An Examination of Wildlife Crime on the Treasure Coast: Do Crime Detection Rates Differ on Conservation Lands?

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In 2015, the Florida Fish and Wildlife Conservation Commission Law Enforcement Division (FWC) recorded 11,869 criminal violations. A majority of which are "wildlife crimes", or crimes committed against the environment. The ratio of FWC officers to anglers and hunters is greatly disproportionate, and it is estimated that most wildlife crimes go undetected. The current study will examine the locations of poaching and conservation-related tickets issued on the Treasure Coast of Florida in an effort to better understand the predictors of wildlife crime detection. Overall, approximately half of the tickets issued as a result of a wildlife violation occurred on conservation lands, as defined by the Florida Natural Areas Inventory. In addition, in all three counties, the percentage of crimes detected on conservation lands was larger than the percentage of the county area designated as conserved, indicating a higher probability of detection in the conserved areas.

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INTRODUCTION

Wildlife crimes are common in Florida yet there are few studies that evaluate the factors of natural resource enforcement and the occurrence of wildlife violations. The Florida Fish and Wildlife Conservation Commission Law Enforcement Division (FWC) is tasked with monitoring human-environment interactions and protecting the natural resources across the state of Florida. FWC employs over 800 sworn officers to patrol the waterways and hunting grounds of the state. This includes 53,927 square miles of land and 5,983 square miles of waterways (Brewer, 2011).

Wildlife crime is defined by Muth and Bowe (1998) as "[a]ny act that. . . contravenes the laws and regulations established to protect wild, renewable resources, such as plants, mammals, birds, insects, reptiles, amphibians, fish and shell fish" (as cited in Crow et al., 2013, p. 637). Crow et al. (2013) further defined four narrower categories of wildlife crime: 1) Illegal Taking or Methods, 2) Illegal Possession of Wildlife and By-products, 3) Improper Permitting, and 4) Conservation-related Offenses. The first two categories could also be classified as poaching. This includes, but is not limited to, hunting out of season, using incorrect equipment, and possessing wildlife that is under or oversized. Improper Permitting is a failure to possess the appropriate fishing or hunting license required for that specific activity. Approximately 50% of the wildlife offenses that occur in Florida involve improper permitting as defined by State Statute Chapter 379. Conservation-related Offenses violate laws designed to protect natural habitats. Examples include littering and trespassing on protected lands and management areas (Crow et al., 2013). It is important to note that Conservation-related Offenses do not necessarily need to occur on conserved lands.

Unfortunately, data from FWC only includes those violations that were detected and reported. It is believed that Florida has 1.2 million anglers

and 200,000 hunters. This translates into a ratio of 1,750 hunters and fishermen per individual FWC officer (Law Enforcement, n.d.). Several researchers have argued that this small ratio likely means that most wildlife offenses go undetected. Furthermore, "estimates of the ratio of discovered offenses to actual offenses range from 1:30 to 1:83", according to Eliason (2003), Green et al. (1998) and Kaminksy (1974) (as cited in Crow et al., 2013). Therefore, it is imperative that negative human-environment interactions be better understood and predicted.

Conservation criminology is a growing discipline of study that seeks to understand the relationships between human behavior, environmental crime and natural resource conservation. Gore (2011), a supporter of conservation criminology, states "[s]uch [knowledge] can help us better define strategic policy goals and generate effective and appropriate conservation actions" (p. 660). The current study will expand the comprehensive understanding of conservation criminology by investigating poaching and conservation-related crime detection rates within conservation lands and in non-managed areas.

This snapshot study will examine the detection rates within the counties of the Treasure Coast of Florida for the year 2015. It is expected that more crimes will be detected on conservation lands, based on research conducted by Stretesky et al. (2010), discussed below.

Determining the detection rate variability by land category allows an additional spatial element to be included in other studies. For example, Crow et al. (2013) studied wildlife crime offender profiles in the state of Florida. It could be beneficial to continue that study and determine whether offender profiles differ based on the category of land. In addition, there is little research that explores the daily activities of FWC or other fish and wildlife law enforcement officers. If there are significant differences in detection rates, then that would indicate a need to evaluate the enforcement efforts in conservation areas.

