resale of ginseng, their budget could be expanded to hire on more conservation officers.

Next, three conservation officers identified legal challenges that impact their ability to pursue plant poaching cases. For example, Conservation Officer Seven shared, “One barrier is the laws requiring us to contact the county police department to seek other avenues of enforcement for poaching.” In other words, some conservation officers are required to contact

the county police department when a case of poaching is reported on private property. A few conservation officers in the sample, in an undisclosed state, are hindered by legal challenges in the form of a lawsuit in regard to placing cameras on private property for monitoring and catching poachers. A lawsuit may take years to resolve, resulting in years that law enforcement cannot pursue plant poachers effectively.

Additionally, three participants in the study identified the remoteness and terrain of the Central Appalachia Region to be a barrier. Conservation Officer Ten identified the terrain they work on as difficult, while Conservation Officer Eight shared that the remoteness of their area is one of the biggest barriers they face. Remote areas can make it difficult to communicate or call for assistance when there is more than one poacher.

One participant also identified a learning curve to learn their job and specifically plant poaching. Conservation Officer Sixteen shared, “There was a learning curve for me coming into it because I did not know anything about ginseng.” New conservation officers or park rangers that are hired at entry levels may not have the knowledge of plants and poaching habits in their area. Therefore, training on these topics would be beneficial for conservation officers and park rangers to more effectively combat the problem.

Lastly, two participants in the sample identified the barrier of public perception. For example, Conservation Officer one shared:

“And for some reason, I cannot explain why people really take the poaching of animals personally, but necessarily when it comes to the poaching of flora. There is not this outcry from the public. There is not this sense of moral stigma to someone who goes onto your land and kills an animal. You don’t necessarily

think if someone came and took mushrooms or ginseng that they are a bad person. Even though they fall into the same category legally, with the same punishments.”

Although, the problem of plant poaching is commonly known and understood by professionals in the field, the public does not always share the same perception. Similarly, Conservation Officer Ten stated:

“The public’s perception makes it difficult. We have a Facebook page where we can post the poached plants that were seized. We will get comments like “You are really worried about that?” The public does not realize that it is an important issue.”

The public is made aware of the seized plants and the successful apprehension of plant poachers; however, the public does not fully understand the importance of conservation efforts due lack of exposure and education on plant poaching.

Contributing Agencies

There are a number of agencies the sample identified working with on plant poaching cases. Almost half of the sample (N=9) reported working with their local sheriff’s office. This is typically due to conservation officers contacting the local sheriff’s office when the report of poaching is made on private property. Again, almost half of the sample (N=8) reported working with the U.S. Forest Service on plant poaching cases. Several of the participants (N=6) identified working with the U.S. Fish and Wildlife on more prominent cases of plant poaching. In addition to the most commonly mentioned contributing agencies, the sample also identified working with the Tennessee Department of Agriculture, Tennessee Department of Environment and Conservation (TDEC), North Carolina Wildlife Service, and North Carolina Department of Agriculture. Last, Park Ranger One shared that state parks stay in communication with each

other, which served to keep them up-to-date with current issues or new issues as they arise within the parks.

Chapter Summary

The purpose of this chapter was to discuss the content of the interviews with conservation officers and park rangers in the Central Appalachian Region. This chapter also served to understand the perception of plant poaching, poacher characteristics, poacher motivations, poaching tactics, target areas, deterrence measures, barriers, and other agencies that aid in the enforcement of conservation. Each research question was discussed in detail to better understand the findings. The final chapter will further discuss these findings and the implications of this study, limitations, and future research directions.

Chapter 5. Discussion

The aim of this study was to investigate perceptions of flora poaching in the Appalachian Region. The investigation was carried out by conducting qualitative interviews with conservation professionals, such as conservation officers and park rangers. The first two chapters of the study delved into the history of wildlife and natural resource regulations, current laws and policies, and related research. In Chapter 3, the purpose of the current study and the methodology associated with it were discussed. A content analysis of interview quotes was conducted to address the research questions presented in Chapter 2 and Chapter 3. Chapter 4 identified the findings regarding the research questions outlined in Chapters 2 and 3. This chapter serves to provide a more nuanced discussion of those findings.

