A Quick Guide to Roadkill

The Bad News

1,000,000-Number of vertebrates run over each day in the United States (11.5 vertebrates every second)
253,000- Number of reported animal-vehicle accidents annually
90- Percent of collisions involving deer
200- Number of humans killed annually from animal-vehicle collisions

$2,000- Average minimum cost for repairing a vehicle after a collision with a deer
200,000,000- Annual cost to society for fatalities and injuries resulting from animal collisions

The Good News

93- Percent by which desert tortoise roadkill was reduced after installation of a wildlife culvert on a stretch of the Mojave Desert highway
40- Percent by which deer roadkill was reduced after a deer wildlife crossing was built in northeast Utah.
HR3550- the name of the transportation bill that would require states to plan for wildlife crossings when constructing highways

Species of Roadkill in Vermont

Wide Ranging, Large Carnivores and Slow Moving Animals:

- Bear
- Beaver
- Deer
- Large Bird
- Mink
- Moose
- Otter
- Turtle

Top Three: Deer, Moose, Bear

Cartographer: Alissa Marturano
December 12, 2008
Tufts University Urban and Environmental Policy and Planning
Map Coordinate System and Projection:
Vermont State Plane 1983/ Transverse Mercator
Resources: Vermont Center for Geographic Information www.vgci.org
US Department of Transportation Federal Highway Administration
See Marturano 2008 for more detailed information on background and analysis

Analysis of Priority Areas Along Vermont Highways For Wildlife Crossings

Overview

As development and demand for more infrastructure increases, we will continue to build roads and consequently fragment wildlife habitats. Animals will be forced to cross highways to access their entire habitat, putting their and our lives in danger. Thus, it is imperative that animal-vehicle collision mitigation plans are incorporated into transportation design projects. In this study, I assess priority areas along Vermont highways for wildlife crossing development based on roadkill, transportation, wildlife crossing values, and land use data. I feel that the best areas for wildlife crossing development are those with relatively high traffic and roadkill counts. In addition, these highways must be surrounded by forest, have a Wildlife Crossing Value ≥ 8, and should be a minimum of 500m from a water source.

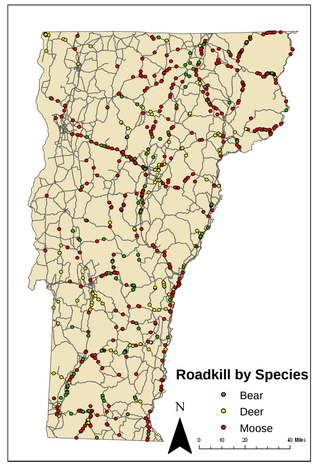
Methodology

Step 1: Convert Vector to Raster Data

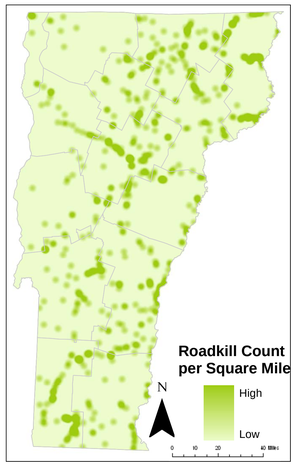
Roadkill

1. Selected roadkill for the years 2000-2006 to provide the most current analysis
2. Selected the top species of roadkill in Vermont: Deer, Moose, and Bear (the following analysis will be on these species only)
3. Created a density map of roadkill in Vermont

Roadkill on Vermont Highways



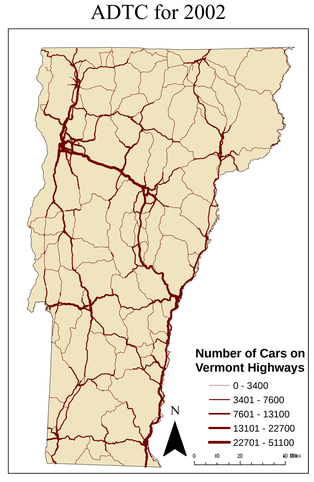
Roadkill Density



Traffic Data

1. Converted Annual Average Daily Traffic Count (ADTC) Statistics for 2002 into raster data
2. Visualized which highways in Vermont have the most traffic

ADTC for 2002



Step 2: Determining Roadkill/Traffic Relationships

1. Combined Roadkill Density map and Average Annual Daily Traffic Count raster data into a new layer called "TrafficKill."

This layer showed the relationship between traffic and roadkill counts on each highway in Vermont and assigned a particular value to each possible combination. The results are reflected the following matrix. Thus, areas with high traffic and high roadkill counts were given a value of 44, low traffic and low roadkill areas were given 11, etc.

