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The Global Impact of COVID-19 and Tourism on Conservation Rangers' Guardianship Capabilities

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THE GLOBAL IMPACT OF COVID-19 AND TOURISM ON
CONSERVATION RANGERS' GUARDIANSHIP CAPABILITIES

by

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B.S. University of Central Florida, 2022

A thesis submitted in partial fulfillment of the requirements
for the Honors in the Major Program in Criminal Justice
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ABSTRACT

This thesis explores how the COVID-19 pandemic has impacted wildlife rangers with an emphasis on the influences of tourism rates. Two sets of data are used: one is a survey of rangers around the world and the other looks at global governmental tourism data. While coming from a routine activities perspective, the problem of decreased capable guardianship becomes apparent in the form of massively decreased tourism arrivals and troubling ranger perceptions. This data allows for the establishment of tourism trends and changes during COVID. The findings of this thesis link the downturn in tourism with impacts on formal and informal guardianship within protected areas. Recommendations and discussions include potential ways to preserve guardianship in future pandemic settings.

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INTRODUCTION

The COVID-19 pandemic spawned worldwide impacts spanning from travel restrictions to guidelines on social gatherings. The most significant change is the government lockdowns that nearly every country has employed (Joffe, 2021). Much of the academic attention up to this point has focused on global health, political, and economic implications, (Silva Andrade et al., 2021; van Holm et al., 2020; Sigala, 2020) while relatively little research had been done on the impact of COVID-19 on authority personnel, including law enforcement authorities. Even less is known about how conservation rangers (also known as wildlife rangers, conservation officers, game wardens, etc.), who may be tasked with enforcing environment and wildlife laws and regulations, have experienced and dealt with the occupational changes associated with the pandemic. Increased threats to conservation areas, as well as the potential rise of wildlife crime globally further point to the need to understand how frontline conservation personnel has been affected by the pandemic (Aditya et al., 2021; Ndlovu et al., 2021). The sharp reduction of international tourism and public interest in national parks as well as the perception rangers have on tourism rates (Souza et al., 2021; Singh et al., 2021) around the world also have the potential to impact conservation officers' duties specifically their job as formal guardians of the protected areas. Other areas of guardianship, including informal guardianship capabilities of tourists and community members, will be examined as well. This study will use and compare ranger survey data and national-level tourism data to examine the impact of the COVID-19 pandemic on their occupation and threats to protected areas.

CHAPTER ONE: REVIEW OF THE LITERATURE

Introduction

This chapter examines the relevant literature to set the foundation for the present study. Specifically, a broad overview of conservation crime will be provided. To add, a baseline understanding of how protected areas are managed and monitored must be established to recognize the COVID-19 impacts. Also, the issues that conservation officers face must also be acknowledged in order to assess the potential changes to guardianship. Rangers' overall stress levels, perceived occupational danger, and organizational influences are studied in this chapter to assist in comprehending how these factors may contribute to the capability of rangers to serve as guardians.

Conservation crime

Before examining the impact that COVID-19 has had on conservation crime and conservation officers, a foundation of the phenomena must be established. At this point, no harmonious definition for conservation crime, green criminology, or conservation criminology exists (Gibbs et al., 2009). For the sake of this thesis, conservation crime will be defined as actions that violate the law of the land while causing harm to flora and fauna or biodiversity. Among the most infamous environmental crimes is poaching which this paper will define as the illegal seizure or killing of animals (Moreto & Lemieux, 2015). Prior research indicates that the volume of poaching is somewhat malleable. The rates of illegal poaching of tigers in India, prior to the pandemic, fluctuated depending on demand and levels of enforcement (Sharma et al., 2014). This conclusion is relative because if the demand for goods such as ivory or animal skins

is impacted by COVID-19, then the stressors of being a conservation officer could also show a correlative change. This is further supported by the notion that conservation officers have a strong sense of duty, which includes fulfilling their role in protecting and conserving wildlife (Kuiper et al., 2020). Other forms of conservation crime include the illegal gathering of wood, livestock grazing in prohibited areas, illegal fishing, and illegal hunting (Travers et al., 2019).

The driving factors for wildlife crime mainly revolve around the ability to profit or provide sustenance for oneself. In South Africa, economic factors are the main force behind the poaching of rhinos (Lunstrum & Givá, 2020). Prior research also shows that illegal fishing is influenced by a person's perception of financial reward playing into their rational decision-making (Petrossian, 2015). In addition to financial reward, there is a distinction between committing wildlife crimes for financial gain and perpetrating these crimes due to poverty. In other words, some people commit these crimes to get rich while others do it to survive. Just like with financial gain, there is also a linkage between poverty and certain wildlife crimes (Duffy & St John, 2013). With poverty and food insecurity likely being a result of the COVID-19 pandemic (Pereira & Oliveira, 2020), it is reasonable to assume that financial desperation will drive even more people to both continue and even begin to participate in wildlife crimes due to desperation. However, prior research supports the idea that the pandemic can cause a short-term decline in wildlife crime due to criminals' fear of catching COVID-19 as well as changes to the access suppliers have to buyers (Anagnostou et al., 2021). But once the fear of catching the disease subsides as well as the ability to offload products increases, there is little reason to believe that the crime rates will not increase again.

In addition to financial motivations to commit wildlife crimes, several other drivers surrounding the threat to conservation exist as well. Prior research into the illegal bushmeat trade, the illegal seizure and trade of wild meat (Lindsey et al., 2013), in Africa shows that cultural issues, such as the preference to use wild meat for weddings and holidays, play a role in the prevalence of this type of wildlife crime (Warchol & Johnson, 2009). Utilization for traditional medicine or rituals as well as to aid in hunting also drives the demand for the bushmeat trade (Lindsey et al., 2013). In addition to cultural norms, public attitudes as a whole hold bushmeat as a resource for food, especially among the racial groups more likely to be impoverished, rather than an aspect of conservation (Warchol & Johnson, 2009).

Prior research also shows that religious influences can bolster wildlife crimes (Minton, 2020). Spanning from the relatively low prioritization of animals in some religions to religious text-based practices such as sacrifice, religious contributors to environmental crimes perceive wildlife in such a way that helps justify their illegal actions. Additionally, legal defects in some countries such as insufficient punishment for crimes against wildlife and low risk of being caught are factors in the bushmeat trade (Lindsey et al., 2013). Last of all, issues of corruption and political factors may embolden some to commit wildlife crimes.

Due to the understudied and complex nature of environmental crimes, a myriad of different strategies has been employed to try to bolster conservation efforts. One such strategy is the ‘fences-and-fines’ approach. This approach largely separates human involvement in protected areas as the two entities are seen as conflicting (Kubo & Supriyanto, 2010). A somewhat similar approach is that of fortress conservation. This strategy also emphasizes the separation of people and protected areas due to the threats that people pose to conservation (Rai

et al., 2021). These more traditional law enforcement approaches such as 'fences-and-fines' and fortress conservation focus on deterrence, punishment, and imposing regulations (Stern, 2008). These separatist approaches largely contributed to the creation of the phenomena known as protected areas or parks (Hayes, 2006). Traditional enforcement approaches have even reached the point in which militarized conservation has been implemented in some areas. Militarized conservation may utilize armed guards to enforce the regulations associated with protected areas (Duffy, 2014).

Conversely, community-based conservation models encourage steadfast participation from community members towards the goal of promoting the conservation of wildlife (Moreto et al, 2017). Community-based conservation is achieved in part via revenue sharing, projects, and rangers' work in dealing with problem wildlife. Community-based conservation is also extremely popular among rangers as one study showed they unanimously agreed that community involvement was important (Moreto et al, 2017). To add, research shows that there is not a significant difference in conservation effectiveness between more traditional and community-based approaches (Hayes, 2006). However, problems with community approaches do exist in terms of mounting tension due to the lack of benefits received by certain areas as well as negative interactions between parties (Moreto et al, 2017). These approaches also tie into the concepts of inclusionary management versus exclusionary in which exclusionary practices would be more top-down and traditional in approach as opposed to inclusionary management which would seek out contributions from more people including the community.

Managing and monitoring protected areas: Conservation rangers

Within the last decade, there has been a growth in research examining the attitudes and experiences of conservation rangers. Prior research on the occupational stressors regarding law enforcement rangers conducted before the COVID-19 pandemic shows that Ugandan rangers generally did not perceive their job as stressful; however, certain factors such as occupational danger, lack of resources, physical strain, and negative perceptions of law enforcement by the community certainly contributed as stressors that these rangers faced (Moreto, 2016). Similar findings of moderate stress perceptions and analogous stressors were shared in the study of wildlife rangers across six US states (Ledford et al., 2020). However, it is reasonable to believe that the stress levels faced by conservation officers may have changed because of the pandemic. Other issues regarding job satisfaction may have been affected as well. A key factor in job satisfaction is the ability of rangers to work outdoors compiled by relative occupational freedom (Eliason, 2006). Different lockdown policies depending on the country could have forced more officers to stay indoors thus reducing their time spent in nature and their overall job satisfaction. It is worth noting that the inverse impact is also possible. A study of Chinese conservation officers showed approximately one-quarter of these officers suffered injuries while out in the field (Gao & Li, 2021). Therefore, a decrease in fieldwork via lockdowns could reduce rangers' stress over occupational dangers in turn boosting job satisfaction.

Another aspect of the ranger profession are the occupational dangers associated with it. Conservation officers may face verbal abuse and physical assault which may even result in death (Eliason, 2006). Since the pandemic may have had negative impacts on ranger and community relations, it is reasonable to infer that with damaged relations, the community could become even more hostile towards game wardens. At a time in which threats towards conservation are potentially increased and manpower, as well as tourism revenue, has decreased, the combination

of stressors could have a massive impact on rangers. Additionally, contracting and spreading COVID-19 can be considered another occupational danger faced by rangers due to the pandemic. This is highlighted by the fact that a substantial number of rangers are stationed far away from medical facilities if they need medical assistance (Singh et al., 2021).

As noted above, tourists' access to and interest in national parks has been diminished because of pandemic-related lockdowns. Research shows that protected area downgrading, downsizing, and degazettement (PADDD) can damage the effectiveness of protected areas as well as their ability to aid in conservation (Mascia & Pailler, 2010). Notably, PADDD can be heavily influenced by social attitudes (Mascia & Pailler, 2010). However, early research does show that a decrease in resources available to rangers has not occurred as a result of the pandemic in Zimbabwe despite budget concerns (Ndlovu et al., 2021). Researchers note that tourism revenue was massively decreased throughout the full and partial lockdown stages as expected, but questionnaire results support that the resources available to wildlife law enforcement, including manpower, were unchanged no matter the extent of the lockdown (Ndlovu et al., 2021). It is worth noting that prior research does not establish if this is true globally or if resources will remain the same for more than a short period of time.

The impact of COVID-19

Early research has indicated mixed results but does seem to support an overall increase in wildlife crime since the start of governmental lockdowns. For instance, research in Nepal shows the number of injured and killed wildlife had increased in a few protected areas during the span of the pandemic, but most PAs did not see a notable increase (Koju et al., 2021). The number of forest and wildlife crimes regarding illegal activities such as smuggling, logging, and trespassing

during the governmental lockdowns did see an increase as well as the pangolin trade in India and wildlife crime in Zimbabwe (see Koju et al., 2021; Aditya et al., 2021; Ndlovu et al., 2021).