As discussed within the literature review, there have been numerous federal-level measures implemented to protect wildlife in the United States, such as the Endangered Species Act, Migratory Bird Treaty Act of 1918, and The Convention on International Trade in Endangered Species of Fauna and Flora (CITES) (Department of the Interior, 2022; U.S. Fish and Wildlife Service, 1973). There are also other laws and regulations at the state level to further enforce the notion of conservation. Though these vary, they include defining harvest seasons, establishing permit requirements, and defining limits. Even with these laws and regulations in place, the goal to reduce illegal harvesting has been difficult to achieve, especially in relation to flora poaching. As such, the information gathered from the current study should offer much to our understanding of the problem and potential solutions to it.

Flora Poaching

There has been sparse research on rural crimes overall. Specifically, there has been very little research centered on flora poaching in the Central Appalachian Region. For instance, Young et al. (2011) is the only study addressing flora poaching in any form within this part of

the country. Their findings indicated that four primary plant targets exist, including 1) ginseng, 2) bloodroot, 3) black cohosh, and 4) galax (Young et al., 2011). The current study sought to build upon this work by identifying current perceptions of these targets, in addition to others that may exist. Through interviews with conservation officers, park rangers and botanists, several plants that are illegally harvested across the Central Appalachian Region were noted: ginseng, ramps, moss, hydrangeas, rhododendron, grapevine (muscadine grapevines), black cohosh, bloodroot, golden seal, ferns, laurels, may apple, trillium, reishi mushrooms, morel mushrooms, fairy wand, yellow lady slippers, yellow poplar trees, locust trees, fraser firs, slippery elm trees, cherry bark, curly maple trees, silver pines, and oak trees.

The most commonly mentioned plant was the ginseng plant (N=20), which all participants reported being a commonly targeted item. This finding is not surprising since it has routinely been suggested to be the most at-risk plant in the U.S. (Miller, 2021; Predny & Chamberlain, 2005; Young et al., 2011). It appears that concern for its protection is more than warranted based on the interview results. The second most mentioned target was trees or “timber theft” (N=10), closely followed by moss (N=9). Timber theft (illegal logging) is often driven by the desire for higher profits. This is one of the main reasons why some poachers engage in this activity (Noora et al., 2020). The relative isolation of the Appalachian Region, combined with extensive opportunities in the form of national and state forests, likely contributes to the prevalence of timber theft. Moss was reported to be harvested for ornamental decoration, as were galax, ferns, trillium, fairy wand, venus fly traps, and hydrangeas. No research to date has explicitly explored this market, or whether poaching of these plants is committed in connection with legitimate businesses (or simply the work of opportunistic actors). Since previous works

have found that businesses may have involvement in other forms of poaching (e.g., taxidermists, guide services), it may be beneficial to explore this potential connection in future work.

Galax, bloodroot, and black cohosh are commonly harvested for medicinal purposes, especially for export to Asian markets (Gurley et al., 2012; Ha et al., 2017; Miller, 2019; Robbins, 2000). Since all grow in abundance within the Appalachian Region, and since those markets make their exportation financially worthwhile, it is understandable that they are considered to be common targets. Mushrooms, muscadine grape vines, and ramps were also mentioned within the interviews. These can all be harvested for consumption, or intended for later transfer to wholesalers and distributors. Rhododendron was identified by a few participants, as was laurel. These are both primarily harvested for landscaping purposes, and bring little value on the illegal market. This likely partially explains why fewer participants viewed them as significant targets among poachers.

The current study also sought to determine whether the poaching of plants was considered to be prevalent, both in terms of the individual's own experiences and what they heard from coworkers. The vast majority of the sample perceived flora poaching to be an extensive issue. For example, only one individual perceived plant poaching to be an issue of the past. All others pointed to it being of significant concern, especially within certain areas that offer greater opportunities. Flora, based on what was learned from these individuals, appears to be a commodity that is in demand. Further, this demand appears to increase when market conditions warrant it (such as when prices are considered high). Though most previous attention has been directed toward the poaching of wildlife, it seems that conservation professionals consider plants to be equally at risk and worthy of protection.

