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SQUISHED ON THE ROADWAYS: A STUDY EXAMINING THE IMPACT OF ROADS ON LOCAL WILDLIFE

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ABSTRACT

The public road system impacts the fatality rate of wildlife within local habitats. In this study, we collected data on frequency of road kills along four rural roads within Huntingdon County, Pennsylvania. The data show a strong association between the number of road kills and the surrounding habitat. Significantly more road kills were found along roads bordered by woodland and/or fields than those bordered by houses and other human development.

Keywords: habitat, road kills, wildlife

INTRODUCTION

"At least 3.9 million miles of public roads crisscross the United States" (Critters, 2003). These roads impact and threaten both humans and local wildlife in several ways. Humans can get seriously hurt in vehicle-animal collisions. "Each year, more than 200 motorists are killed and thousands more are injured in animal-vehicle collisions, according to The Wildlife Society" (Critters, 2003). Millions of vertebrate animals, including birds, reptiles, mammals and amphibians, are killed every year by vehicles traveling on roads. Although, roads are necessary for travel they are hazardous for wildlife. "Wildlife deaths as a result of collisions with vehicles become more numerous when animals are faces with increased traffic, more roads, and wider roads" (Jackson Hole Wildlife Foundation, 2003). By fragmenting wildlife habitat, roads can also hinder movement of species.

We tested whether the frequency of road kills is correlated with roadside habitat (woods, fields, and human development) in Huntingdon County, Pennsylvania. We predicted that road kills would be most frequent along wooded roads. Another purpose of our project was to provide data that would persuade local transportation authorities to mark current and potential problem areas, thus warning motorists of potential danger. Furthermore, we hope that this study will encourage transportation authorities to protect wildlife along highways by making future roadways more compatible with animals and their habitats.

FIELD SITE

We monitored a 30-mile loop encompassed Cold Springs Road to Petersburg Pike to 305 East to Route 26 (between Huntingdon and State College) and back to Cold Springs Road. The habitat along these roads varied in number of houses, wooded areas, and fields. The majority of Cold Springs Road (near the Moore Street end) is located within a well-developed rural community, full of houses, side streets, and other human development (e.g., a retirement home, a hospital and three schools). Along the other half of Cold Springs Road (connecting to Route 26), the habitat changes to more isolated homes and more wooded

areas. Petersburg Pike, which offshoots about a quarter of a mile along Cold Springs Road (Moore Street-end), is a very windy back road with dense forest coverage on either side. Petersburg Pike merges into 305 East, which is a scenic farm road. Fields and some housing make up the main habitats along this road. Route 305 ends at a "T" where route 26 is reached. To complete the loop, one takes 26 South (heading back towards Huntingdon) back to Cold Springs road. Again, 26 S mainly runs along farming communities characterized by lush fields, scattered houses, and some wooded areas.

METHODS

To determine our study area, we used information on local road kill data, collected by the Department of Transportation and the Pennsylvania Game Commission. These data showed that deer fatalities were especially frequent along Cold Springs Road., Route 305, and Route 26 (between Huntingdon and State College). We added Petersburg Pike because it enabled us to drive a complete loop within our study area. We characterized roadside corridors (up to an estimated 100 ft from the road) into three major categories: field (any treeless area), woods (any area with trees), and houses (any area with houses or other human development). Considering both sides of a road, six categories were recognized in all: field/field, field/woods, woods/woods, woods/house, field/house and house/house.

We identified and reported the location of all road kills, while driving in a car at slow speeds (average 30 mph). If the animal could not be identified on the first pass, we either stopped and walked back to the kill or drove past until we could identify what was killed. The loop was driven seven times over a three-week period (March 31 – April 15, 2003). We usually made censuses every two days because of the chance of scavenging animals or road patrols removing the road kills.

RESULTS

The highest number of road kills occurred along roads bordered by fields, followed by field/woods and woods/woods (Table 1). Significantly fewer road kills were found along roads with houses (Table 2). The types of animals found dead along different roadside habitats are listed in Table 3. The total numbers of each type of animal found dead are listed in Table 4. The most common road kills were squirrels, followed by opossums and skunks.

