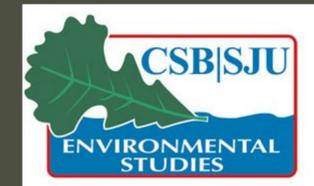


Factors Influencing Deer-Vehicle Collisions and Comparison of Mitigation

Strategies in the Twin Cities

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Abstract

Each year, there are 35,000 deer-vehicle collisions in Minnesota, causing between 3 and 11 fatalities. Deer-vehicle collisions (DVCs) are a nationwide problem that threatens public property and safety. Although the number of annual deer-vehicle collisions in the US has been dropping since 2008, in Minnesota the number is rising, making studies on mitigation strategies important. After conducting a literature review and interviewing staff from the Minnesota Department of Transportation, I discuss the factors influencing the frequency of DVCs and compare the cost and effectiveness of current mitigation strategies in the Twin Cities area. I conclude that the factors contributing to the high frequency of DVCs in the Twin Cities include a highly diverse landscape and vegetation, urban development, and the hunting season. Although most mitigation strategies discussed in my paper prove to be expensive, fencing, crossings, temporary warning signs, and sharpshooting can effectively reduce the number of DVCs. However, finding the most suitable countermeasure will require further analysis on the characteristics of DVC hotspots, an accurate count of urban deer population, and site-specific studies within the Twin Cities on the effectiveness of various mitigation strategies.



Source from: <http://www.visualphotos.com/image/2x3562899/>

Method

Factors influencing DVCs in Twin Cities are based on conclusions of past research and information provided by MnDOT officials. Land use and roadway characteristics of Twin Cities, hunting season, and deer biology are concerned to decide whether the conclusions are valid in Twin Cities. **Mitigation strategies** are grouped into three categories:

- strategies intended to alter deer's behavior: fencing, crossing, whistles, repellents, reflectors, supplemental feeding.
- strategies intended to alter driver's behaviors: warning signs, speed limits.
- strategies intended to control the deer population: controlled hunts, sharpshooting, fertility control.

Mitigation strategies are evaluated by effectiveness, cost, difficulties in utilization, management and administration, duration, and public opinions.

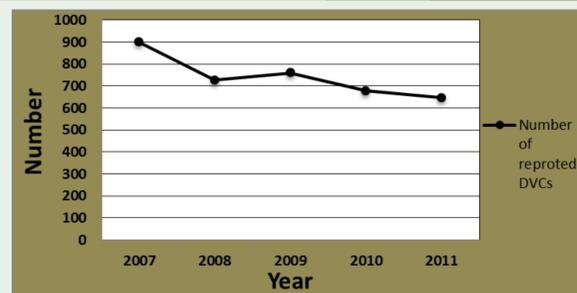


Figure 1. Number of reported DVCs in Twin Cities area(2007 to 2011), provided by Nathan Drews, Minnesota Department of Transportation (MNDOT) Transportation Specialist.

Mitigation Strategies

Name	Cost	Effectiveness	Maintenance	Complexity	Duration	Acceptance
Fencing	\$27-42/per meter	High	Yes	Medium	Long	Yes
Crossing	\$10,000 to several million each	High	No	Difficult	Long	Yes
Whistles	\$5-100 each	Low	Yes	Easy	Long	Yes
Repellents	\$20-50 per 40 ounces	Medium	Yes	Medium	Short	Yes
Reflectors	\$7,000-10,000/mile	Medium	No	Medium	Long	Yes
Supplemental feeding	Unknown	Medium	Yes	Medium	Short	Yes
Warning signs	\$45 per sign	Medium	No	Medium	Long	Yes
Speed limit	\$60 per sign	Medium	No	Medium	Long	Yes
Controlled hunts	\$117 per deer	High	Yes	Difficult	Short	No
Sharpshooting	\$194 per deer	High	Yes	Medium	Short	No
Fertility control	\$500-1,000 per deer	High	Yes	Difficult	Medium	Yes

Conclusion

An understanding on relationship between deer habitat, road characteristics, and DVCs are transportation department to predict DVC locations in order to find appropriate countermeasures. In my paper, I found high-diverse landscape and vegetation, speed limit, road condition, hunting season, and mating season are associated with high frequency of DVCs. I suggest that fencing and crossings are most effective to keep deer away from roadway. Temporary warning signs in the fall with reduction in posted speed limit can remind drivers that they are in a frequent DVC road section and a high deer movement season. Sharpshooting for controlling deer population can fit into fragmented landscapes in Twin Cities, because it requires least time and easy administration and can practice close to residential lands. However, most of these mitigation strategies are very expensive. But the cost can offset by social and economic benefits, because it helps maintain public safety while saving bills on vehicle insurance, repairs and medical treatment.

Factors influencing of deer-vehicle collisions

Frequency of DVCs is high where

(Deer habitat)

- Density of human population and dwellings are high.
- High diversity of vegetation and landscape.

(Roadway characteristics)

- Undivided roads
- Dark conditions
- Fewer passengers
- Speed limits over 70 miles per hour.

(Hunting season)

- In November combining effects of hunting and mating behaviors.