In addition to their own experiences, the majority of the sample regularly heard about plant poaching from their colleagues, which further suggests it is a common issue. The participants in the study reported hearing from other professionals and discussed how they share similar concerns. Park rangers and conservation officers appear to share information with coworkers and other conservationists, such as botanists, which allows professionals in the field to stay up-to-date on current conservation issues. Moreover, it seems that sharing information allows individuals to work together to investigate cases and deter potential offenders. Flora conservation is difficult to achieve, as previously discussed. Information on flora conservation, based on interviewee responses, needs to be easily accessible and updated regularly in order to keep the public and conservation officers educated on endangered species, harvesting seasons, and other important concerns (Havens et al., 2014). Conservation officers, park rangers, and other conservation professional can be well-informed through regular communication with each other, which may also assist in working with the public to spread awareness.

Motivations and Characteristics

The current study also sought to explore the perceived motivations and characteristics of plant poachers. A few studies have taken this approach in the past. For example, Muth and Bowe (1998) examined various motivations that might influence someone to take part in poaching activities by performing a content analysis on existing poaching literature. Ten (10) separate motivations were identified in their work: (1) commercial gain, (2) household consumption, (3) recreational satisfaction, (4) trophy poaching, (5) thrill killing, (6) protection of self and property, (7) poaching as rebellion, (8) poaching as a traditional right, (9) disagreement with specific regulations, and (10) gamesmanship. Muth and Bowe's (1998) poaching motivations

were geared toward fauna (i.e., animal) poachers, which is a notable difference since some aspects (such as thrill killing and trophy poaching) are unique to the targets in question.

The current study identified four motivations of flora poachers through the completed interviews: 1) financial gain, 2) illicit drugs, 3) traditional practice, and 4) gamesmanship. The most commonly mentioned motivation for plant poachers in the current study was financial gain (N=18), followed by illicit drugs (N=11), traditional practice (N=9), and gamesmanship (N=1). Three of the four motivations identified in the current study align with three of Muth and Bowe's motivations. First, the motivation of financial gain aligns with Muth and Bowe's commercial gain motivation. For example, the price of dried ginseng varies year to year, but it sells for approximately \$550 per pound on average, while wet (fresh) ginseng typically sells for \$160 per pound (West Virginia Division of Forestry, 2020). These financial values increase when sold in bulk (i.e, more than five pounds), which constitutes a sizeable amount of untaxed money. Second, the motivation of traditional practice is similar to Muth and Bowe's notion of poaching as a traditional right. Traditional practice can take the form of harvesting plants for their medicinal purposes. Galax is a plant that is well-known in East Asian markets and is often used for medicinal purposes. Additionally, Asian markets and distributors commonly seek bloodroot, black cohosh, and ginseng for treatment of gastrointestinal ailments, skin cancer, and reproductive organ ailments (Gurley et al., 2012; Ha et al., 2017; Miller, 2019; Robbins, 2000). The illegal hunting of native flora has gained more attention from the media due to the recent resurgence in popularity of herbal and holistic medicine. Consequently, the demand for these plants has increased.

Third, the motivation of gamesmanship directly matches Muth and Bowe's gamesmanship motivation, which suggests these motivations are also applicable to both the

Central Appalachian Region and plant poaching. Gamesmanship is essentially the idea that individuals get a “thrill” out of the hunt and avoiding law enforcement. Though “trophy” targets are not as relevant to plants (as they are to animals), it appears that this does not dissuade some individuals from seeking this type of fulfillment. Finally, and of unique interest, the current study identified the additional motivation of procuring illicit drugs, which has to date not been discussed in previous research. The participants shared how flora poaching can be used to obtain quick cash, or in some cases, traded for drugs. This demonstrates a shift in current flora poaching motivations from historical poaching motivations.

The addiction rates in the Appalachian Region have been on the rise for two decades (Moody et al., 2017). The price of illicit drugs may drive the need for drug users in the Appalachia Region to seek out illegitimate means such as quick, untraceable cash. This can be obtained by spending time in the forests in the Appalachian Region poaching various native plants for financial gain or trading (bartering) for illicit drugs. Furthermore, Moody et al. (2017) highlighted drug use in rural Appalachia follows the pattern of low education levels, high rates of unemployment, and high rates of job-related injuries perpetuate risks for substance use, which is similar to poacher characteristics described by the sample in the current study.