	High Traffic Roads (40)	Moderately High Traffic Roads (30)	Moderately Low Traffic Roads (20)	Low Traffic Roads (10)
High roadkill area (4)	44	34	24	14
Moderately High roadkill area (3)	43	33	23	13
Moderately low roadkill area (2)	42	32	22	12
Low roadkill area (1)	41	31	21	11

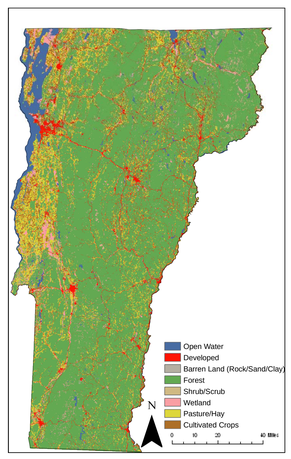
I decided to focus on the highlighted values for the remainder of my analysis because wildlife crossings should be placed where there are relatively high roadkill counts. I found that roads with relatively high traffic experience higher rates of roadkill than roads with low traffic.

Step 3: Locating Forest Cover in Areas Surrounding Vermont Highways

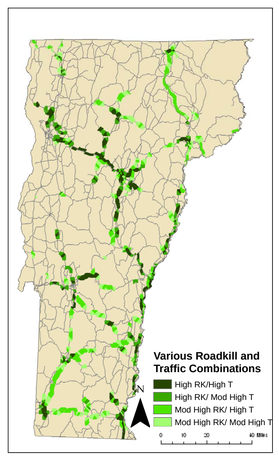
1.Combined Vermont Land Cover with "TrafficKill" layer to determine where highways with selected traffic and roadkill relationships are surrounded by forest

Since most of the roadkill species in Vermont live in forests, they most likely died attempting to reach forest habitat on the other side of the highway. Therefore, these species would benefit the most from a wildlife bridge connecting two forests.

Land Cover in Vermont



Road Segments with Forest Cover on Both Sides



Step 4: Incorporating Wildlife Crossing Value (WCV) (see Marturano 2008 for detailed definition)

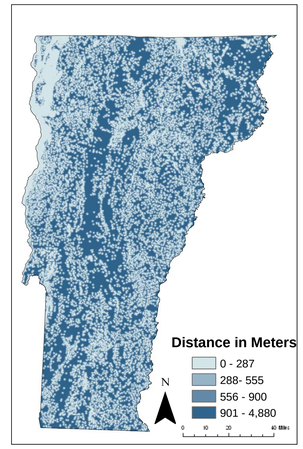
1. Used WCV layer created by biologists in Vermont, which ranked highway segments in terms of animal migrations from 5–9, with 9 being the highest
2. Combined this layer with forested "TrafficKill" layer so that road segments in question were coded with their corresponding WCV

Step 5: Locating Water Supplies Near Previously Determined Priority Areas

1. Created a distance to water bodies map
2. Combined the map with the previous layer to determine where water bodies lie in the vicinity of Vermont highways

Animal habitats require a supply of water, and so more species will be found in areas near a water body. Thus, a wildlife crossing should be built connecting forested areas that contain a water source.

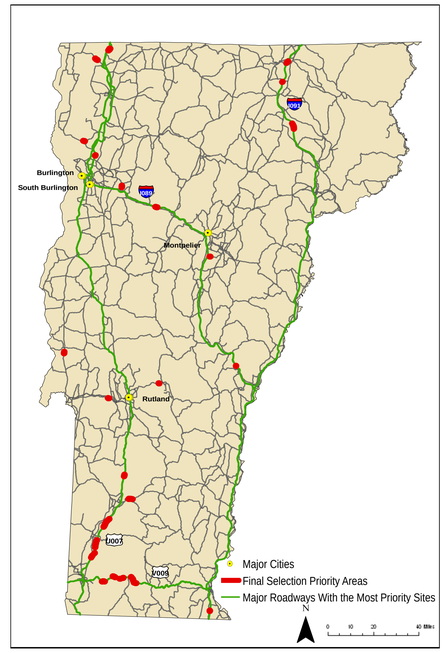
Distance to Water Bodies



Step 6: Final Selection of Priority Areas

1. Selected for areas with Moderate to High Roadkill and Moderate to High Traffic surrounded by forest **AND**
2. With a Wildlife Crossing Value ≥ 8 **AND**
3. Within 500 m from a water body

Wildlife Crossing Priority Areas in Vermont



Limitations and Conclusions

Some limitations include data currency, as no layer includes data after 2006. In addition, the accuracy of the roadkill data is +/- .5 miles, which is a significant distance. If some the roadkill data points are off, it will affect real life applicability of my project, since roadkill may be represented in an area where it actually has not been found. Finally, there are other many important variables that should be considered in assessing wildlife crossing placement. These include deer wintering areas, roadway widths, elevation, and current bridge locations.

My final selection identified 62 potential areas for wildlife crossing development. These findings reveal that Vermont has ample sites to begin implementing conservation efforts into traffic design and policy.