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JUDGING THE EFFECTIVENESS OF ANTI-POACHING HOTLINES

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ABSTRACT

All state wildlife law enforcement agencies in the United States have toll-free phone numbers that allow citizens to report wildlife crimes that they witness. The success of these lines in leading to the apprehension of wildlife criminals is reliant on the knowledge of the caller. This is particularly problematic for wildlife violations due to the varying conditions that dictate whether the reported act is a crime. These conditions include factors such as time of year, time of day, type of gear used as well as others. Therefore, in order for anti-poaching hotlines to be an effective means of reducing wildlife crimes, the caller must understand the state's established hunting and/or fishing laws. This paper outlines a pilot study that used survey data to explore participants' knowledge of wildlife laws and crimes as well their knowledge of the reporting hotlines in their states. This information can be useful in determining the most effective use of publicizing wildlife crime information and poaching hotline phone numbers to the public and includes recommendations for future research on this subject.

For law enforcement officials to intervene or even investigate a criminal action, they must first become aware of the crime. This can take place by virtue of the police detecting the crime themselves or through citizen notification. For citizens calling the authorities to report a crime, Black (1970) reports that only about two-thirds of the incidents reported to the police show up in official crime rates. Further limiting the accuracy of official crime rates is the fact that citizens who have witnessed a crime cannot report it until a series of events take place. They must note the act as significant enough to warrant official attention. Beyond this, they must recognize that the act is a crime. At this point, notification procedures must be followed.

This series of events creates a problem for reporting wildlife crimes like illegal hunting and fishing. There are legal methods of hunting and fishing which makes recognizing the illegal methods more difficult. No legal alternatives exist for other types of crime. Robbing a store at gunpoint is always illegal. Citizens are therefore more likely to recognize the act. Yet because many hunting and fishing violations are often based on time events such as time of day or time of year, they are not as evident. If the witnesses of crime are not aware of the dates of the hunting season, they may assume that hunting season has begun when they see hunters dragging killed prey from the forest. There is a prerequisite of knowledge that is necessary for the authorities to be notified of such a crime.

Another important aspect to consider about wildlife crimes is the notification procedure. Due to the specialized nature of wildlife crime enforcement, game wardens in the United States are part of a specific agency that is unrelated to other local law enforcement agencies like sheriffs' departments. This means that there is a different direct notification procedure for these state government agencies. Each state's wildlife law enforcement agency has a unique toll free anti-poaching hotline telephone number. Therefore, witnesses to wildlife crimes must also have knowledge of their state's anti-poaching hotline number as well as familiarity with the wildlife laws.

Because wildlife crimes are a rural-specific type of crime, it is proposed here that residents of rural areas will be more likely than residents of non-rural areas to have the knowledge necessary to recognize a wildlife crime. Furthermore, because these rural residents are more often exposed to hunting and fishing behaviors, they will be more likely than non-rural residents to have knowledge of their states' anti-poaching hotlines. Additionally, those people who participate in hunting and fishing will be more likely than people who do not participate in such activities to be familiar with the anti-poaching hotlines.

This article outlines previous literature on crime reporting trends and uses survey data to test the above stated research hypotheses. It also discusses a pilot study carried out on college students from a mid-sized university in Virginia. It draws conclusions that are helpful for refining the research while still showing support for the research hypotheses using ordinary least squares regression and logistical regression analysis.

LITERATURE REVIEW

Most of the research on crime reporting focuses on reporting by victims. This does not apply directly to wildlife crimes because the victims of those crimes cannot report their victimization. Furthermore, wildlife crimes are not easily categorized in the victimization literature. Sigler (1980) called wildlife crimes victimless crimes and more recently the Convention on International Trade in Endangered Species and Wild Fauna and Flora (n.d.), commonly called, notes that wildlife crime is similar to victimless crimes. Yet the argument can be made that the victims of this type of crime simply lack the capability of reporting their victimization. Furthermore, as species disappear, future generations of wildlife viewers will become secondary victims due to the lost viewing ability. Comparing victim reporting to witness reporting is also difficult because the immediate personal consequences of victimization may increase the likelihood of reporting by victims.