Moreover, other rural-specific crimes are at times committed to pursue drugs. For example, Lynn et al. (2023) examined farm-related crime and victimization. Their study asked agricultural investigators about the perceived motivations for agricultural crimes, one of which was to support a drug addiction. Lynn et al. (2017) also came to the conclusion that offenders with an agricultural knowledge base commit thefts to finance these drug habits. This is in many ways similar to rural, low-income, and knowledgeable poachers, harvesting plants to support their drug habits either by quick cash or bartering ginseng roots for drugs.

In addition to motivations, poacher characteristics and demographics were examined. To date, only one study has explored demographics and the role that they may play in poaching activity. Crow et al. (2012) found that the typical poaching offender was white (81.2%) and the majority were male (95.2%). The typical offender was approximately 36 years of age. Black individuals were more likely to be cited for the illegal possession of fish, while White individuals were cited for illegal hunting methods and marine conservation offenses (Crow et al., 2012). It is also important to note Crow et al. (2012) study was focused in Florida, which is outside of the Appalachian region and likely not generalizable to Central Appalachia due to the unique populations in Florida.

As such, it was important for the current work to address the topic. Results indicated that interviewees perceived the age of plant poachers to vary significantly depending on the target in question. For instance, the reported age of plant poachers ranged from 18 to 60 years old. Age can vary in plant poaching due to the differing labor requirements to harvest. For example, timber theft typically involves multiple individuals with the physical ability to cut down the tree and load the log segments. It would seem that such an undertaking would be more easily completed by younger individuals in good physical condition. Conversely, harvesting ginseng or other smaller plants requires the ability to identify the plants, dig the roots, or pluck the plant from its place in its natural habitat. This is not as laborious, and may in fact be more easily achieved by older individuals who have extensive knowledge of the area and the ability to blend in without looking suspect.

Findings related to race and sex were consistent (primarily white and male). Though most perceived offenders to be male, some indicated that women also at times played a role as the partner of a male offender. The physicality involved in timber theft could potentially explain the

lack of female poachers. For other targets requiring less physical strength, it is possible that women stay with the vehicle out of fear for their safety. Female partners may also choose to stay behind to serve as a distraction or to appear to simply be waiting at their vehicle. The prominence of whites being identified could also be explained by the lack of diversity in much of the Central Appalachian Region. This is further supported by Pollard et al. (2023) who found that the Central Appalachian Region is largely made up of White individuals (94%).

Though demographics were a focus of the current work, questions were open-ended, which allowed participants to discuss other commonly witnessed characteristics such as physical fitness, lack of employment opportunities, and drug addiction. Poachers were also commonly referred to as “mountain men,” “mountain folk,” or “mountain-men-like.” In relation to the notion of “mountain folk” it is important to note that identification of plants that may be of value is not everyday knowledge among the general population. Since these plants are largely used for medicinal reasons, or as food, it requires the individual to have a unique knowledge base. This knowledge is in many cases passed down from those well-versed in mountain culture and tradition. Mountaineers identify themselves as a community with a shared culture, but fear the loss of their identity due to global changes (Keefe, 2000). They also worry about the disappearance of their traditional way of life and the adoption of new cultural practices, as well as the future of their offspring (Keefe, 2000). It has been established that rural areas have historically relied heavily on “living off the land” and sharing wisdom with the next generation (Cuerrier et al., 2012). However, this has to some degree changed with globalization and the move toward more modern ways of living. As such, those who still seek to hunt traditional plants may simply be “throwbacks” to another era, and designated as “mountain people” or “mountain like.”

Poacher Tactics

The next goal of the current study was to explore perceptions of poaching tactics. Some work has focused on this in the past, though it has been restricted to the poaching of fauna (see Eliason, 2013; Forsyth, 2008 for examples). As previously discussed, Eliason (2013) broadened the knowledge of perceived motivations by focusing on typologies of trophy poachers in Montana. Interviews and surveys with conservation officers (n=22) revealed that several categories of poachers existed: 1) poachers who work alone, 2) those who hunt on private property and behind locked gates, and 3) poachers who have been caught before. The current study identified six different poaching tactics: 1) backdoor poaching, 2) drop-off and pick-up, 3) camouflage and concealment, 4) corruption, 5) poaching in groups, and 6) poaching alone. Backdoor poaching consists of plant poachers harvesting on land they are legally permitted to be on, and then crossing over onto private or national forest land. Poachers do this to avoid detection upon entering prohibited areas and increase the chances of avoiding conservation officers and park rangers all together. Eliason (2013) also found that poachers who hunted on private property and behind locked gates were found to be calculating in their endeavors and made the work of conservation officers difficult (due to a lack of routine patrol in these areas).