Research in the United Kingdom on urban law enforcement supports the idea that urban crimes have largely decreased due to a lack of public mobility (Halford et al., 2020). In other words, fewer people going to the store allows for less shoplifting. These results are not exclusive to the UK. A similar study in the United States also shows a decrease in most types of crimes in urban cities (Abrams, 2021). Although a reason for a decrease in some crimes, such as drug crimes, can be explained by a lack of emphasis by policing agencies on these types of crimes, this study also cites mobility as a key reason for the decrease in urban crimes. With that being said, in terms of protected areas, the impact on mobility is largely uncertain at this point. Mobility to parks may even be increased as a result of people moving out of cities and closer to rural protected areas (Aditya et al., 2021; Ndlovu et al., 2021). This would support that it is not only a different amount of people with mobility and access to national parks but potentially different types of people as well. Travel restrictions, lack of interest, and lockdowns have made it virtually impossible for tourists to visit foreign national parks during the peak of the pandemic. Therefore, the people who have access to national parks or protected areas shifted to fewer foreign visitors to a demographic made up of local residents (Anagnostou et al., 2021). This phenomenon of mobility would give some credence to the routine activities that this paper will discuss in length later. Another factor in the rise of wildlife crime is the increase in poverty due to the pandemic. This notion combines with the aspect of increased migration to rural areas as noted above.

An increase in wildlife crimes committed by domestic residents could have severe impacts on community-based approaches of wildlife law enforcement. Community-based conservation is a strategy that holds many perceived benefits by game wardens (Moreto et al.,

2016). If people are committing wildlife crimes due to a lack of employment caused by the pandemic, then they could perceive law enforcement officers as the enemy. In turn, this harms the relationship between ranger and community. The assertion that community relations have been damaged is supported by prior research of rangers' perceptions on the impact that COVID has had on their profession (Singh et al., 2021). However, this research supports that this change is largely due to reduced interactions between rangers and civilians out of fear of spreading the disease rather than increases in wildlife crime rates. Another factor that could impact relations between park officials and the community is the lack of tourism revenue generated by the protected areas. Some protected areas have revenue-sharing programs that give money to local communities and therefore boost relationship status (Moreto et al., 2016). It is likely that the loss of income received by the parks due to lockdowns has led to less money being given to local communities. Given the existing financial hardships brought about by COVID- 19, community involvement and relations could be damaged even further by a lack of relief from the parks. Furthermore, many rangers in Africa, Asia, South America, and Central America felt that they did not share sufficient rations with the communities (Singh et al., 2021). The potential speculation that park authorities are unwilling to support local communities during the harsh pandemic could also harm community relations.

In addition to the potential changes in wildlife crime rates that have occurred during the pandemic, COVID-19's impact on ranger perceptions and stress levels must also be studied. To begin with, prior research suggests that urban law enforcement personnel in the United States may be more prone to an increase in occupational and general stress due to the pandemic (Stogner et al., 2020). This compiles on the fact that law enforcement officers already have a job that exposes them to increased danger even before the pandemic. One of the main additional

stressors that law enforcement personnel face as a result of COVID-19 is the risk of infection. Urban law enforcement officers have been shown to have concerns about catching COVID-19 as well as spreading it to family members and others in the community (Frenkel et al., 2021). Although it is reasonable to assume that game wardens and rural law enforcement officials have a level of fear of contracting the virus, research shows that around the globe over a quarter of surveyed rangers said they live in a remote location (Singh et al., 2021). This means that their risk of catching COVID-19 is lowered due to less exposure to others, but it also denotes that these rangers do not have access to medical care if they do contract the disease (Singh et al., 2021). Other stressors, such as many rangers' perception of increased threats to protected areas globally (Singh et al., 2021), compound the negative impacts of the pandemic. At this point, it looks extremely likely that the stress levels of most law enforcement officers, both urban and rural, have been negatively increased as a result of the COVID-19 pandemic. This increased stress could have long-term impacts on the mental and physical health of rangers as research has shown that law enforcement are already more prone to mental health issues such as depression and PTSD than the general population (Wang et al., 2010). Although this study does not look at the mental health of rangers specifically, it is important understand these issues because of their potential to impact formal guardianship.

Park rangers have also been presented with occupational changes as a result of the COVID-19 pandemic. One occupational change is the reassignment or additional duties that these rangers are required to perform daily. These tasks range from enforcing COVID policies such as mask mandates and social distancing to providing medical assistance or food rations (Singh et al., 2021). Many of these added occupational stressors are also shared by urban law enforcement officials. These include different enforcement policies as well as changes in

officers' schedules and patrol routes (Stogner et al., 2020). Another key stressor that COVID has brought upon urban law enforcement is that healthy officers may have to work more hours due to other officers contracting the disease (Stogner et al., 2020). Although park rangers work more remotely in nature, this medically induced reduction in manpower is a stressor to look out for. One area in which rural and urban law enforcement differ is the presence of adequate personal protective equipment (PPE). Prior research shows that urban officers experienced a lack of PPE such as masks and sanitizer while game wardens largely perceived that they had sufficient PPE around the globe (Stogner et al., 2020; Singh et al., 2021).

COVID-19 impacts on tourism

To better address the aims of this study, we must fully understand how the tourism industry was impacted by lockdowns induced by the COVID-19 pandemic. It is no secret that the international tourism industry was heavily damaged by the lockdowns. Data from the United Nation's World Tourism Organization (UNWTO) show that international tourism was down 73% globally from 2019 to 2020 (UNWTO, 2021). These declines in tourism rates naturally have significant financial implications. Prior research estimated a global loss to GDP from approximately 4 trillion US dollars to almost 13 trillion USD in losses while simultaneously costing up to 500 million jobs (Škare et al., 2021). Given this harsh decline, leaders in that industry became split on how to proceed post-virus: some wanted the industry to return to pre-pandemic status while others envisioned an entirely revolutionized tourism industry (Higgins-Desbiolles, 2020). It can be reasonably assumed that the combination of devastating losses as well as vast uncertainty of the future structure of the industry can give leaders pause in how to address the situation.

Summary

In totality, although conservation crime is not particularly defined, financial, cultural, and religious factors all influence the rates at which green crimes occur. Wildlife crime is combated mainly by two distinct approaches: traditional law enforcement methods which exclude the community and community-based conservation models. With ranger stress and danger perceptions established, it is reasonable to infer that occupational, as well as organizational changes accrued by the pandemic, may have had substantial impacts. This goes without mentioning the fear of COVID-19 contraction and food insecurity of family members that are ever-present on the mind of a ranger.

CHAPTER TWO: THEORETICAL FRAMEWORK

Introduction

This chapter will describe the theoretical framework that will guide the present study. Routine activities theory is considered to be one of the most well-known and studied theories on crime and incorporates both macro-level elements and micro-level elements. The global societal, economic, and cultural changes brought upon by the COVID-19 pandemic drastically impacted the routine activities of many individuals. This chapter reviews how routine activities theory has been applied as an explanation of conservation crime prior to the pandemic as well as investigates potential changes that may occur.

Routine activities theory

Routine activities theory was first developed by Cohen and Felson (1979) and provides insight into crime events at both the macro and micro-level. At the macro-level, societal changes in socio-cultural expectations and opportunities, and technology have impacted individual behavior and routine activities. At the micro-level, routine activities theory has led to the recognition and study of the three main elements of crime: a likely offender, a suitable target, and the absence of a capable guardian.

Macro-level elements of routine activities theory

One of the macro-level influences of routine activities theory is how societal changes impact the previously discussed concept of mobility. At an extremely basic level, certain infrastructures such as roads and transportation influence where people spend their time, thus increasing the possibility of criminality (Brantingham et al., 2017). This can be extended one step further to environmental crimes as prior research shows that protected areas with more

accessible infrastructure may be at higher risk of crime (Warchol & Harrington, 2016). However, with the focus of this study in mind, the largest social and political change on mobility, and therefore the routine activities of individuals, are the government lockdowns implemented. As mentioned previously there is an increase in the number of people moving from urban cities to rural places which are closer to protected areas (Aditya et al., 2021; Ndlovu et al., 2021). It is reasonable to assume that the macro-level influence of these lockdowns has influenced the opportunities and routine activities of many to be more prone to environmental crimes.

Other macro-level factors of routine activities theory, such as cultural perceptions of wildlife crimes and the increase in technology, exist as well. As previously mentioned, the rates of the illegal bushmeat trade in Africa were influenced by how it was viewed as a cultural and traditional asset (Warchol & Johnson, 2009). This supports that the likelihood of an offender is swayed by the public and cultural perceptions of the wildlife crime being committed.

Additionally, since non-law enforcement citizens can act as guardians of environmental resources (Eliason, 2012), it is possible that fewer citizens would stand in the way if an action were deemed socially acceptable. Technological advances have also changed the routine activities of both buyers and sellers of poached wildlife. Prior research shows that poachers of wild cats in some countries have utilized online markets to broaden their consumer base (Nijman et al., 2019). Although, this research does show that in many countries poachers do not use this technology out of fear of getting caught. In totality, this supports the idea that macro-level advances in technology can impact the desirability of committing wildlife crimes such as poaching. In other words, if the buying and selling of animal skins is easier, then more people would likely get into that market.

Micro-level elements of routine activities theory

As noted, routine activities theory emphasizes the need to understand the three micro-level elements of crime (also referred to as the crime triangle): a likely offender, a suitable target, and the absence of a capable guardian. There are reasons to believe that the COVID-19 pandemic has influenced all three elements to increase the rate of wildlife crime. The first aspect, a likely offender, has to do partially with the concept of mobility that was discussed earlier on. As shown, the lockdowns caused a migration of people away from urban cities and into rural areas which are closer to wildlife and protected areas (Aditya et al., 2021; Ndlovu et al., 2021). The implications of an increased population living near protected areas are two-fold. It is rational to believe that more people observing flora and fauna on a daily basis will result in more people being tempted by the prospects of committing wildlife-related crimes. To add, as shown by the decrease in urban crimes due to the lack of their mobility, it is possible that existing criminals with a propensity for committing crime have moved closer to parks thus providing more likely offenders. Another aspect of an increase in likely offenders is the notion of poverty and financial hardship resulting in higher motivation for crime which was discussed earlier. The second element, suitable targets, has to do with the profitability and sustenance benefits of wildlife areas. Wildlife crime has been estimated to be worth 8-10 billion dollars annually (UNODC, 2015). Additionally, the presence of animals, such as fish, that are capable of feeding one's family creates an ideal target for individuals who have endured poverty or food insecurity due to COVID. In totality, this paints wildlife-rich protected areas as perfectly suitable targets for crimes. The final element, the absence of a capable guardian, has also been affected by the pandemic in many places. A global survey conducted on park rangers resulted in 74.4% of respondents answering they either agree or strongly agree that daily law enforcement operations

have been negatively impacted by COVID-19 (Singh et al., 2021). This would suggest that park rangers' capabilities for catching criminals such as poachers or illegal fishermen, or guardian capabilities, were diminished due to the pandemic. It is worth noting that a lot of the factors involved in routine activities theory are intertwined. For example, the value or price of a target plays a role in how suitable it is deemed to be (Warchol & Harrington, 2016). However, the argument can also be made that the potential for financial reward impacts the motivation of potential offenders.