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Most of the research crime reporting has not focused on answering these dilemmas for wildlife crime research. Except for McSkimming and Berg (2008) who examined angler reporting motivations of illegal fishing, most of the crime reporting literature does not address wildlife crime. The review of the literature should therefore be read with the understanding that the connections of crime reporting to wildlife crime are often secondary.

McSkimming and Berg (2008) interviewed conservation officers and fishers to examine the motivations of fishers who report illegal fishing behaviors. They found that legal anglers were willing to report others' illegal fishing behaviors for four reasons: to prevent the loss of fishing resources, to prevent the loss of fishing industry economic benefits to the local economy, to prevent the loss of access to fishing streams that might be restricted because of the abuses of poachers, and to protect the safety of legal fishers. Noting that the respondents who were willing to report illegal fishers were legal anglers is pertinent to this study. They were therefore more likely to recognize illegal behaviors and to know how to report it. It is also worth noting that some responding conservation officers to McSkimming and Berg's (2008) study believed that some legal fishers who reported poachers, did so to increase their own chances of catching fish.

Latane and Darley (1970) examined crime bystander reporting actions. A crime witness must make a series of decisions all of which require an affirmative answer for the crime to be reported. The witness must recognize the event and define it as an emergency. Next, the witness must believe he or she has a responsibility to intervene. Third, the witness must determine the appropriate intervention. Finally, the witness decides how to go about implementing their action.

Gaps in these steps cause shortcomings in crimes and police knowledge of them. Previous research on crime reporting (Black 1980; Hindelang 1976; Skogan 1976a, 1976b, 1984) indicates that crimes are not reported to police for several reasons. The research demonstrates that crime victims are less likely to report their victimization to the authorities if a crime were attempted but not completed. They are also less likely to report their victimization to authorities if they do not believe the crime committed against them was serious or if the crime did not result in injury or financial loss. They are also less likely to report the offense if the criminal did not use a firearm or if they believe the police cannot catch the offender. Conklin (2002) notes that some crime victims may not report their victimization because they do not view the offense as serious or important. Furthermore, some offenses may not be reported to authorities because victims are reluctant to cause problems for the offender. This may be out of fear of reprisal from the offender, or, as other

research suggests (Berg and DeLisi 2005; Donnermeyer and Barclay 2005; Baumer 2002), attributable to informal social controls of community norms.

These informal controls may lead to witnesses personally confronting the criminals. This type of reaction is less likely in areas where fear of crime is higher (Conklin 2002). However, rural areas where witnesses are more likely to be acquainted with offenders may not confront such issues due to established acquaintanceships.

Donnermeyer and Barclay (2005) researched the reporting of farm crime such as livestock and farm equipment theft. Their data was collected from rural crime victims and their jurisdictional law enforcement officers in New South Wales, Australia. They reported that about half farm crime victims had not notified police of their victimization and that police felt this was one of their biggest problems. The reasons for not reporting the crime included concerns over lack of proof and uncertainty about their victimization. Assuming that these same considerations could apply to wildlife crimes is reasonable.

They also note the importance of informal standards of behavior in rural areas. Many crime victims felt that their problems could best be solved with informal intervention instead of notifying the police. This is due to the likelihood of crime victims knowing the perpetrators or their families. Furthermore, the social pressure for enforcement of informal controls is so strong that those reporting crimes to the police may face actual sanctions from the community. Reporting a believed criminal has the added ramifications of upsetting the suspect's family and friends. The believed victimization may be better addressed by notifying the proper acquaintances in the community who can exert their informal controls to either prevent future crime or correct the wrongdoing. This norm is apparently so established that the police expressed frustration over the lack of rural crime reporting.

Baumer (2002) examined violent crime reporting among non-rural neighborhoods. He researched whether community characteristics like socioeconomic status influence the likelihood of notifying police of crime. He found that these neighborhood characteristics were not helpful in predicting robbery or aggravated assault victimizations. However, they were helpful in predicting simple assault reporting to police: residents in socially disadvantaged neighborhoods were more likely to report their victimization to police than residents from neighborhoods with higher socioeconomic status.