Table 1. Number of road kills according to roadside habitat type.

Field/Field	23
Field/Woods	19
Woods/Woods	12
Subtotal 1	**54**
Woods/House	1
House/Field	0
House/House	1
Subtotal 2	**2**

Table 2. Chi-Square test comparing frequency of road kills along roads with (2) and without houses (1).

	Observed	Expected	Total
1	54	27	81
2	2	27	29
Total	56	54	110

Chi-Sq. value = 3.951 + 4.097 + 11.035 + 11.443 = 30.525; $df = 1$; $P < 0.001$

Table 3. Types of animals found dead, according to road, habitat type and date of discovery (coded as indicated below).

Corridors	Field/Field	Field/Woods	Woods/Woods	Field/House	Woods/House	House/House
Route 305	Red fox	Opossum	Squirrel			
	Rabbit	Deer	3 Squirrels			
	Crow					
	Squirrel		*Opossum*			
Cold Springs					**Opossum**	*Robin*
26 N	Bird	Squirrel	*Opossum*			
	Raccoon	*Skunk*				
	Skunk	*Raccoon*				
		Squirrel				
Date Key	**3/31/2003**	4/1/2003	4/2/2003	4/8/2003	4/10/2003	*4/15/2003*

Table 4. Number road kills per animal species.

Animal	Number of road kills
Squirrel	14
Bird	5
Rabbit	1
Fox	3
Deer	1
Opossum	11
Skunk	6
Raccoon	3
Groundhog	4
Duck	1
Cat	1
Unknown	4
Other rodents	2
Total	56

DISCUSSION

More road kills were found along roads without houses than with houses, but no significant differences were found among roads traversing field/field, field/woods and woods/woods habitats. Therefore, our prediction that the highest number of roadkills would occur within wooded areas was not supported. This unexpected result may have been due to the small sample sizes of our study resulting in insufficient data to examine habitat-road kill patterns of specific species.

Future research on road kills would benefit if (1) the location of road kills were marked on a map for future comparisons, (2) the time of death was determined, (3) one had further knowledge of the road kill removal methods used by the Department of Transportation and the Game Commission, thus better allowing the assessment of the accuracy of road kill monitoring, and (4) the size of the habitat regions investigated were better standardized.

During three weeks of study, we observed nearly 60 road kills. If we assume that there is a constant rate at which road kills occur, one can predict that > 1000 animal deaths per year should occur along the roads in our study area alone. This equals roughly 3 kills per day.

Road kills threaten humans, as well as animals. As already mentioned, more than 200 motorists are killed and thousands more are injured in animal-vehicle collisions, according to The Wildlife Society. The insurance industry estimates that the annual cost to society for these fatalities and injuries is $200 million. Individual motorists usually pay at least $2,000 in vehicle repair every time they hit a deer (U.S. Department of Transportation, 2000). However, with research and the development of safe animal passages, or the construction of new "animal safe" roads, this mutual inconvenience could be avoided. Under the Transportation Equity Act for the 21st Century, or TEA-21, Federal Highway Administration funding support is available for wildlife crossings on both new and existing roads. Thanks to TEA-21 and an expanded "Transportation Enhancements" category, states and communities can get help not only for crossing structures, but also for habitat connectivity measures.

Programs have been implemented all over the world to help both animals and motorists avoid fatal interactions. In the Netherlands, up to 20% of the annual population of badgers (Fig. 1) are killed on highways. As observed in our study, many road kills were found along field habitats. The Dutch have successfully resolved this problem by constructing tunnels under their roads (Fig. 2).

Figure 1. European badger

Figure 2. Underpass badger tunnel

Similar systems could be implemented in Central Pennsylvania and other places with high frequency of road kills. "Underpasses like this one, together with land acquisition and habitat protection, are tools we can use to minimize the impacts of highways on wide-ranging mammals," said Terry Gilbert, an FWC biologist from the State of Florida.

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