The drop-off and pick-up poaching tactic were identified by over half of the sample in the study. The tactic consisted of another person dropping the poacher off in one location and then picking them up later at a separate location. Poachers who use this tactic are generally more experienced and desire to avoid detection and maximize their profit. By being dropped off, poachers can avoid detection from conservation officers and park rangers as they do not leave a vehicle behind. Poachers who are dropped off also must keep moving to their pickup point, which means they will maximize their profit by avoiding backtracking.

It is also important to highlight the difference in a poacher's experience level. A seasoned ginseng hunter will not backtrack and will keep moving based on comments made by the current interviewees. These findings are similar to Eliason (2013) and Forsyth (2008), who also found that those who had previously been caught were deemed to be motivated to improve their tactics (as a result of the learning process involved in being apprehended at least once) and poachers who remained mobile tended to have a greater chance of avoiding detection. This relates to the amount of experience a poacher was perceived to have. For instance, a successful poacher must know the terrain they are traveling in order to take routes to evade conservation officers and park rangers. Poachers who hunted in areas they knew well were more difficult to locate than those who were opportunistic in nature (Eliason, 2013).

Camouflage and concealment were also mentioned, and entail poachers being more creative in avoiding conservation officers and park rangers. For example, poachers try to 1) conceal their harvest in the woods or in spray painted sacks, 2) try to camouflage themselves as a hiker, 3) wash their hands or change clothes entirely, 4) step off the trail to blend in with the foliage, 5) wear camouflaged patterned clothing, 6) practice their own reconnaissance, and 7) make camp in an area for a prolonged poaching stay according to the interviews conducted for the current study. Camouflage and concealment in terms of plant poaching or poaching in general have not been discussed as tactics. Poachers conceal their harvest in the woods or in spray painted sack to hide them from potentially waiting conservation officers or park rangers. When they come out of the forest, they want to appear as any other hiker or nature enthusiast to blend in. Concealing their harvest also makes it more difficult for conservation officers and park rangers to charge them with poaching if they cannot find their illegal harvest. The second tactic includes blending in or concealment. Poachers will want to look similar to other nature

enthusiasts or hikers in the forest. Poachers will also wash their hands to get rid of dirt that collects on their hands and under their nails. Changing clothes also aids in concealing their illegal poaching activities.

Moreover, poachers will step off the trail to blend into the surrounding foliage to avoid detection from conservation officers and park rangers if given advance notice. This is made easier by wearing camouflage patterned clothes to better blend in and appear as part of the surrounding landscape or foliage. Since many outdoor enthusiasts dress in this manner, particularly in hunting seasons, it does not arouse suspicion when travelling to the areas in which they plan to poach. Next, poachers will practice their own reconnaissance to better avoid detection and hide themselves from conservation officers and park rangers. During reconnaissance, poachers may either personally scope out the area for signs of enforcement or have an accomplice stay with their vehicle to watch for others.

Last, poachers will at times establish campsites. Camping out for days in the woods allows the poacher to maximize their harvest and avoid unwanted attention from frequently entering or exiting a wooded area. Further, if these campsites are in areas where camping is allowed it should not arouse suspicion and may in fact make their presence appear as more legitimate. This strategy can be combined with others, such as storing harvests in camouflaged areas, to decrease the likelihood of detection in the event that they are in contact with a park ranger or conservation officer.

Although corruption is not a common occurrence among professionals in the conservation field, it can happen. It is important to reiterate that one participant in the current study identified the possibility of corruption among conservations officers and park rangers as contributing to the issue of poaching. For example, a conservation could have knowledge of a

poacher illegally harvesting ginseng. Instead of the conservation officers writing a citation or arresting the poacher, the conservation officer makes a deal to split the profit. Corruption is also a similar concern in other forms of law enforcement, indicating that even rural-specific crimes are not immune to traditional problems (Fijnaut & Huberts, 2000; Jancsics, 2021).