Although this research focuses on urban communities, Baumer (2002) suggests that informal controls and social cohesion among residents in a geographic area

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may hold explanatory power for crime reporting behaviors. However, this relationship is not linear; it varies by crime. Residents in disadvantaged neighborhoods may rely on their informal networks to address the problems resulting from crime. If this holds true across rural areas, which frequently lack socioeconomic status and resources, crimes viewed as minor may not be as likely to be reported to authorities even if the witnesses to the crime recognize it as such.

Researchers (Gove, Hughes, and Geerken 1985; Bennett and Wiegand 1994) have concluded that seriousness of an offense influences reporting behaviors more than attitudes toward law enforcement. Rural communities where hunting and fishing behaviors are common may contribute to low wildlife crime reporting rates because the witnesses, if they recognize the act as criminal, may view the offense as minor.

Skogan (1984) found that females are more likely to call police after viewing a crime than males. This is problematic for wildlife crimes because males are more likely to be involved in hunting and fishing than females (United States Census Bureau 2002) and are hypothesized here to have more knowledge of wildlife regulations. Hence, the gender most likely to recognize a wildlife crime may be less likely to report most types of crime.

While the research on crime reporting has mostly avoided wildlife violations, much of the data can be used to infer how these crimes are not reported. The literature reveals where the gaps are in Latane and Darley's (1970) crime reporting sequence for these offenses. The current research project is a pilot study to begin examining the specifics of these deficiencies so solutions can be developed. By determining the effectiveness of anti-poaching reporting hotlines, researchers can begin to understand the factors that influence the reporting of wildlife crimes.

RESEARCH METHODOLOGY

The data for this pilot study were collected through a paper survey distributed to criminal justice classes at a mid-sized university in the southeastern United States. An informed consent form was attached to the front of the questionnaire and the researcher or his trained assistants discussed the informed consent with the students to make sure they understood that their participation in the project was completely voluntary and that no identifying information was to be included with the final questionnaires. The researcher or his assistants then allowed the participants to return the completed questionnaires into a folder. All of the classes were combined into a completed questionnaire compilation.

A total sample size of 124 was achieved from this method. The questionnaires were coded and entered into an SPSS spreadsheet. These findings were analyzed. Two of the participants were from Washington, D.C. which does not have an anti-poaching hotline, so their questionnaire results were excluded from the analysis. Other participants failed to complete their questionnaires and were excluded. This left the final N at 114.

Research Hypotheses

The following hypotheses were tested using SPSS statistical analysis:

H₁: Participants living in rural areas will be more familiar with poaching hotline knowledge requirements than participants living in urban areas.

H₂: Participants living in rural areas will be more familiar with their states' poaching hotlines than participants living in urban areas.

H₃: Participants active in outdoor activities like hunting and fishing will be more familiar with all measured aspects of their state's poaching hotlines than participants who are not active in outdoor activities.

FINDINGS

This project's first hypothesis states that study participants from rural areas will have more of the knowledge requirements necessary to report wildlife crimes through their states' anti-poaching hotlines than study participants from non-rural areas. Two OLS regression models were run to test this hypothesis. Table 1 demonstrates the results of the first model that uses familiarity with illegal fishing behaviors as the dependent variable. The results provide support for the hypothesis by yielding a statistically significant relationship between living in a rural area and being familiar with the law regulating fishing behaviors. The other statistically significant variables were gender and membership in a fishing club. Male participants in this study were more familiar with fishing regulations than females. This is not surprising because males are more likely to fish than females. Membership in a fishing club or organization was also a significant predictor of being familiar with fishing laws.

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TABLE 1. SUMMARY REGRESSION ANALYSIS FOR RURAL RESIDENTS' KNOWLEDGE OF ILLEGAL FISHING BEHAVIORS WITH CONTROL VARIABLES (N=114).