Suitable targets

After establishing the potential application of routine activities theory contributing to wildlife crimes during the pandemic, it must be examined how this theoretical perspective was utilized for other instances of conservation crimes. Prior research shows that a driving factor of illegal poaching in South Africa is the availability of valuable species which would play into the notion of a suitable target (Warchol & Harrington, 2016). In addition to the quantity of potential targets, this research also shows that ease of access to protected areas makes crimes, such as illegal fishing and harvesting, all the more fitting. The presence of infrastructures such as fences, roads, and the proximity to likely offenders can increase the risk of illegal activities within protected areas (Warchol & Harrington, 2016). Another factor that impacts the suitability or desirability of the target is the value and demand of the illegally obtained wildlife (Mir Mohamad Tabar et al., 2021). This is supported above as the financial benefits of wildlife crimes such as poaching are a driving factor in conservation crime (Lunstrum & Givá, 2020; Petrossian, 2015). However, the action of the wildlife themselves can also make them suitable targets. Certain wildlife in the Western United States are prone to relocating to private lands in order to escape hunters (Eliason, 2012). While on the surface this may seem like the species are making

themselves less suitable targets, the creation of these “safe harbors” on private land makes it extremely difficult for conservation officers and legal hunters to access them (Haggerty & Travis, 2006; Eliason, 2012). Thus, those with access to the private safe harbors have a plethora of suitable targets to choose from. Last of all, prior research shows that the presence of certain hot spots, areas with increased rates of crime, may reveal insight as to which areas are more suitable targets (Brantingham et al., 2017). Although this research discusses urban crimes, the notion of “overlap in activity”, when routine paths intersect, certainly occurs surrounding protected areas (Brantingham et al., 2017). In other words, the migration of people closer to rural areas may result in a higher overlap in activity, which in turn makes the wildlife in the protected areas more suitable targets.

Motivated offenders

There are many factors that play into the motivation for an offender to commit a wildlife crime. These include financial, recreational, and cultural reasons as well as status and greed (Mir Mohamad Tabar et al., 2021; Stassen & Ceccato, 2020; Eliason, 2012). Similar to the variance of motivational factors, the motivated offender can be classified in different ways. Prior research shows that South African abalone poachers could be allocated as unorganized local residents or tourists, organized but small operation poachers, and large organized poaching operations (Warchol & Harrington, 2016). The differences seen in types of offenders coincide with some of the motivational factors. For example, although some unorganized locals do poach for profit, personal consumption of abalone in South Africa was more of a factor for this group rather than the profit-based motivations of its organized counterparts (Warchol & Harrington, 2016). It is worth noting that increases in demand for wildlife correlate with the amount of illegal fishing occurring in Iran (Mir Mohamad Tabar et al., 2021). This further supports the notion that

profitability impacts offenders' motivation. As noted above, the intersection of activity between offenders and targets plays a role in the suitability of the target (Brantingham et al., 2017). It is reasonable to assume that close proximity and overlap of activity can add to the motivation of the offender as well. In all, although motivated offenders come in different forms and are driven by varying factors, the ability to profit financially appears to be the paramount motivator.

Capable guardians

When discussing capable guardians in this context, it is likely that the focus of this study, conservation officers, comes to mind. Protection of the area and resources is absolutely one of the duties that these officers serve and can carry this out with discipline, fines, and apprehension. Prior research shows that the presence of a capable guardian does play a role in deterring potential offenders such as poachers or illegal fishermen (Warchol & Harrington, 2016; Mir Mohamad Tabar et al., 2021). In fact, protected areas that are more remote in nature and have less capable guardians can be more prone to environmental crimes (Stassen & Ceccato, 2020). However, it is worth noting that simply having a game warden on the job is not always sufficient. Prior research shows that rangers who are not necessarily committed to their jobs, those who do not complete or even falsify their patrol routes, can impact the factor of capable guardianship (Warchol & Harrington, 2016). This research also shows that other elements, such as insufficient equipment, similarly diminish guardianship capabilities despite the occupational presence of a game warden. Additionally, wildlife officers are not the sole form of guardianship in regard to protected areas. Certain barriers, whether man-made or naturally occurring, also serve as a form of guardianship for protected areas in South Africa (Warchol & Harrington, 2016). To add, non-law enforcement persons, such as landowners and regular citizens, also play a role in the guardianship of wildlife resources (Eliason, 2012). However, this thesis contends

that tourists play a role in informal guardianship as well. Tourists serve a similar role to land owners and locals in informal guardianship, but also positively contribute to formal guardianship. The revenue tourism generates likely allows authorities to have increased capabilities such as better equipment. In totality, conservation officers are the main form of guardianship of protected areas, though it is clear they cannot act alone. The introduction of new duties and a perceived reduction in law enforcement capabilities (Singh et al., 2021) because of the pandemic creates the potential for a lack of capable guardians during lockdowns. To add, potential changes to the number of locals and tourists can decrease both informal guardianship and financial aspects of formal guardianship.

All in all, the prevalence of three elements of crime: suitable targets, motivated offenders, and capable guardians serve as guidelines to explain the change in crime rates in certain areas (Cohen & Felson, 1979) including environmental crime research. As mentioned above, on a macro-level the lockdowns have impacted the geographic location and mobility of many individuals towards more rural areas as well as the global economy. As outlined, there is reason to believe that the pandemic has brought upon changes to each of the three elements that make up the routine activities of crime theory.

Statement of the problem

In accordance with routine activities theory (Cohen & Felson, 1979), the redirection of attention away from typical activities, such as patrolling and monitoring, may create an absence of capable formal guardianship in protected areas, as well as an increase in offending behavior due to a) increases in motivated offenders and b) limited formal guardianship. Due to the nature of lockdowns to stop the spread of the pandemic, it is no secret that many countries banned or

seen a massive decrease in international tourism. This leads to the first research question: To what extent are each region experiencing changes in tourism due to the COVID-19 pandemic? It can be argued that tourists themselves can act as informal guardians that can help support the formal guardianship activities of rangers, therefore, limited tourism may have negatively impacted protected area monitoring efforts. This proceeds the second research question: How have tourism levels impacted both formal and informal guardianship as well as threats to protected areas?

CHAPTER THREE: DATA AND METHODS

Introduction

After gathering a baseline understanding of conservation crime, wildlife rangers, and the routine activities perspective from the previous chapters, this thesis can use that information to begin data collection. This thesis used two primary sources: The first source encompasses survey data conducted with a focus on wildlife rangers' perceptions as they have been impacted by COVID-19. The second source deals with governmental records of tourist arrivals to compare the years leading up to the pandemic and the lockdown years of 2020 and 2021.

Sampling

The target population for this thesis includes individuals who engage in protected area monitoring and management, specifically conservation officers, who are at the forefront of such conservation efforts and are members of ranger associations. Participants for this study were recruited in part by the World Wide Fund for Nature (WWF), Global Wildlife Conservation (GWC), International Ranger Federation (IRF), regional ranger association listservs, ranger-associated social media platforms, and the University of Central Florida. The final sample size totaled 1,313 respondents from 60 countries. However, only 1,247 agreed to the informed consent portion and of those 1,247 only 917 completed the whole survey. It is worth noting that the survey was administered in three languages, English, French, and Spanish. The second data set from the United Nations World Tourism Organization compares tourism arrival rates in countries before and after the pandemic occurred. This tourism dashboard utilizes official data from the government of each country. Every country was part of this database; however, there are some countries that do not report data to UNWTO and some that participate in general

tourism arrivals but do not participate in more specific measurements such as type of tourism arrival.

Data collection

Data used for this thesis is based on two sources: first, the thesis will rely on a ranger-centered global survey based on included seven sections and 52 questions. Respondents were provided with a Likert-scale ranging from "strongly disagree", "disagree", "agree", and "strongly agree". Respondents were also provided with a "not applicable" response option. These sections included COVID-19 impacts on various topics such as protected area management and monitoring, budgeting, occupational welfare, wildlife crime threats, and community activities with the final section asking about ranger's perceived role in pandemic relief as well as access to COVID-19 testing.

The surveys were collected using Qualtrics. To facilitate anonymity, each study participant was provided with a unique identifier and were not asked to provide their name. The participants were advised to take the survey in a location of their preference. Participation was voluntary and informed consent was gathered prior to the start of each survey. The data was stored securely and only accessible to members of the research team.

The second source is based on a secondary dataset that provides monthly tourism rate changes by country during the pandemic. The United Nations World Tourism Organization dataset has several subsets which were utilized in this analysis. These sets included: incoming tourism arrivals, incoming tourism by region, incoming tourism by purpose, and domestic tourism trips. Every country was represented in each of these data sets; however, the countries not included in the 60-country ranger survey were removed as well as countries in the UNWTO

database that did not have data for 2020. One limitation of this study is the attrition of available 2020 data from certain countries as the subset got more specific. The number of countries that were both included in the ranger survey and had 2020 data went from 48 for total arrivals to 27 for arrivals by purpose and as low as 17 for domestic tourism. Due to this decrease in available data, the countries were grouped into five regions instead of seven. This information will allow in part for the explanation of both research questions involving the potential impact of tourism on guardianship and wildlife threats.

Strengths and limitations

Among the biggest strengths of this research is the fact that rangers from sixty countries were covered in this global study. This broad scope provides diverse insight into the varying ways in which the COVID-19 pandemic has impacted rangers and conservation. Another strength is that this research was done in late 2020 during the pandemic. This disallows for any revisionist history or memory issues among the participants. Conversely, this study does have several limitations. Although participants spanned 60 countries, some were more heavily represented than others. For example, there was strong representation in the United States, Australia, and India, but much less in China, Zambia, and Brazil among other countries. One possible explanation of this leads to another limitation. The study was conducted in three languages as mentioned above. However, rangers who are not fluent in one of these three languages did not have the ability to express their opinions in this survey. To add, since the survey was conducted online those without internet access are likely underrepresented. Additionally, for the data examining tourism activities, not all the 60 countries represented in the ranger survey were sufficiently included in the UNWTO dataset. Finally, despite the advantages

of conducting research during the pandemic, things may have changed as time progressed and there was no chance to reflect on the events that had occurred.

CHAPTER FOUR: RESULTS

Introduction

This chapter looks shows the findings of both datasets mentioned in the previous chapter. The impacts on tourism in the UNWTO dataset were measured by the percent change in tourism arrivals/ trips from an average of five pre-COVID years (2015-2019) to the pandemic year (2020). The averaging of the previous five years was done to give a baseline of that country's tourism rate while disallowing for data to be skewed if a country had an outlier year in 2019. The data for each country was then grouped into regions. Results of the ranger study are reflected in the percent of rangers who expressed agreement or disagreement to each question.

Findings

As shown in Figures 1 and 2, all regions experienced a large decrease in the percent of total tourism arrivals from before COVID to 2020. Figure 2 shows each region having relatively steady levels of tourism from 2015-2019 and then nosediving in the pandemic year of 2020. This percent change in tourism is then reflected in Figure 1.