Additionally, solitary and group poaching were identified by the sample. Group poaching was commonly seen by participants (75%) in the study, though solo poaching (90%) was thought to be more common. This is also similar to findings in past research. For example, poachers that worked alone have been found to be difficult to apprehend and were described by conservation officers as “loners” (Eliason, 2013). According to a study conducted by Forsyth (2008), poachers who worked alone were more successful as they did not have to worry about potential witnesses or indiscretions, unlike those who worked in groups. This finding is consistent with previous studies and the current study has also shown that poachers who operate as “loners” or solo are less likely to get caught (based on interviewee perceptions). Splitting up or going solo ensures they can cover more ground or potentially alert one another of law enforcement presence (to better evade conservation enforcement).

It should be noted that conservation officers have started working flora poaching cases in a similar manner to drug cases. This could potentially explain the high observations of group poaching from participants in the study, in spite of the fact that it has not been extensively documented in other areas of poaching. Put differently, it is possible that they are focusing more attention to networks of individuals to build larger cases, which in turn would render most investigations focused on groups. These groups may be similar to the poaching rings documented in a handful of previous studies focused on the illegal taking of black bears, paddlefish, and sturgeon, (Noguchi & Maltese, 2006; Twiss & Thomas, 1999; Wilson, 2023). Conservation

officers have identified three categories of offenders within ginseng poaching and illegal selling cases: 1) buyers, 2) sellers, and 3) trustees. Since many buyers and sellers are undoubtedly aware of the illegal taking of these plants, it would seem logical that they may be involved in some meaningful way.

The results of the study also indicated that opportunistic and habitual behaviors were observed by conservation officers and park rangers in the sample. Habitual poachers adapt their skills and pre-plan their tactics, while opportunistic poachers illegally harvest when they need to make money or if they come across an opportunity to poach. Many of the participants observed both behaviors while working in the field. Comparatively, Eliason (2008) also revealed that both habitual and opportunistic behaviors were present in a study of fauna poaching. Habitual poachers take more time to plan their behaviors and adapt their skills during their poaching career. This type of poacher is also more private about their endeavors and committed to the act of poaching. These individuals seldom share their activities with others in an attempt to avoid detection (Eliason, 2008).

Though less prevalent, over half of the participants also observed opportunistic behaviors. Poachers who were familiar with the area were harder to locate than opportunistic poachers. Perceptions of the participants suggest that the opportunity to make quick cash or the promise of financial gain are the motivations behind opportunistic poachers. The need to obtain money also relates back to poacher characteristics, specifically low socioeconomic status. It could also relate to the discussion of drug-related motivations, as individuals seeking to support their addiction may take advantage of any opportunity that presents itself, or only seek them out when lacking other ways to obtain drugs.

Last, targeted areas have been discussed in past research, specifically in Young et al.'s (2011) research in the Shenandoah National Park. They identified that 5% of the national park was at high risk of poaching, while one-third of the park had some level of risk. The study also predicted that the majority of the national park (62%) had a low risk of poaching. The researchers also revealed that locations of previous poaching incidents involving ginseng were found to be in or near areas with a higher risk of poaching than random locations. The current study served to provide general descriptions of targeted areas to better aid conservation officers, park rangers, private land owners, and other researchers in understanding the environment individuals typically seek out. The descriptions were generally applicable to the five states examined in the study: Tennessee, Kentucky, Virginia, West Virginia, and North Carolina. To clarify, conservation officers and park rangers identified that secluded, less travelled areas are more likely to be targeted. Participants in the study described geographical characteristics such as northeast ridges, swags, hollows, and sides of the mountains. These areas also typically receive shade from the sun. The identified areas can be used by conservation officers and park rangers to establish an initial plan of deterrence in these specific areas of their assigned counties or acreage. These geographical characteristics can also be used as a starting or ending point for patrols, camera usage, signage, etc.