VARIABLE	SLOPE		SIG.	CONFIDENCE INTERVAL	
	b	β		LOWER	UPPER
Constant	4.6				
Rural Scale	3.0	.42	.000***	4.2	1.9
Age	0.4	.11	.162	-0.2	1.0
Gender	-5.5	-.29	.000***	-8.4	-2.5
Race	6.5	.13	.091	-1.0	14.1
Fishing Club	15.6	.27	.001***	6.8	24.4

NOTES: Multiple R = .60; $R^2 = .36$; Adjusted $R^2 = .33$; Standard Error = 7.48; F Score = 12.2***; *** $p \leq .001$.

The beta weights show that the rural scale had the strongest effect of the statistically significant independent variables on the dependent variable. It is logical that membership in a fishing club is a significant predictor of fishing law knowledge. Interacting with other people who fish is probably educating club members through formal procedures or through informal discussions of fishing regulations. Because the rural relationship with fishing law knowledge is strongest, this model shows support for the hypothesis.

Model 2 used knowledge of hunting regulations as the dependent variable. The findings are shown in Table 2. The R^2 for this model shows that the independent variables accounted for more variation in the dependent variable with this model than in Model 1. Furthermore, the two most explainable independent variables yielded results that were significant at the .001 level. As predicted, the more rural area in which a person lives, the more knowledge the person will have of hunting regulations. Yet the standardized slope indicates that the better predictor is membership in a hunting club or organization. Similar to Model 1, this is probably attributable to regulation knowledge spreading formally as well as informally through hunting clubs. Nevertheless, the ruralness item provides support for the hypothesis, though clearly hunting club membership should be taken into account when this study is done with a large sample size.

TABLE 2. SUMMARY REGRESSION ANALYSIS FOR RURAL RESIDENTS' KNOWLEDGE OF ILLEGAL HUNTING BEHAVIORS WITH CONTROL VARIABLES (N=114).

VARIABLE	SLOPE		SIG.	CONFIDENCE INTERVAL	
	b	β		LOWER	UPPER
Constant	1.8				
Rural Scale	2.3	.28	.000***	-3.4	1.2
Age	0.7	.18	.007**	0.2	1.3
Gender	-2.0	-.09	.185	-4.9	1.0
Race	-2.0	-.11	.100	-4.3	0.4
Shooting Club . .	0.8	.03	.700	-3.5	5.2
Hunting Club . .	15.1	.55	.000***	10.8	19.4

Notes: Multiple R = .75; $R^2 = .57$; Adjusted $R^2 = .55$; Standard Error = 6.9; F Score = 23.5***; ** $p \leq .01$; *** $p \leq .001$.

Models for Hypothesis 2

The study's second hypothesis states that participants living in rural areas will be more familiar with their states' toll free anti-poaching hotline than participants in non-rural areas. The models for testing this hypothesis used logistic regression because of the dichotomous dependent variables. This method allows the use of a binary dependent variable while still controlling for several independent variables (Aldrich and Nelson 1984; Menard 2002). A significant effect noted by this type of analysis indicates the likelihood of an independent variable falling into one of the dependent variable's categories. The models yielding significant results are shown in Table 3.

Model 3's dependent variable inquired whether the participants were aware of their state's anti-poaching hotlines. The independent variable of interest for testing the hypothesis is labeled as Rural. Controls variables accounting for age, gender, race and membership in a hunting, fishing or shooting club were also included in this model. The pseudo R^2 's suggest that the independent variables account for between 28 percent and 45 percent of the variation in the participants' awareness of their states' fish and game poaching hotlines. The model also demonstrates strong predictive power with 86 percent of the cases correctly predicted. Two variables demonstrated statistical significance, living in a rural area (as the hypothesis predicted) and club membership. The positive relationship with the rural

TABLE 3. LOGISTIC REGRESSION ESTIMATES FOR HYPOTHESIS 2.