Figure 1. Percent Change in Tourism Arrivals in 2020 by Region

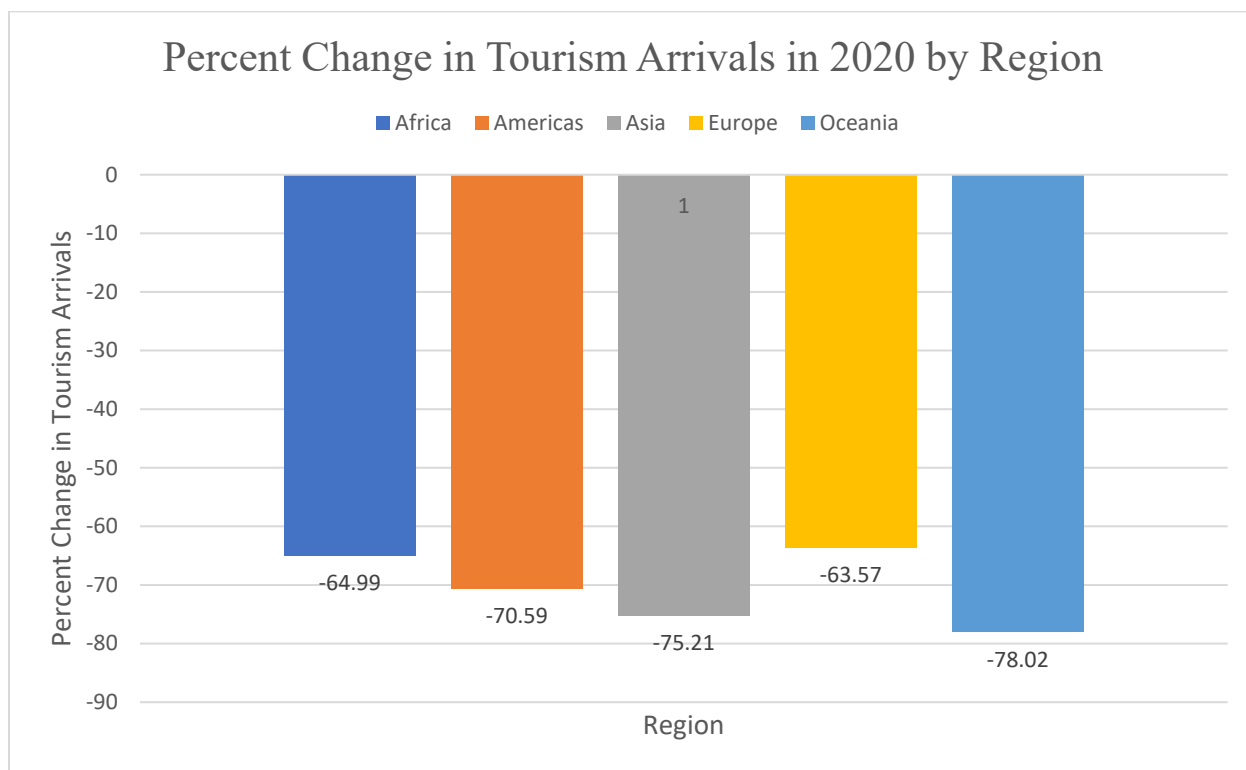
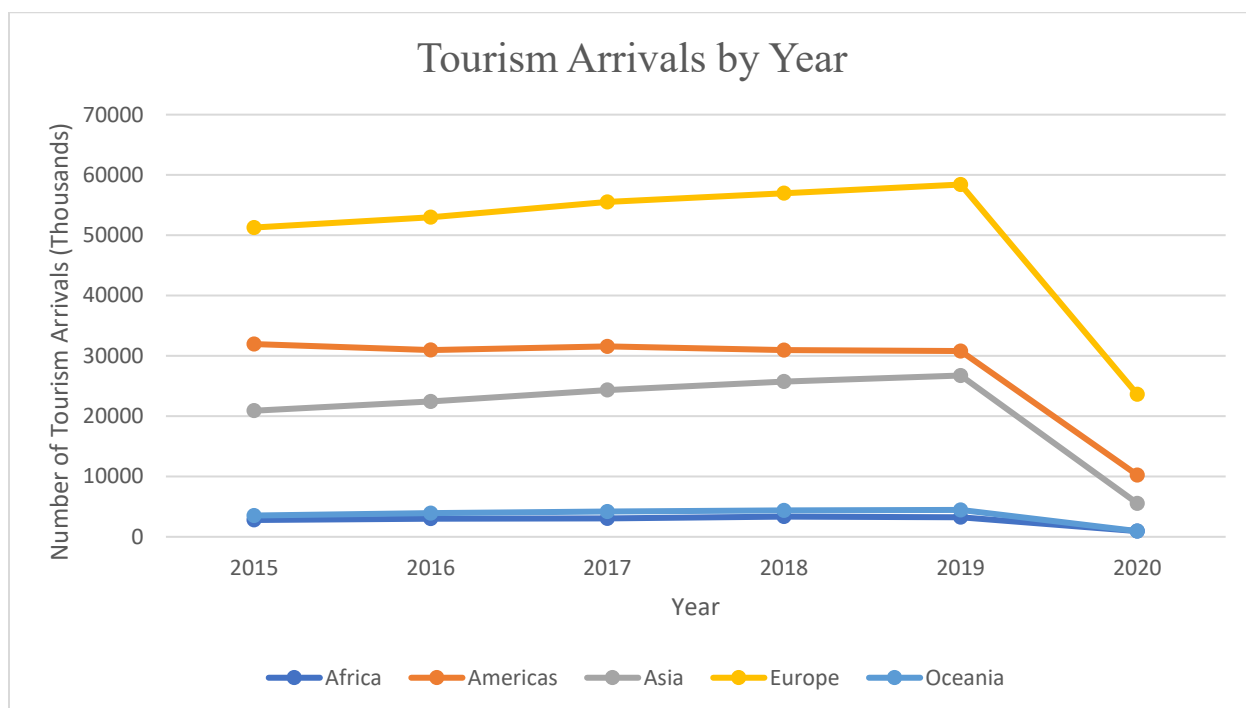
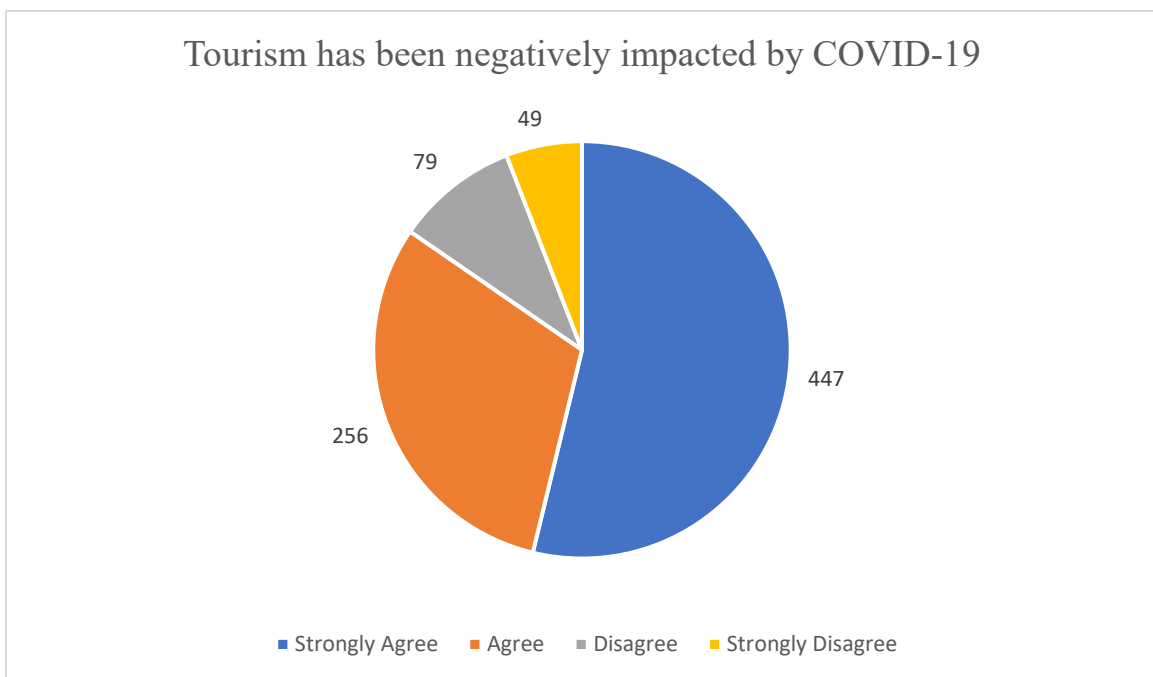


Figure 2. Tourism Arrivals by Year



This finding coincides with the results from the ranger survey as well. Rangers overwhelmingly responded that tourism was negatively impacted by COVID-19 as 85.13% of participants who were asked that question either strongly agreed or agreed with the sentiment as opposed to the 14.87% who strongly disagreed or disagreed (Figure 3).

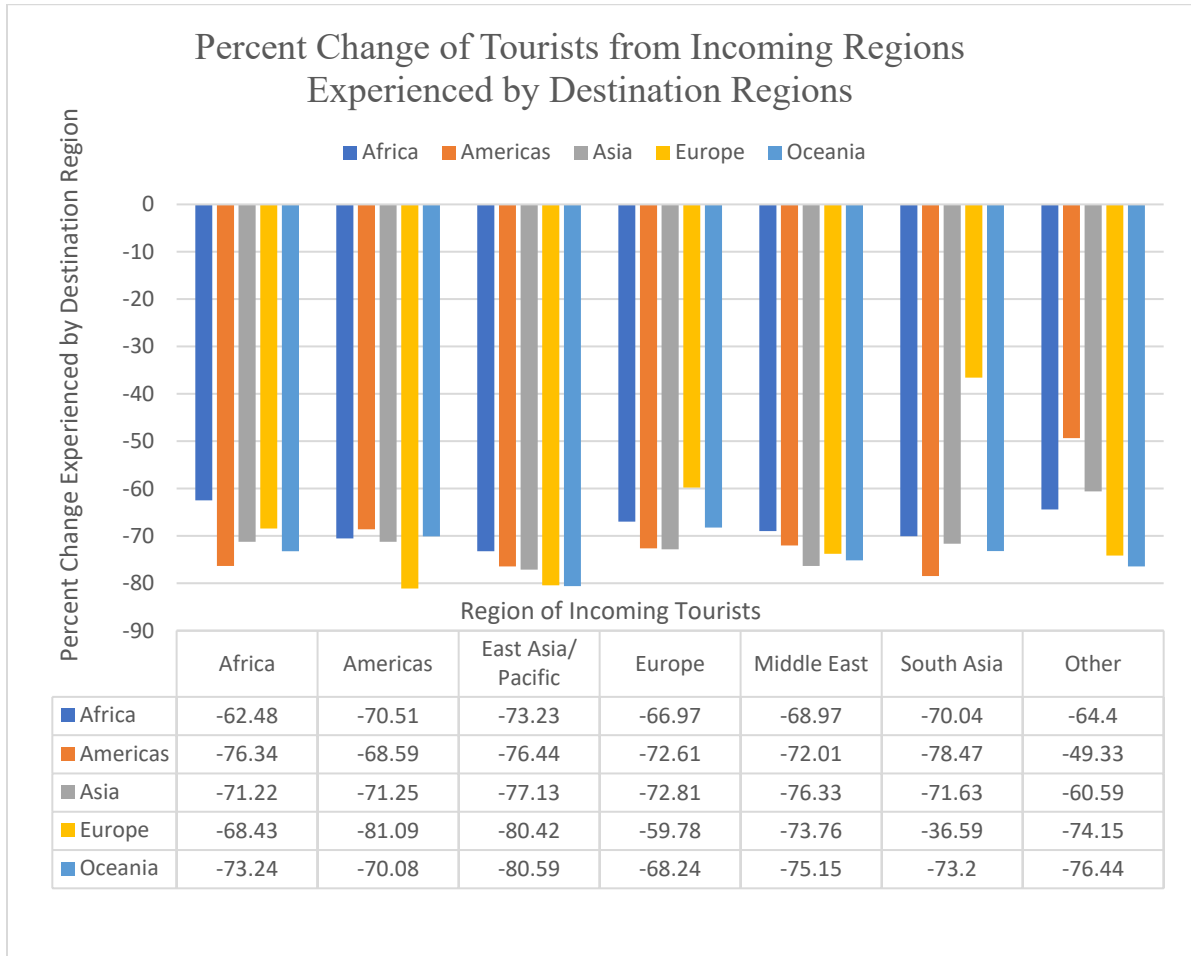
Figure 3. Tourism has been negatively impacted by COVID-19



It is worth noting that the if a region experienced a larger drop in tourism arrivals than another region, it did not strongly correlate with the percent of rangers in that region who perceived negative tourism impacts from COVID ($r = -.12$). For example, 95% (see also Singh et al., 2021) of African rangers either agreed or strongly agreed that tourism was negatively affected by the pandemic despite Africa experiencing a 64.99% decline in total tourism arrivals. Conversely, only 61.1% of North American rangers (Singh et al., 2021) either agreed or strongly agreed but experienced a larger decline in tourism arrivals at 78.62%.