Deterrence Measures, Barriers, and Other Agencies

Deterrence measures related to poaching have not been discussed in depth in previous research. With that said, several deterrence methods were identified by participants in the current work: 1) patrols, 2) education, 3) marking programs, 4) cameras, 5) harsh sentencing, and 6) replanting. Patrols, education on plants, cameras, and harsh sentencing are generally self-explanatory deterrence methods but are reiterated and discussed below. First, patrolling is

effective in making enforcement visually known to the public and potential poachers. Typically, patrols are used in various forms of law enforcement as a deterrent, as potential offenders may be dissuaded by the idea that they could come into contact with an officer. It appears that conservation officers and park rangers also favor this approach. They indicated that they regularly patrolled areas under their jurisdiction in order to observe potential poaching behavior. However, it was also noted that this had somewhat limited utility since they cover such large geographic areas, a topic previously discussed by other researchers (Department of the Interior, 2021; Eliason, 2014; Falcone, 2004; Oliver & Meier, 2006). With this in mind, many pointed to education as a potential option. Education on plants and animals is a common duty for park rangers in their assigned park. For instance, park rangers will attempt to educate and inspire the public with information on the fauna and flora like within the parks to impart on them the long-term importance of conservation.

Next, marking and replanting programs are noteworthy. As previously mentioned, there is a relatively new marking program for ginseng that uses a proprietary powder marker. The plant or the top part of the root is exposed and then sprayed with a tree marking paint before the powder is applied. The plant absorbs the powder and will glow under a black light. In addition, there is an RFID program that functions like a tag on a store item with a UPC number. This technology can be used for deterring purposes and tracking the overall amount of poaching from a specific region. Cameras are already used in traditional law enforcement, specifically body-worn cameras and dash cameras on patrol vehicles (Hyland, 2018). Similarly, trail cameras can also be used to monitor specific areas of national forests and parks. They may be placed at entry or exit points of the property or in areas that have experienced poaching in the past.

Harsh sentencing was also mentioned as being effective by several in the sample since it is perceived to deter poachers from engaging in illegal harvesting. It also sets an example that poachers will be punished for harming the overall biodiversity in the Appalachian Region, not just for taking plants. The perception of the potential punishment and consequences of poaching could act as deterrence, which has been examined in previous research (Doob et al., 2014). Taken together, it appears that conservation officials believe that the combination of these measures may offer much to curbing the high prevalence of plant poaching in the Appalachian Region.

Implications of the Current Study

The findings of this study increase our knowledge base and understanding of flora poaching in the Central Appalachian Region in several ways. First, this was an exploratory study; therefore, it has provided a baseline knowledge of targeted plants, prevalence of plant poaching, poacher characteristics, motivations, tactics, deterrence measures, barriers, and agencies that assist in protecting plant species. This may potentially set the stage for more specialized and directed research in the future. In addition, it can provide law enforcement with a better understanding of what other agencies and officials have seen in their areas so that they may be better able to respond to their own problems. Second, there has been previous research that explored poacher typologies, motivations, and behaviors in relation to the poaching of animals. The current study sought to determine if similar findings would emerge in relation to the poaching of flora. Some overlap was seen, though other findings appear to be unique to the target in question. This points to the need for nuanced approaches to poaching and increased awareness of the issues associated with flora poaching. It has been established that flora poaching does not hold the same public attention and stigma as wildlife or fauna poaching.

Filteau (2012) also identified and discussed the societal disregard for flora poaching and the potential threat to biodiversity. Educational programs relying on agencies and relationships with the media may offer much in terms of overcoming these perceptions.

In addition, practitioners in the field can use the findings in the current study to implement more diverse deterrence measures. As aforementioned, several deterrence methods were identified by participants: 1) patrols, 2) education, 3) marking programs, 4) cameras, 5) harsh sentencing, and 6) replanting. The marking programs were only utilized by a small portion of the sample. State parks and national forests within the Appalachian region could potentially reduce flora poaching in their areas if they consider some of these more innovative options.

Also, communities could use information gathered in the study to become more aware of the threat of poaching on their private property. Landowners can set up cameras, check on their property often (equivalent to patrols), and contact appropriate agencies. These proactive measures will aid in the apprehension of plant poachers on privately owned land. The findings of this study will also aid allow landowners to be knowledgeable on identifying factors associated with plant poachers such as dirty hands, clothes, or sacks to store their harvest.