Variable	MODEL 3				MODEL 4			
	B	(SE)	Wald	Exp(B)	B	(SE)	Wald	Exp(B)
Age	0.04	0.11	0.1	0.08	0.14	0.09	2.5	1.1
Gender	-0.70	0.78	0.8	0.50	-0.47	0.46	1.1	0.62
Race	-1.9	1.3	2.2	0.15	0.62	1.2	0.26	1.9
Club	2.5***	0.69	13.1	12.2	1.0*	0.53	3.9	2.8
Rural	0.92**	0.31	8.9	2.5	0.32	0.17	3.7	1.4
Constant	-6.4	2.8	5.1	0.00	-5.4	2.3	5.3	0.01
χ^2	37.8***				15.6**			
Cox & Snell R ²	0.28				0.13			
Nagelkerke R ²	0.45				0.17			

NOTES: * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

variable indicates that participants living in rural areas are more likely to be aware of their states' anti-poaching hotlines than respondents in less rural areas. Yet the model suggests that this finding only yields a 2.5 percent increase in the odds of more rural participants being aware of the hotlines. The other significant variable from this model suggests that membership in a hunting, fishing or shooting club better predicts the likelihood of a participant being aware of his or her state's poaching hotline. This variable accounted for a 12 percent increase in the odds of participants being aware of their states' anti-poaching hotlines.

Model four uses the same independent variables as the previous model with a different dichotomous dependent variable: whether the participants knew where or how to find their states' anti-poaching hotlines. This was included to account for participants who were aware of the hotline but did not know how to find it if they needed to report a wildlife violation. The pseudo R^2 s demonstrate that the independent variables account for very little of the variation in the dependent variable: between 12.7 percent and 17 percent. Furthermore, only one independent variable, membership in a hunting, fishing or shooting club, showed statistical significance at the .05 level. This means that membership in one of these clubs increases the likelihood that participants knowing where or how to find their states' wildlife crime reporting hotlines. As previous models have suggested, this is to be expected based on interactions between members of clubs that apparently helps keep members educated on their locating their states' toll free anti-poaching phone numbers.

Models for Hypothesis 3

The third hypothesis states that study participants who participate in hunting or fishing would be more likely to be familiar with all measured aspects of their states' anti-poaching hotlines than participants who do not hunt or fish. Tables 4 and 5 show the findings of the logistical regression analysis from these models. Table 4 shows the results for when the participants' fishing frequency was used as an independent variable in two models with different dependent variables: whether the participants were aware of the anti-poaching hotline and whether they knew where to locate it if they had a crime to report. The control variables included age, race, gender and ruralness. Table 5 does the same but includes hunting frequency instead of fishing frequency.

Model 5 in Table 4 yielded pseudo R^2 s showing that approximately 27.4 percent to 44 percent of the variation in hotline awareness is accounted for by the included independent variables. Furthermore, this model correctly predicted 87.8 percent of

TABLE 4. LOGISTIC REGRESSION ESTIMATES FOR HYPOTHESIS 3: FOR PARTICIPANTS WHO FISH

Variable	MODEL 5				MODEL 6			
	B	(SE)	Wald	Exp(B)	B	(SE)	Wald	Exp(B)
Age	-0.07	0.12	11.7	2.5	0.15	0.10	2.5	1.2
Gender	-1.03	0.71	2.1	0.4	-0.30	0.47	0.4	0.7
Race	-1.88	1.31	2.1	0.2	0.83	1.25	0.4	2.3
Rural	0.94**	0.34	7.9	2.6	0.21	0.18	1.4	1.3
Fish Frequency	0.93***	0.27	11.7	2.5	0.82***	0.23	12.4	2.3
Constant	-4.94	2.91	2.9	0.0	-6.14	2.58	5.7	0.0
Chi-square	36.9***				27.1**			
Cox & Snell R ²	0.27				0.21			
Nagelkerke R ²	0.44				0.28			

NOTES: * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

the cases. The participants' fishing frequency and rural living area were significant predictors of hotline awareness at the .001 and .005 levels respectively. Both increased the likelihood of a successful prediction of the dependent variable by approximately 2.5 percent. Therefore, this model suggests that participants who fish are frequently more likely to be aware of the anti-poaching hotlines than participants who fish less often or not at all. Living in a rural was also a statistically significant predictor of hotline awareness. As demonstrated in previous hypotheses, participants living in rural areas were more likely to be aware of the hotlines than participants from non-rural areas.