Another lens through which to view tourism arrivals is incoming tourists by region (see table 1). Although some outliers exist, for example, European countries experienced only a 36.59% decrease in tourism from South Asian countries. This data further supports that international tourism arrivals were significantly decreased and relatively well distributed among each region. After looking at the tourism data in its totality: the percent change faced by each region, the total number of tourist arrivals per region from 2015-2020, tourism by incoming tourists' region, and the ranger perceptions of the tourism industry, the first research question can be answered. All regions were significantly impacted by a decrease in tourism arrival rates of over 60% to upwards of almost 80% depending on the region and country.

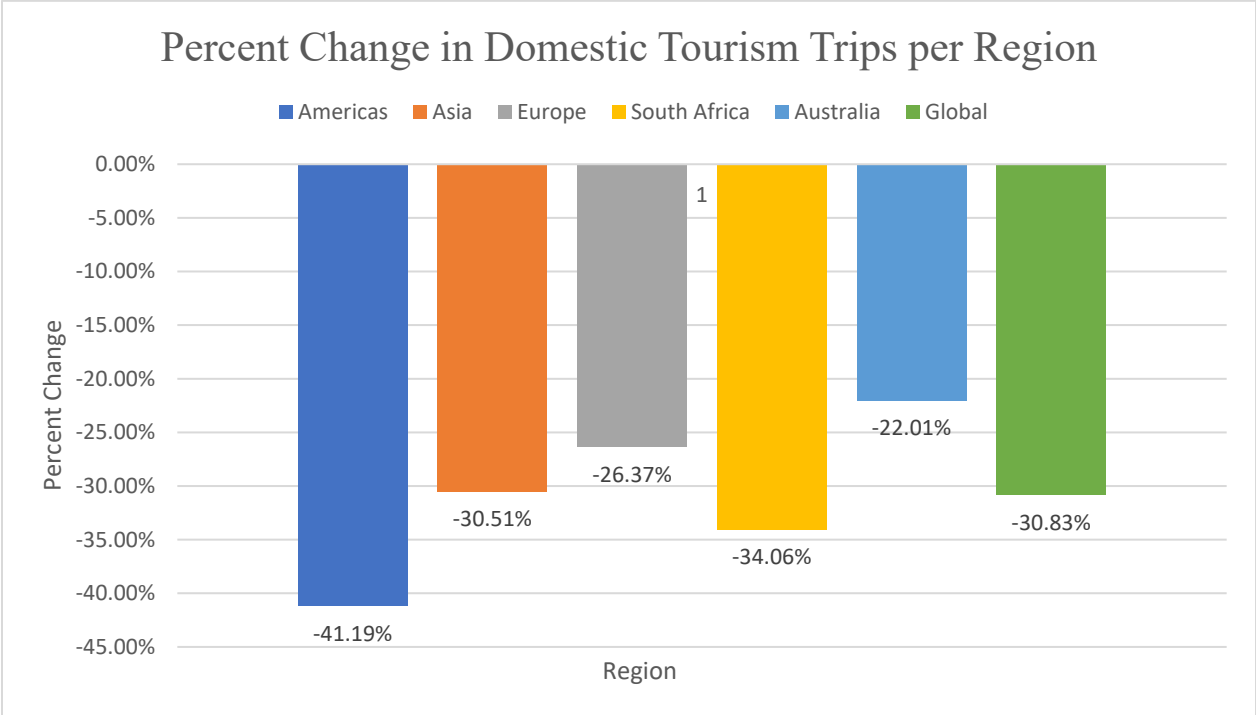
Table 1. Percent Change in Tourists from Incoming Regions Experienced by Destination Regions



It is clear that international tourism massively declined in regard to 2020 from years prior. However, domestic tourism must also be studied. The notion of migration from urban to rural areas was discussed above. It is reasonable to wonder whether domestic tourism amplified or offset this concept. In other words, were domestic tourists part of this mass movement within countries? Or did a lack of domestic tourism cancel out the effects of citizens moving from urban to rural areas? The available data was somewhat limited as only 17 countries in the ranger survey had sufficient reporting data for 2020. South Africa and Australia were the only countries from their respective regions to fit that mold. Although there was still a large decrease in 2020 when

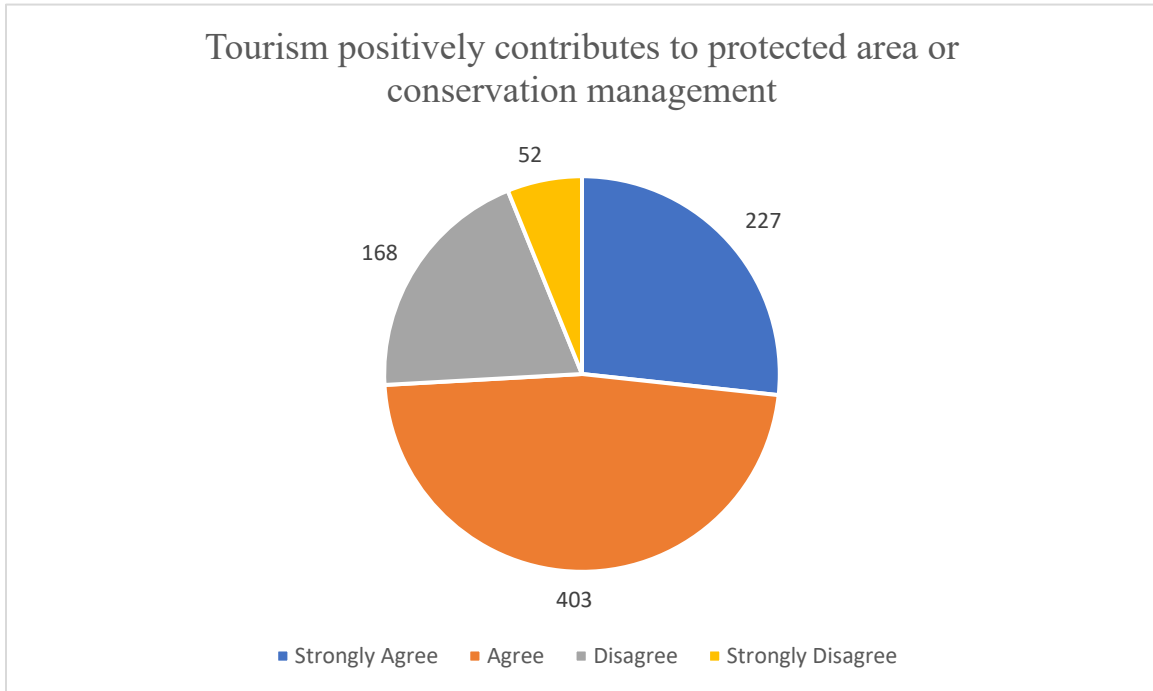
compared to the years before COVID-19, it was not nearly as large as the change in total arrivals per country. The region that experienced the largest average decrease was the Americas but at only a 41.19% decrease (Figure 4). A far cry from the 74.39% decrease these countries saw in total tourism arrivals. The European countries included in this sample as well as Australia experienced declines of approximately 26% and 22% respectively. These figures are without a doubt still impactful; however, it is nowhere near the catastrophic decline in total tourism arrivals.

Figure 4. Percent Change in Domestic Tourism Trips per Region



Now that a significant reduction in tourism has been established, we can begin to look at the potential impacts this has on conservation and guardianship. According to rangers who were asked if tourism positively contributes to protected area or conservation management respondents overwhelmingly agreed (see Figure 5).

Figure 5. Tourism Positively Contributes to Protected Area or Conservation Management



This reduction and perceived benefit of tourism most likely plays a role in other survey questions regarding budget cuts. Ranger pay, available equipment, and overall conditions were likely impacted by the reduction in tourism-related revenue. Respondents of the ranger survey overwhelmingly concurred with this sentiment as 80.27% either agreed or strongly agreed when asked if revenue has decreased as a result of the pandemic (Figure 6). Not only has the cash flow slowed down, but the lack of revenue is impacting the ranger occupation. Almost 69% of respondents agreed that the daily operations were negatively impacted by budget cuts associated

with the COVID-19 pandemic (Figure 7). To add, 62.51% saw detriments to law enforcement activities (Figure 8) due to these cuts.