LITERATURE REVIEW

Predictors of Wildlife Crime and Detection

Although conservation criminology is a growing field, presently there is limited research on this subject matter. A study conducted by Stretesky et al. (2010) showed an association between the presence of conservation organizations and the detection of wildlife crimes in all 67 counties of Florida, based on records from 2009. An ordinary least squares (OLS) multiple regression was used to control for several factors including "the number of [FWC] officers, the location of natural resource targets (conservation land and water), potential offenders, proportion of the county's population that is rural, and the economic benefits derived from natural resource use" (Stretesky et al., 2010, p. 401). This study controls for the number of conserved acres in a county, as defined by the Florida Natural Areas Inventory; however, it does not differentiate on which land category a crime occurs. To clarify, this study states that the number of conserved acres influences the overall number of wildlife crimes detected in that county, but does not specify where those crimes are detected. More conserved land in a county could mean that more resources are devoted to the area as whole, not specifically to the conserved areas.

Stretesky et al. (2010) concluded that "each additional [conservation] organization in a county is associated with somewhere between 17.4 and 64.6 additional violations detected" (p. 407). The association is stronger for those counties with greater numbers of natural resource officers. The results revealed a small correlation between the number of conserved acres and the number of conservation organizations; as the number of conserved acres increased, the detection rates increased too. In addition, the study ruled out any influence as a result of social disadvantage. The results showed that race, ethnicity and income of a community did not predict the detection of violations (Stretesky et al., 2010).

Although offender profiling is not directly linked to crime detection, this information can be used to improve detection efforts. Profiling based on racial characteristics is illegal, but law enforcement officers use behavioral patterns to help detect criminal acts. Eliason (2013) conducted surveys and phone interviews of Montana Game Wardens. The study aimed to evaluate how profiling techniques are used by game wardens in the process of apprehending poachers. The research concluded that over longer time periods, game wardens identified potential offenders by observing behaviors and characteristics such as living off of some form of disability, viewing natural resources as a commodity or right, obsessing with trophy animals, or exhibiting extreme hunting

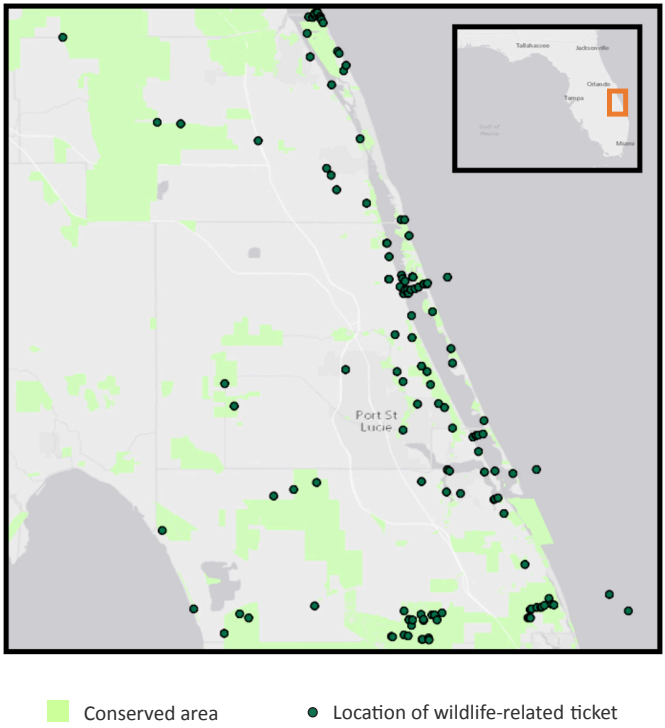

Figure 1 **Locations of Wildlife Crimes**

success year after year. First impressions also played a role. These impressions were based on behaviors including waving too much or too little, the condition of equipment, or vehicle characteristics such as presence of hunting-related bumper stickers (Eliason, 2013).

METHODOLOGY

Study Area

The study area, as shown in Figure 1, includes all three counties of the Treasure Coast of Southern Florida: Indian River County, St. Lucie County and Martin County. The whole area encompasses 1,043,840 acres, which are monitored by 33 FWC law enforcement officers. FWC divides the state into five regions: Northwest, North Central, Northeast, Southwest, and South. St. Lucie and Martin Counties both fall within the South Region. Crow et al. (2013) state "the south region is home to more marine-based recreational opportunities, resulting in an increased likelihood of fishing and marine conservation offenses being committed, and thus cited" (p. 648). Even though Indian River County is a part of the Northeast Region, this description holds true for this county as well (Law Enforcement, n.d.).

