

ARE TERRESTRIAL FROGS MORE LIKELY TO BE SPLATTERED ON ROADS?

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In the past decade, there has been a great increase in recognition of problems faced by amphibians because of unnatural changes made to their environment. One major problem that humans impose on the environment is roads. Roads fragment habitat, disrupting movement of amphibians through the landscape. Many amphibians are killed crossing roads when trying to maintain their traditional travel routes, in numbers great enough to reduce their population size. However, some species may be more susceptible to being killed on roads than others. Species with large home ranges such as the leopard frog (*Rana pipiens*) are more likely to be killed on the roads than other species with less land movement such as the green frog (*Rana clamitans*). We hypothesize that species which disperse the farthest from water will be killed over the largest area of the road network.

To test the hypothesis we surveyed all state and county highways in the towns of Potsdam, Canton, Lisbon, and Madrid in St. Lawrence County New York, a total of 340 km of roads. We surveyed roads by both walking and driving transects, to census which species of toads and frogs are killed by road traffic. All roads were driven at 20-30 mph between the hours of 5 am and 12 am. When a frog was found during the census, we walked 50 meters along the road in each direction away from the frog to estimate the density of frogs killed within that sample area. Only about one third of the roads were covered each day; the roads that were driven were rotated so that every road was sampled at least once every three working days. Information on each location of a frog was recorded, along with the species and sex if possible. Frogs or toads that could not be identified to species were also counted and included in the total number of frogs found. Frogs and toads were removed from the road after identifying them so as not to count them on subsequent sampling days.

Known hot spots were located at four different locations on the surveyed roads. A “hot spot” was an area with a consistently greater range of frog diversity and a noticeably higher number of amphibian fatalities than other roads. Hot spots were located in areas where roads crossed through wetlands. The identified hot spots were surveyed at dawn. These surveys consisted of walking along the shoulder of both sides of the road for a defined distance and recording all frogs found there. The average length of the four transects was 225 meters.

The study is still on going; however, we have detected a definite pattern in which species are killed by cars along the highways. We compared the pattern to known dispersal distances, as obtained from scientific literature, with the patterns of frog and toad deaths in our census. At the hot spots there is

the greatest biodiversity among species, with up to seven different species being killed by motor traffic. Numbers of frogs and toads killed fluctuated throughout the season, with peak numbers coinciding with the dispersal of young frogs away from their natal ponds. On peak days, transects had an average of 11.8 frogs per meter. These peaks were correlated with the movement of juvenile frogs of certain species. Moving away from the wetland areas, the number of fatalities among more aquatic species fell to almost zero. The amount of terrestrial frogs found at the hot spots compared to the amount of aquatic frogs was 0.94 terrestrial frogs found for every 1.0 aquatic frog found on the road. Away from the hot spots there was 1.0 terrestrial frog found for every .00034 aquatic frog found. More terrestrial species, such as leopard frog (*Rana pipiens*) and the American toad (*Bufo americanus*) are found far from any water source in numbers as high as at the hot spots. Our data support the hypothesis that for terrestrial frogs and toads, especially the leopard frog (*Rana pipiens*), population members are more likely to come in contact with roads, and thus are killed in many more areas than other species. Potentially, these terrestrial species may be at a risk than more aquatic species from the presence of roads.

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