Figure 6. Revenue has been Negatively Impacted by COVID-19

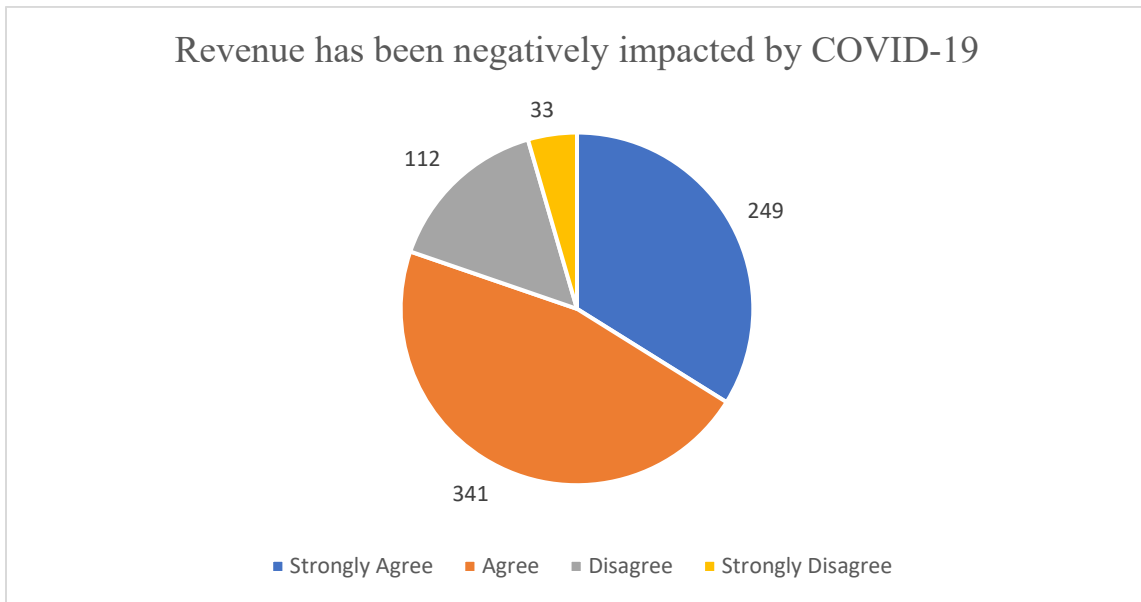


Figure 7. COVID-19 Budget Cuts have Negatively Affected Daily Work

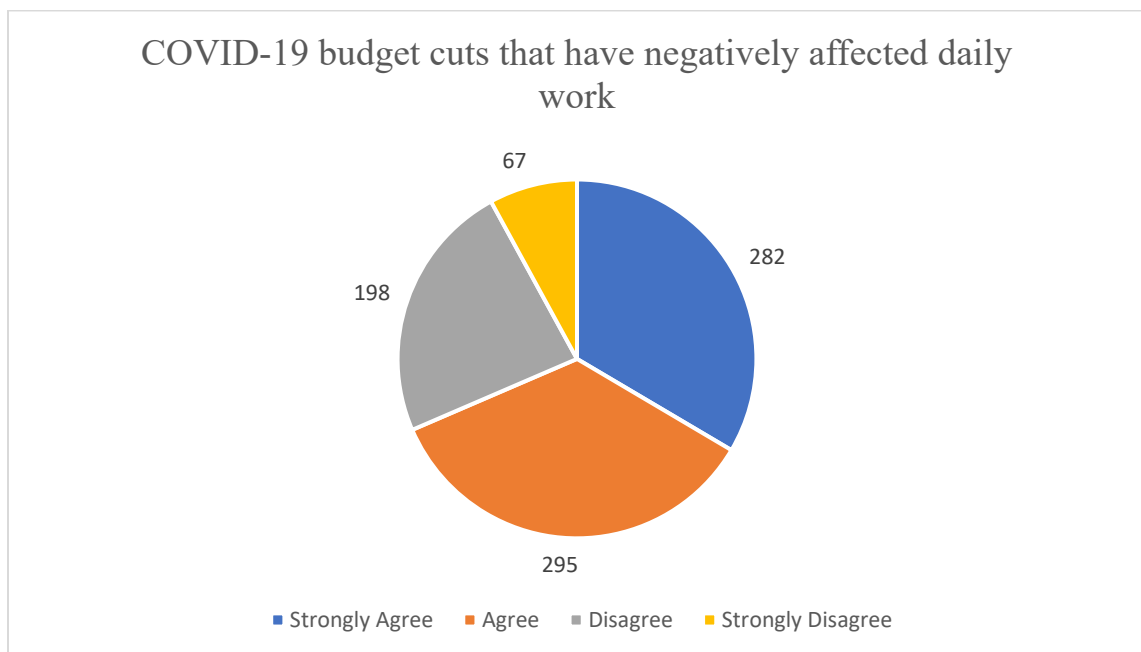
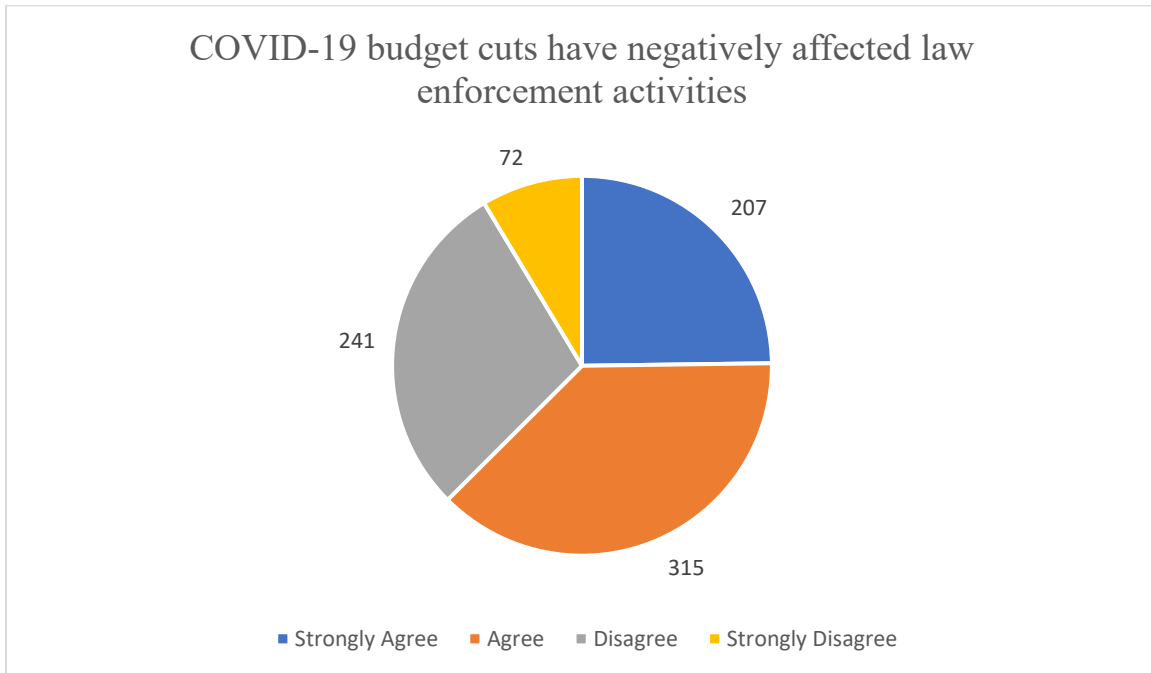


Figure 8. COVID-19 Budget Cuts have Negatively Affected Law Enforcement Activities



Figures 6, 7, and 8 begin to support the notion that formal guardianship has been affected by the pandemic. The rangers largely believed that not only was there a decrease in funds but this decrease created hardships in their daily operations and as guardians. It is also reasonable to assume that the aforementioned decrease in tourism plays a role in this. The tourism industry no doubt brings a lot of revenue to protected areas and conservation services. Thus, if these budget cuts were even partly due to the lack of tourism arrivals, then it can be reasoned that a crumbling tourism industry decreased the capability of formal guardians of protected areas.

In addition to aspects of formal guardianship such as patrols, equipment, and law enforcement activities, informal guardianship could have also been changed due to COVID-19. As referenced in the literature review, community involvement is massively important to conservation officers. Unfortunately, the results from the ranger survey support the idea that community involvement regressed during the pandemic. Over 90% of respondents either agreed

or strongly agreed that community outreach, education, and conservation activities were negatively impacted by COVID (Figure 9). Additionally, approximately 65% of ranger respondents did not believe the protected area authorities did enough to financially support the local communities once the pandemic started (Figure 10). It is important to note that the lack of financial support is more than likely associated with the sharp decline in tourism-based revenue generated by the parks. Although this will be discussed at length in the following chapter, the potential that these statistics show for decreases in informal guardianship is important, especially in regard to routine activities theory. The relationship between rangers and the community is extremely important. It is not unreasonable to assume that locals with a poor perception of protected area authorities would be more likely to become motivated offenders, especially in times of hardship.

Figure 9. Community Involvement Activities have been Negatively Impacted by COVID-19

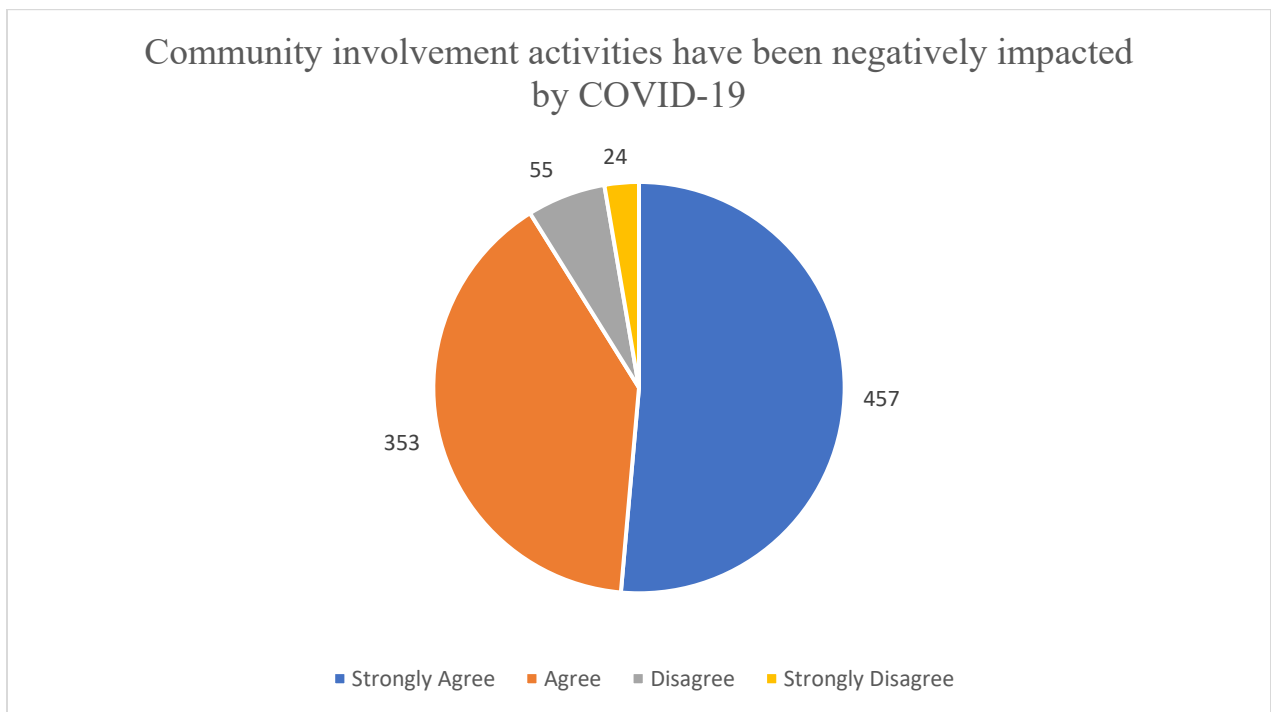
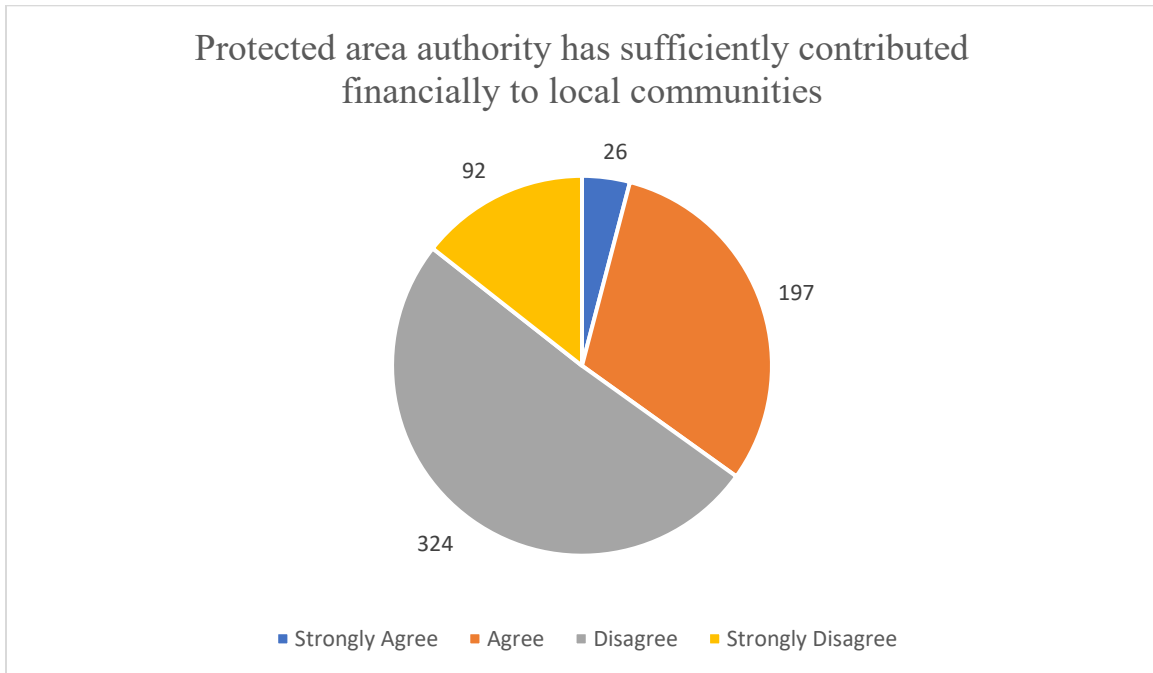
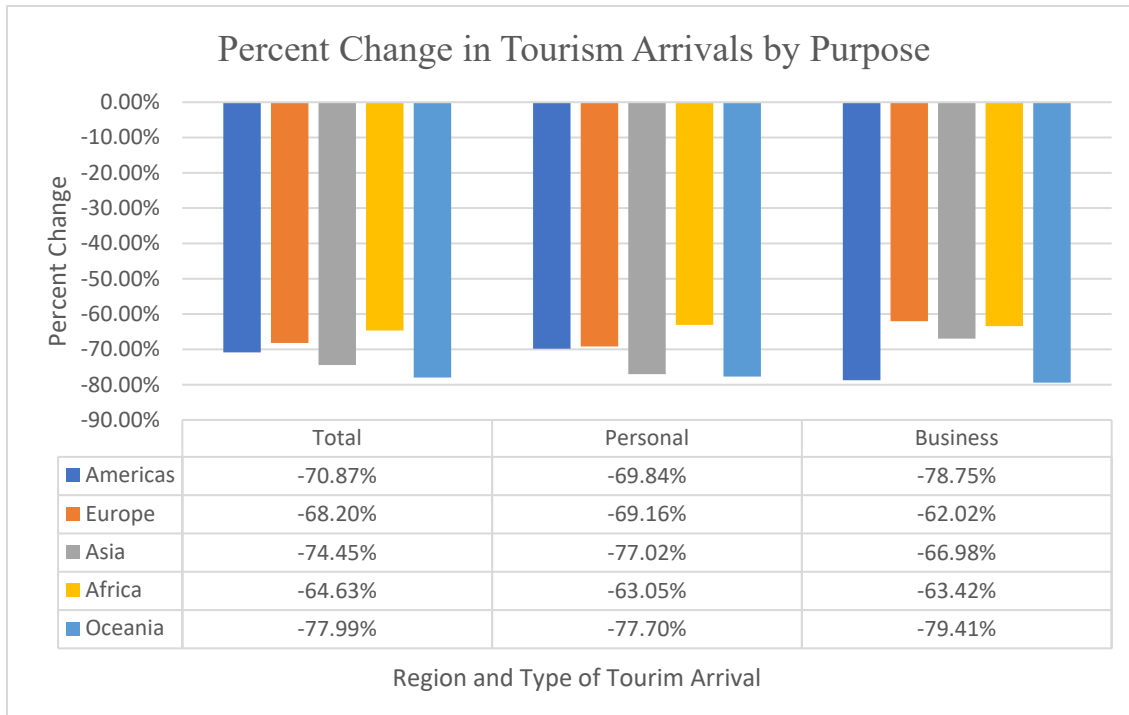