When the same independent variables were used in Model 6's logistical regression with knowledge of where to find the hotlines used as the dependent variable, only fishing frequency demonstrated significance. Participants who fish are frequently more likely to know how to find their states' anti-poaching hotlines than participants who did not fish.

Because study participants were more likely to fish than hunt, the same independent variables were used in an analysis of the participants who hunt. Table 5 shows the results from these analyses. Model 7 uses awareness of the hotline as the dependent variable and correctly predicted 90 percent of the cases. As expected, hunting frequency was a significant predictor of awareness. The increase in the odds of correctly predicting hotline awareness with knowledge of hunting frequency was only more than 4.6 percent. Interestingly, race also helped in predictive power with white participants being more likely than non-white participants to be aware of the hotlines. However, this may be due to the unrepresentative sample used for this pilot study.

Model 8 used knowledge of how to find out the anti-poaching hotline as the dependent variable with the same independent variables as Model 7. The pseudo R^2 's show the independent variables accounting for approximately 25 to 33.5 percent of the variation in the dependent variable. As seen in Model 8, only the frequency with which a participant hunts is statistically significant. The positive relationship means that the more often a person hunts, the more likely he or she is to know where to find the anti-poaching hotline if he or she witnesses a wildlife crime.

Limitations

This pilot study collected data from college students in a mid-sized university in the southeast United States. This limits the generalizability. The results should not be viewed as conclusive. For example, the respondents were asked to report their rural orientation by stating whether they lived in a rural, suburban, or urban

TABLE 5. LOGISTICAL REGRESSION ESTIMATES FOR HYPOTHESIS 3: FOR PARTICIPANTS WHO HUNT.

Variable	Model 7				Model 8			
	B	(SE)	Wald	Exp(B)	B	(SE)	Wald	Exp(B)
Age	-0.24	0.17	2.0	0.8	0.06	0.09	0.4	1.1
Gender	-0.23	0.87	0.1	0.8	-0.10	0.48	0.0	0.9
Race	-2.83*	1.36	4.3	0.6	0.09	1.20	0.0	1.1
Rural	0.09	0.36	0.7	1.1	-0.06	0.20	0.1	0.9
Hunt Frequency	1.53***	0.34	19.7	4.6	1.01***	0.26	14.8	2.7
Constant	3.33	3.69	0.8	28.0	-1.96	2.46	0.6	0.1
Chi-square					33.06**			
Cox & Snell R ²	0.38				0.25			
Nagelkerke R ²	0.62				0.34			

NOTES: * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

area. This may have caused some confusion for the students; they may have been unclear whether to reply regarding their college dwelling or their family homes away from college. Such a limitation should not be relevant to a more representative sample. Additionally, a more accurate measure of ruralness should be used in future research. Researchers could allow for several considerations when measuring ruralness.

DISCUSSION

The models generally showed support for the study's hypotheses while controlling for factors such as race, age, gender and membership in hunting, fishing or shooting clubs. However, remembering that the analyses are not based on responses from a randomly selected sample is important. Furthermore, because this project was implemented as a pilot study, the sample is not very large. A larger, more representative sample should produce findings that are more generalizable.

Nevertheless, the findings have shown support for the hypotheses overall and provided insight for future research on this topic. The proposed model for explanation may be that membership in hunting, fishing or shooting clubs is also a significant predictor of knowledge of wildlife crimes and reporting procedures. This factor appears to account for variation in the dependent variables more than being in rural areas. The reader should note that McSkimming and Berg (2008) found similar findings in their research. The participants in their study who were willing to participate in the research and to report illegal fishers were members of hunting or fishing organizations.

This project addressed some of Latane and Darley's (1970) sequence of crime reporting events. For example, measured variables inquired into the factors that influence recognizing an event as a wildlife crime and determining the correct intervention as well as deciding how to implement their actions. However, it did not explore whether participants believed they had a responsibility to intervene. This should be addressed in the future research on this topic.

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