The study area contains 223,630 acres of conservation lands as defined by the Florida Natural Areas Inventory (FNAI) (Acres of Conservation, 2015). A property must be mostly undeveloped and the managing agency "must demonstrate a formal commitment to the conservation of the land in its natural condition" (FNAI, 2015, p.1) to be considered "conserved land". This land can be owned by federal, state, local, or private means. It can also include lands that are in the process of being actively restored to their natural condition (FNAI, 2015).

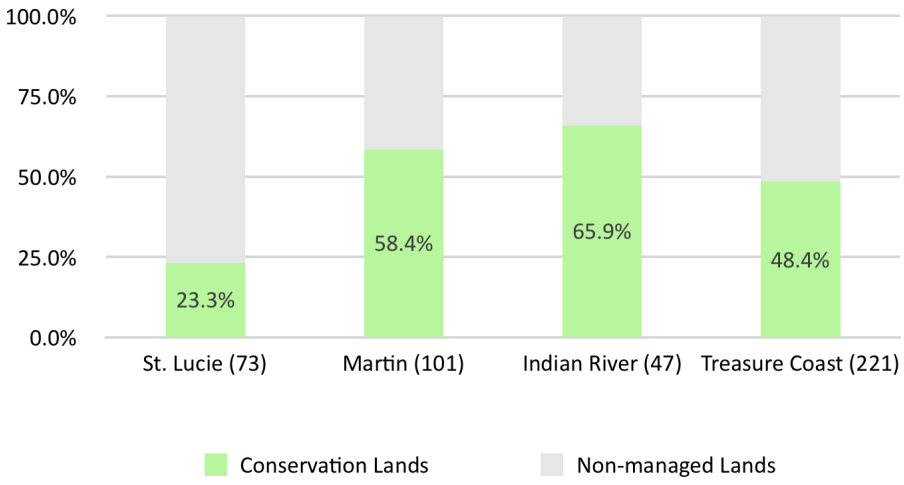

Figure 2 **Tickets Issued by County and Land Category**

Data and Methods

Data were collected from FWC through a public record request. The database included all tickets issued by FWC officers in 2015 throughout the state. Originally, there were 451 violations and 364 separate tickets listed for the Treasure Coast. If a ticket included multiple violations, it was only counted one time for the purpose of this study. Non-wildlife offenses, cases without longitude and latitude coordinates, and cases with incorrect longitude and latitude coordinates were eliminated. One ticket was listed under Martin County, but the coordinates placed it within St. Lucie County. This ticket was kept as part of the study and was added to the St. Lucie County dataset. Permitting violations, as defined under state statute 379.354, were eliminated as well. These violations were removed from the dataset in an effort to focus on events that caused physical harm to the environment. Thus, the data used for this analysis consisted of 221 tickets (Resource Citations, 2015).

FNAI GIS data was utilized to map the conservation lands of the Treasure Coast (Florida Natural, 2016). Once this information was uploaded into ArcGIS, then the locations from the 221 tickets were plotted as well (Figure 1). Based on the map, tickets were classified as occurring within conservation lands or non-managed areas according to location.

The data collected from this map were descriptively analyzed into percentages of crimes discovered by land category in each county, and then in the Treasure Coast as a whole. All three counties are similar in size (less than a 45,000-acre difference), but St. Lucie County has a significantly lower percentage of acreage devoted to conservation (9%) as compared to Indian River and Martin Counties (30% and 27% respectively) (Acres of Conservation, 2015). For this reason, rates were used to compare crime events within and among each county. The rates were calculated by dividing the number of crimes by the corresponding acreage for that land category. For example, the number of crimes committed on conservation land in St. Lucie County was divided by the acres of conservation land within St. Lucie County. This was done for each county individually, and then for the Treasure Coast as a whole.