Figure 10. Protected Area Authority has Sufficiently Contributed Financially to Local Communities



One interesting point is whether the type of tourist arrival matters in terms of their influence on guardianship. Although most regions saw a relatively similar decrease in both personal and business arrivals, it is of note that the Americas experienced an almost nine percent greater decrease in business arrivals than personal, and Asian countries included in this subgroup experienced the opposite with a greater decrease in personal tourism arrivals by approximately ten percent (see table 2). It is possible that those who arrive at protected areas for personal reasons care more about the protected areas than those on business trips and thus play a greater role in informal guardianship; however, no distinction in the impact based on type of tourism arrival was made by this thesis.

Table 2. Percent Change in Tourism Arrival by Purpose



After establishing tourism rates, ranger perceptions, and potential changes to guardianship, it is possible to assess the impact these factors have on conservation threats. Participants of the ranger survey were asked if various threats to the protected area had increased since the start of COVID. Most threats elicited mixed responses as increased threats of illegal hunting for subsistence, illegal logging, and illegal encroachment drew near even percentages of agreement or disagreement (47.41%, 48.12%, and 47.23% agreed that there was an increase in the respective threat). However, shy of 42% of respondents believed that commercial or profit hunting had increased (Figure 11) while other pressures such as grazing and non-timber forest product collection was the most agreed upon increase at 64.96% (Figure 12).

Figure 11. *Illegal Hunting for Profit has Increased during the Pandemic*

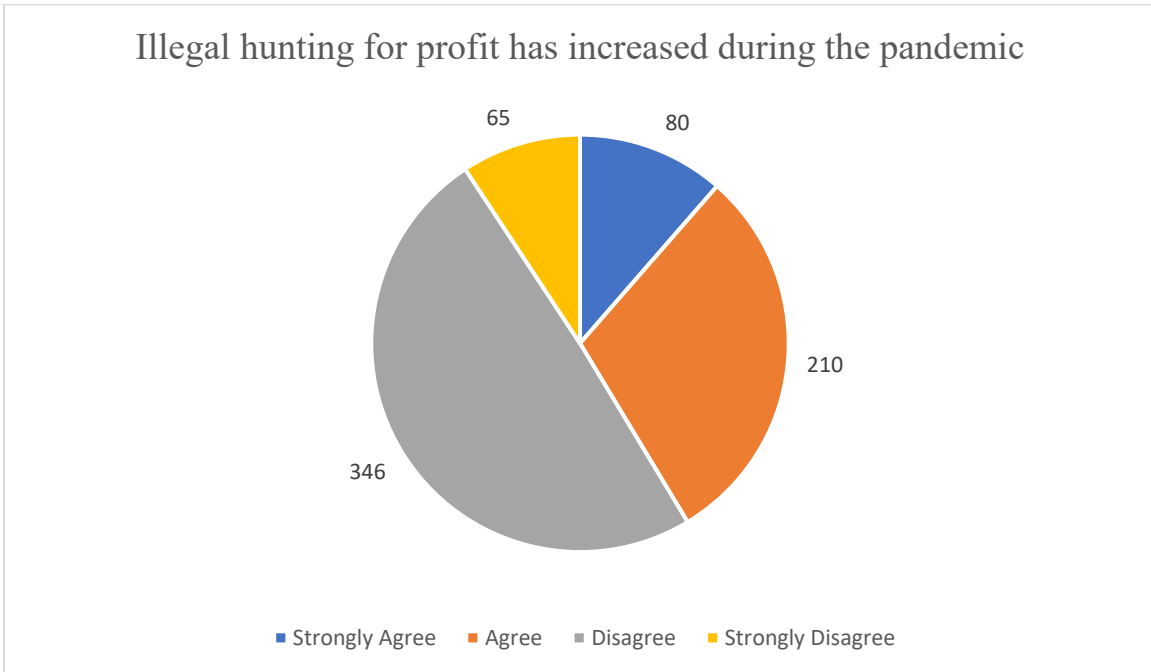
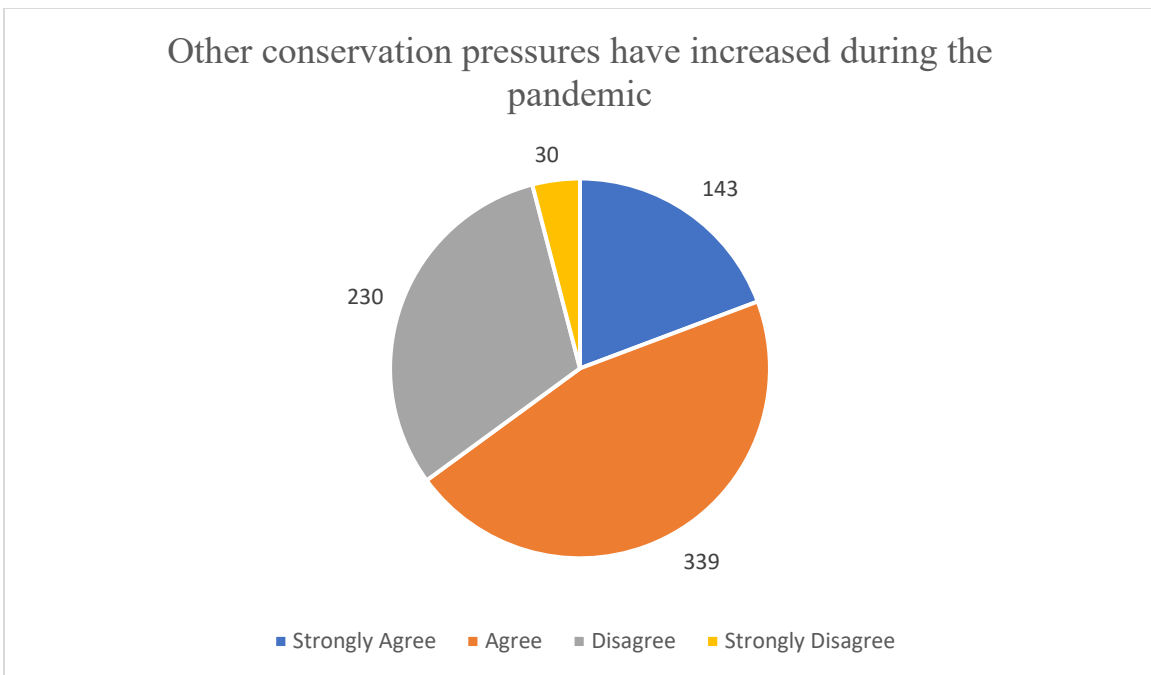


Figure 12. *Other Conservation Pressures have Increased during the Pandemic*



CHAPTER FIVE: DISCUSSIONS

Introduction

This chapter applies the findings to the theoretical perspective explained in previous chapters. Questions about tourism and guardianship will be answered using trends and results from the datasets. Additionally, policy recommendations and mitigation strategies will be suggested in order to prevent damage in future events.

Answering the research questions using routine activities theory

After examining the results, this thesis can begin to relate the findings to the theoretical perspective of routine activities theory. To start off, the results support the idea that conservation officers are experiencing budget cuts that impact their daily operations. It would also be reasonable to infer that the sharp decline in international tourism arrivals played a role in these cuts due to a loss in revenue. This would bolster the idea that capable guardianship has decreased due to the COVID-19 pandemic. As mentioned above, prior research suggests that insufficient equipment can prevent wildlife law enforcement from capably protecting the area (Warchol & Harrington, 2016). In turn, this decrease in guardianship could partially explain why many surveyed rangers perceived an increase in threats to their protected area. Another element that plays into the capability of formal guardianship is the motivation of park rangers and conservation officers. The combination of insufficient staffing and equipment, decaying community relations, and stress related to the pandemic could cause wildlife law enforcement to be less effective. As mentioned in the theoretical framework chapter, less motivated officers can be prone to skipping out on their duties and falsifying reports. To add, the results indicate that informal guardianship could have also decreased thus resulting in increased threats as well. As

shown in the results chapter, surveyed rangers overwhelmingly believed that community involvement activities, as well as protected area authorities' contributions to the local communities, were not up to par. As previously explained, community involvement is crucial to protected area authorities and conservation. It is logical to assume that the lack of these outreach programs, especially during a crisis like the pandemic, had damaged the perceptions that locals had of conservation officers. As a result, poor relations could turn some desperate and unhappy locals into motivated offenders. Additionally, locals with less attachment to conservation efforts could be less likely to report or prevent others from committing wildlife crimes. Last of all, the tourists themselves can be seen as informal guardians. Typically, perpetrators of crime tend to avoid offending in front of others and unfortunately, it is unrealistic to think that conservation officers can always guard the entire area. Therefore, a park filled with tourists could make an illegal hunter more afraid of getting caught or witnessed. However, the inverse is also true. An empty protected area with a dearth of informal guardians can provide expanded access to motivated offenders.