Limitations and Directions for Future Research

Though the current study was exploratory and provides an initial understanding of the problem of flora poaching, some limitations do exist. First, the sample size was relatively small in comparison to some other works. With that said, saturation was achieved for the majority of topics and many qualitative works have used a similar number of participants. Second, the State of Tennessee was somewhat overrepresented in the sample, which may mean that findings are more insightful of the problems faced by its officers and rangers. But outside of certain plants being targeted disproportionately by state, most other findings were relatively consistent across

the sample. Finally, the sample disproportionately consisted of conservation officers (17 of the 20 participants), which may mean that park ranger and botanist perceptions were not as generalizable. However, it is likely that conservation officers are those most often tasked with addressing these crimes, meaning that their insights are most important.

Future studies could attempt to rectify some of these limitations to extend this line of research. In addition, they could consider seeking insight from other individuals, such as conservationists, property owners, botanists (only one agreed to participate in the current work), or even active offenders. Future studies may also wish to consider the potential for guardianship and opportunities to play a role in offending (a more theoretical approach in line with rational choice or routine activity theory). This would require participation by current or former offenders. Finally, researchers may want to consider other geographic regions in the country, as the types of flora commonly targeted may differ by area.

Conclusion

Generally speaking, poaching is a significant issue in the United States. However, flora poaching is a significant problem specifically in the Appalachian Region. This is due to the terrain, remoteness, rurality, and the native plants that grow there. Flora poaching is damaging to flora species and threatens environmental stability. Historically, rural crimes do not receive the attention other crimes receive, which is especially true of flora poaching. The current study sought to address this lack of research through qualitative interviews with those involved in conservation, seeking their perceptions regarding a number of topics. The results of this study provided further insight into the targets of flora poaching, poacher demographics, motivations and characteristics of poachers, and poacher tactics. The results also noted several deterrence measures the participants utilize in the field and barriers they face. Finally, the results of this

study should serve as a foundation for future researchers and bring more awareness to the unique crimes and challenges in the Appalachian Region.

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APPENDIX: Interview Guide

Hello, my name is McKinley Bowers. I am a graduate student at East Tennessee State University, and I am currently working on my thesis research requirement. My thesis focuses on plant poaching in central Appalachia. By agreeing to answer these questions, I have your consent to use your responses for research purposes. I will not collect any identifiable information that can be traced back to you.

Section One

Demographics

Question One: What is your sex?

Question Two: What state are you located in?

Question Three: How long have you worked in the conservation field overall?

Question Four: What is your current job title?

Question Five: How long have held this position?

Section Two

Research Question One: What types of Flora are being poached in the Appalachian Region to the best of your knowledge, and how prevalent is the problem?

Question Six: What types of plants do you see being poached in your area? (This can include trees, ginseng, blood root, golden seal, may apple, etc.)

Question Seven: Do you hear from other conservation officers regarding these problems in their areas? Is it perceived to be a serious problem?

Question Eight: How extensive is plant poaching in your area? And does that vary depending on the plant in question?

Section Three

Research Question Two: What are the characteristics and motivations of poachers?

Question Nine: In your experience, do plant poachers share similar demographics? Such as age, race, and gender?

Question Ten: What do you think motivates them? Is it solely money, or do you think that other factors play a role (such as survival, psychological fulfillment, excitement, and socialization)?

Question Eleven: Do you think that they are worried about being caught? Do you think they perceive it as wrong?

Section Four

Research Question Three: What tactics, if any, do flora poachers utilize?

Question Twelve: Do plant poachers have specific poaching tactics? How do they accomplish the act of poaching based on what you see and hear?

Question Thirteen: Does it seem like they focus on specific areas?

Question Fourteen: Do you think they are opportunistic, habitual, or both?

Question Fifteen: How do they seem to go about avoiding detection?

Question Sixteen: Are poachers typically in groups or solo based upon what you have seen and heard?

Section Five

Research Question Four: How do conservation officers deter flora poaching in Appalachia? What role do other agencies play in combatting the problem?

Question Seventeen: How do you combat plant poaching in your area? Please explain?

Question Eighteen: Do you have any deterrence measures currently in place?

Question Nineteen: What barriers are there to implementing deterrence measures? (Funding, legal challenges, geography, etc.).

Question Twenty: Are there any other agencies or organizations that assist in combatting the problem, or that you think should be assisting with it?

Thank you for participating in this study!

VITA

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