FINDINGS AND DISCUSSION

Figure 2 presents the wildlife citation rates of the Treasure Coast. These data include tickets issued for poaching and conservation-related offenses. When all tickets from the Treasure Coast were analyzed, approximately half (48.4%) were found to have occurred within conserved lands. A majority of

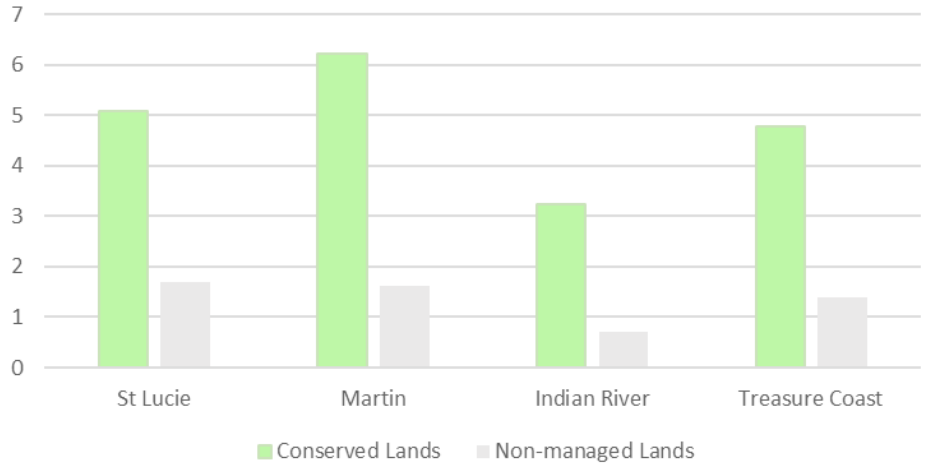

Figure 3 **Crime Detection Rate per 10,000 Acres**

these tickets are violations of administrative codes pertaining to specific animals such as snapper, grouper, stone crab and numerous other protected species. Others cite violations of state park rules and regulations but do not mention any specifics about the situation. Conservation-related offenses include littering offenses not exceeding 15 pounds (Resource Citations, 2015). This is only a few examples out of the dozens of different types of tickets issued.

Indian River County issued 47 wildlife-related tickets in 2015. Almost 66% of these occurred on conservation lands. Martin County data yielded a similar outcome (58.4%) from 101 offenses. The last county, St. Lucie, had a lower percentage (23.3%) based on 73 offenses.

In an attempt to understand the varying percentages as described above, crime detection rates were calculated per 10,000 acres of land. Rates were compared between the different land categories and among the counties. The results are shown in Figure 3.

The crime detection rates per 10,000 acres are higher in the conserved lands for all 3 counties, as compared to non-managed areas. Detection rates in conserved areas ranged from approximately 3 to 6 crimes per 10,000 acres. Non-managed lands yielded less than 2 crimes detected per 10,000 acres. Indian River County had less than 1. In Indian River County, detection rates on conserved lands are approximately 4.6 times the non-managed rates. This is followed by Martin County at approximately 3.87 times, and St. Lucie County at approximately 3.02 times.

These methods of analysis do not control for other variables such as the number of FWC officers, the number of conservation organizations, or demographics of each county. As stated earlier, there is a study that states detection rates are not affected by the socioeconomic status or the ethnicity and race of a community (Stretesky et al., 2010), therefore it is unclear whether demographics would affect the results of this analysis.

There are two other significant weaknesses of this research. The first pertains to the study area. There are 67 counties in Florida which vary greatly in habitat, land use and other factors. The geography of an area can determine the types and numbers of crimes that occur (Crow et al., 2013). The three counties examined in this study are relatively similar to one another, therefore it may not be accurate to infer these results for the entire state. Second, the data for this study is limited to tickets that were issued by FWC officers. It would be beneficial and more complete to include occurrences of verbal and written warnings, and data from other law enforcement agencies.

CONCLUSION

The probability of a wildlife crime being detected is greater on conservation lands than on non-managed lands, as expected. The percentage of crimes caught within conserved lands is larger in all three counties than the percentage of the county designated as conserved. For example, 65.9% of wildlife crimes in Indian River County were detected on less than 30% of the county area. This is further supported by the detection rates. The detection rates on conserved lands are on average 3.83 times the rate of detection on non-managed lands.