In addition to the impacts on capable guardianship, the motivation of offenders and the suitability of the targets may also have been impacted by the COVID-19 pandemic. As touched on before, negative views of wildlife law enforcement and protected areas could sway some people to commit conservation crimes. The aforementioned insufficient support that protected areas provided to the community during the pandemic may have done more than just sour relations. If community members were relying on assistance from the protected area, then it could increase poverty and food insecurity which was already an issue stemming from other economic implications of the pandemic. It is no secret that protected areas contain goods that are capable of both turning a profit and feeding one's family. Therefore, the increase in target

suitability, as well as the heightened motivation of offenders, could explain why more rangers perceived low-level subsistence hunting as increased than commercial poaching. In other words, more regular people were impacted by COVID-19 and had to resort to activities such as illegal fishing or hunting. This supports why more rangers saw an increase in low-level hunting as this group of people, those who offend to support themselves were more affected by the pandemic than commercial perpetrators who offend for profit.

The examination of the results also allows the original research questions to be answered. When looking at the extent to which regions experienced declines in tourism, the data analysis supported every metric to show that tourism arrivals were significantly impacted in every region. Although the decrease experienced by sampled European countries, for example, in the total arrivals metric was substantially less than Oceanic and Asian countries, an over 60% minimum decrease in the number of tourism arrivals from pre-pandemic to lockdown is crushing to the tourism industry in every region. Significant decreases were also seen for tourism arrivals by region, tourism arrivals by purpose, domestic tourism trips, and declines in tourism as perceived by rangers. In sum, the first research question of this thesis is heavily supported by the results chapter. The second research question asks the impact that these declines in tourism have on guardianship. This question is much harder to definitively answer as many factors go into potential changes in guardianship. For instance, the results support that most conservation officers perceived a decrease in revenue that made their jobs and law enforcement duties more difficult. Given the massive drop-off in tourism profits, it is reasonable to say that the formal guardianship aspect of law enforcement activities was negatively impacted by the lack of tourism dollars. However, the economic implications can be multifaceted. For example, a country could also have experienced dramatic drops in gross domestic product or tax revenue during the

pandemic which had nothing to do with tourism. Informal guardianship in this context can work similarly. Although it is reasonable to assume that fewer tourists being in a protected area can provide new opportunities for perpetrators of environmental crime, a decrease in visitation could have occurred from fewer locals visiting the park during the lockdowns. To add, the inverse of tourists playing the role of informal guardians is also entirely possible. It is undeniable that some tourists commit or embolden conservation crime in some capacity. However, given the rangers' responses when asked about this topic (Figure 5) it seems like tourists provide more revenue and guardianship than cause problems. In all, the results of tourism arrivals and ranger perceptions support the idea that tourism provides the revenue for formal guardianship. The results also suggest that tourists have a positive impact on protected areas and provide some form of informal guardianship or the funds to facilitate community-building programs. However, it is worth noting that it is unlikely that tourists and financial gains from tourism are the sole contributors. This research supports the second hypothesis's claim that formal and informal guardianship was negatively impacted by a decrease in tourism; however, the extent is unknown.

Recommendations

Although the COVID-19 pandemic has been an unprecedented and tragic event, governments should still do everything to attempt to learn from this situation in order to minimize the damage of future global health crises. Unfortunately, during a pandemic that results in travel bans and lockdowns, it is extremely hard to preserve or replace the inevitable loss of tourism revenue. However, this does not mean that forms of guardianship in protected areas need to suffer to the extent we saw in 2020. In terms of formal guardianship, it is understandable that a lack of equipment and resources will likely occur due to the economic downturn. One

recommendation would be to focus on supplementing the lack of formal guardianship with increased informal guardianship. This may seem impossible given the lack of incoming tourists to serve as informal guardians which is why the first recommendation would be to make park and protected area access both free and encouraged for locals during future pandemics. The benefits of adopting this policy are plentiful. To start, these parks are outdoors and spread out. Thus, visitors would be safe and not at a significantly increased risk of spreading any disease. The local population would then aid in serving as informal guardians much like tourists do in non-pandemic times. Additionally, a free activity that allows locals to safely leave their homes during lockdown periods could boost community perceptions and satisfaction with protected area authorities. Maintaining sufficient community relations could also help formal guardianship if rangers experience less stress and more motivation as a result. It is worth noting that some countries and park services, such as the National Park Service in the United States, did eliminate entry fees during the COVID-19 pandemic (NPS, 2020). It is also possible that free and easy access to parks could have detrimental impacts such as more offenders or the slim chance of increased spreading of diseases. However, due to the benefits of informal guardianship and community relations, this thesis supports more countries implementing this strategy during future pandemics. The second policy recommendation would be free online access to protected area information during a pandemic. An example of this would be conducting zoom meetings or posting videos on what flora and fauna are legal to gather for consumption during emergencies and which are protected. This policy would have similar benefits to the previous recommendation in the forms of community satisfaction, reduction in illegal subsistence hunting or gathering, and increased ranger motivation.

In conclusion, this thesis stresses that guardianship plays a crucial role in the routine activities theory. Both formal and informal guardianship were heavily impacted by the sharp decline in international tourism arrivals in 2020. While the revenue this industry generates cannot be replaced during an emergency, governments and protected area authorities can implement community-based strategies to bolster the informal guardianship of protected areas.

APPENDIX A
RANGER COVID-19 SURVEY

Ranger-COVID-19 survey

Section 1

1.1. Name of the protected area/conservation site: _____

1.2. Country of protected area/conservation site you work in: _____

1.3. What is your age? _____

1.4. What is your sex? _____

1.5. How long have you worked in the protected area/conservation site: _____

1.6. Are you currently living and working in an outpost or remote location (i.e., not PA headquarters): YES/NO

Section 2

We will now ask you questions related to how COVID-19 may have affected daily operations in your protected area. Using the scale below, please note how much you agree or disagree with the following statements.

COVID-19 has negatively impacted protected area...	Strongly disagree	Disagree	Agree	Strongly agree	Not applicable
2.1. Law enforcement activities (e.g. patrol)	1	2	3	4	9
2.2. Habitat management activities	1	2	3	4	9

2.3. Wildlife monitoring and census activities	1	2	3	4	9
2.4. Community conservation, education, and outreach activities	1	2	3	4	9
2.5. Human-wildlife conflict management activities	1	2	3	4	9

2.6. Have rangers been assigned to work related to the COVID-19 pandemic. For example, monitoring checkpoints, providing medical assistance, conducting border patrols, etc?

YES/NO

2.6.1. IF YES, please note the type of work here:

2.7. In your opinion, are you working more or less since the beginning of the COVID-19 became a pandemic?	Less 0	About the same 1	More 2
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Section 3

We will now ask you questions related to how COVID-19 may have affected organizational staffing and the budget in your protected area. Using the scale below, please note how much you agree or disagree with the following statements.

From your familiarity, COVID-19 has led to...	Strongly disagree	Disagree	Agree	Strongly Agree	Not Applicable
3.1. Budget cuts that have negatively affected the daily work of rangers (e.g., less fuel, rations, etc.)	1	2	3	4	9

3.2. Budget cuts that have negatively affected the personal lives of rangers (e.g., delay in salary, reduction in pay, etc.)	1	2	3	4	9
3.3. Budget cuts that have negatively affected protected area law enforcement activities (e.g., less patrol activities)	1	2	3	4	9
3.4. Budget cuts that have negatively affected protected area community conservation efforts (e.g., community meetings and projects)	1	2	3	4	9
3.5. Budget cuts that have negatively affected protected area human-wildlife conflict management activities	1	2	3	4	9

In your opinion...	Strongly disagree	Disagree	Agree	Strongly Agree	Not Applicable
3.6. Tourism positively contributes to protected area management.	1	2	3	4	9
3.7. Tourism has been negatively impacted by COVID-19.	1	2	3	4	9

3.5. Have rangers been laid off from their job due to COVID-19 related budget cuts or safety reasons (e.g. contracts not renewed because it is hard to maintain a safe distance) YES/NO

3.6. Has your salary been reduced or delayed due to COVID-19? YES/NO

IF YES, please answer 3.6.1 (If NO, please go to Question 4.1):

3.6.1. What was approximately the percentage of the reduction: _____ %

Section 4

We will now ask you questions related to how COVID-19 may have affected the occupational welfare in your protected area. Using the scale below, please note how much you agree or disagree with the following statements.

	Strongly disagree	Disagree	Agree	Strongly Agree	Not Applicable
4.1. I have received adequate information about COVID-19 from the government.	1	2	3	4	9
4.2. I have access to adequate sanitation and hygiene equipment (e.g. clean water, soap, face masks, etc.) that is useful in preventing the spread of COVID-19.	1	2	3	4	9
4.3. I have access to adequate medical insurance that helps cover potential treatment for COVID-19.	1	2	3	4	9
4.4. I am concerned about my financial well-being due to COVID-19.	1	2	3	4	9
4.5. COVID-19 has led to a reduction of adequate operational supplies (e.g. fuel, rations, etc.).	1	2	3	4	9
4.6. My organization has sufficiently supported me during the COVID-19 pandemic.	1	2	3	4	9
4.7. I worry about my family contracting COVID-19.	1	2	3	4	9

4.8 I spend more time with family COVID-19	1	2	3	4	9
4.9 I spend less time with family COVID-19	1	2	3	4	9

Please only answer the following questions, if you are a RANGER:

	Strongly disagree	Disagree	Agree	Strongly Agree	Not Applicable
4.10. I worry about contracting COVID-19 during my patrol operations.	1	2	3	4	9
4.11. I worry about contracting COVID-19 when I encounter a suspect.	1	2	3	4	9
4.12. I worry about contracting COVID-19 when I perform community conservation services (e.g. meetings).	1	2	3	4	9
4.13. I worry about contracting COVID-19 when I informally interact with the community.	1	2	3	4	9
4.14. I worry about potentially transmitting COVID-19 to community members.	1	2	3	4	9
4.15. I worry about potentially transmitting COVID-19 to wildlife that I encounter during patrols.	1	2	3	4	9

Section 5

We will now ask you questions related to how COVID-19 may have affected the threats that affect your protected area. Using the scale below, please note how much you agree or disagree with the following statements.

Since the start of the COVID-19 pandemic in your country	Strongly disagree	Disagree	Agree	Strongly Agree	Not Applicable
5.1. Illegal hunting for subsistence has increased.	1	2	3	4	9
5.2. Illegal hunting for commercial/profit has increased.	1	2	3	4	9
5.3. Illegal logging has increased.	1	2	3	4	9
5.4. Illegal encroachment has increased.	1	2	3	4	9
5.5. Other pressure on forest resources have increased (grazing, NTFP collection)	1	2	3	4	9

Section 6

We will now ask you questions related to how you have been helping local communities during the COVID-19 pandemic. Using the scale below, please note how much you agree or disagree with the following statements.

Since the start of the COVID-19 pandemic...	Strongly disagree	Disagree	Agree	Strongly Agree	Not Applicable
6.1. The protected area authority has conducted sufficient awareness and education programs about COVID-19 for local communities.	1	2	3	4	9
6.2. The protected area authority has sufficiently contributed financially to local communities.	1	2	3	4	9
6.3. The protected area authority has sufficiently shared rations with the local communities.	1	2	3	4	9

Section 7

7.1. Do you believe that rangers have a role in controlling COVID-19? YES/NO

7.1.1. If YES, how so? _____

7.1.2. If NO, why not? _____

7.3. Do you have access for COVID-19 testing? YES/NO

IF YES to 7.3., then answer the following:

7.3.1. Do you have to pay for the testing YES/NO

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