There are numerous variables that could contribute to this higher detection rate in conservation areas. First of all, the publicly owned conservation lands are often designated as such due to specific habitats or species that are found there. These same characteristics can attract recreational users. It is possible that these areas are the most commonly used for hunting, fishing and other outdoor activities, which would lead to a higher concentration of people and consequently a higher number of crimes. Detection rates often do not represent actual crime rates (Crow et al., 2013), therefore it is unknown if the higher detection rate reflects a higher crime rate. On another hand, the designation as conserved could encourage more proactive responses from law enforcement, which could also lead to higher detection. The higher detection rates could reflect more aggressive efforts, such as officers spending more time in these areas, or officers writing more tickets rather than warnings. Furthermore, conservation lands that are privately owned cannot be patrolled on a regular basis by law enforcement. The FNAI map used in this study did not distinguish between the different ownerships of the conservation lands. This may also play a role in detection rates. It is evident that an explanatory study on this topic is needed to fully understand the situation.

Regardless of the reasoning for the higher detection rates, it may be beneficial for local authorities to encourage the designation of more conservation lands. As stated earlier, conservation lands can be owned by public or private means. Currently a very small percentage of the existing conservation lands are privately owned; approximately 2.3% within the Treasure Coast (Summary, 2016; Acres of Conservation, 2015). Private land owners can give up certain rights to a managing agency who would take responsibility for maintaining the natural condition of the land. This could be used to encourage local citizens to help protect and preserve the environment in a way that requires little effort or action on the citizens' part. Organizations such as state colleges and universities, as well as other education-based organizations, can designate land as conserved to help re-enforce the importance of protecting the environment, and can use the land as an additional instructional tool. There are several benefits that individuals, organizations or whole communities can gain by designating more land as conserved. These benefits should be better communicated to the public.

It has been established that the size and presence of conservation areas varies among the three counties in this study. It is not clear why such differences exist, and this is a topic that needs to be explored. Nonetheless, further analysis of the Treasure Coast could benefit other parts of Florida in assessing wildlife crime rates and patterns.

In closing, it is unrealistic to expect that all crimes against the environment can be prevented, or even detected, through traditional officer patrols alone. Monetary resources are limited statewide for employing FWC officers and supporting these officers with the necessary equipment to perform their jobs effectively. Therefore, alternative methods to increase detection rates and decrease criminal acts need to be further examined and implemented. For example, improving education on wildlife-related laws and regulations (D'Lima & Marsh, 2013), increasing the number of conservation organizations in a county (Stretesky et al,, 2010), or increasing the number of conserved acres. In the meantime, the environmental stewards and law-abiding citizens of the Sunshine State can assist law enforcement efforts by reporting suspected natural resource violations to the FWC's Wildlife Alert Reward Program at 888-404-FWCC (3922).

REFERENCES

"Acres of Conservation Lands by County." *Florida Natural Areas Inventory*. Florida State University. Retrieved from http://www.fnai.org/pdf/MAxCounty_201511.pdf.

Brewer, B. (2011). "Florida Fish and Wildlife." *Law and Order* 59(4), 48-53.

Crow, M.S., O'connor Shelley, T., & Stretesky, P.B. (2013). "Camouflage-Collar Crime: An Examination of Wildlife Crime and Characteristics of Offenders in Florida." *Deviant Behavior* 34(8), 635-652.

D'Lima, C., Marsh, H., Hamann, M., Sinha, A., and Arthur, R. (2013). "Positive Interactions Between Irrawaddy Dolphins and Artisanal Fishers in the Chilika Lagoon of Eastern India Are Driven by Ecology, Socioeconomics, and Culture." *Ambio* 43(5), 614-624.

Eliason, S.L. (2013). "Policing the Poachers in the United States: A Qualitative Analysis of Game Wardens and Profiling." *International Journal of Criminal Justice Science*, 235-247.

"FNAI Conservation Lands." *FNAI Conservation Lands*. Retrieved from http://www.fnai.org/conlands_faq.cfm.

Gore, M. L. "The Science of Conservation Crime." *Conservation Biology* 25(4), 659-61.

"Law Enforcement." *FWC*. Retrieved from http://myfwc.com/about/inside-fwc/le/.

Stretesky, P. B., Shelley, T.O., & Crow, M.S. (2010). "Do Conservation Organizations Influence the Production of Natural Resource Violations?" *Organization & Environment* 23(4): 398-416.

"Summary of Florida Conservation Lands." *Florida Natural Areas Inventory*. Retrieved from http://www.fnai.org/PDF/Maacres_201602_FCL_plus_LTF.pdf.