

**REGIONAL SURVEY OF DEER POPULATION,  
VEHICLE TRAVEL, AND DEER-VEHICLE CRASH  
INFORMATION COLLECTION AND MANAGEMENT**

Final Report

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16. Abstract In March 2003 a survey was completed by the Deer-Vehicle Crash Information Clearinghouse (DVCIC). The objective of this survey was to investigate regional Department of Transportation (DOT) and Department of Natural Resources (DNR) activities related to the collection and management of deer-vehicle crash (DVC) and DVC-related data. The respondents to this email and telephone survey were the DOT and DNR representatives on the standing Technical Advisory Committee of the DVCIC. A total of 27 questions were asked. The answers to these questions are summarized in this report. Overall, each of the state DNRs annually estimates either a pre-hunt or post-hunt deer population. The DOTs, State Police, or Department of Public Safety maintain the database of officially reported crash data (which includes DVCs), and the majority of the crash reports in each state are completed by law enforcement. All five of the states also allow some form of citizen self-reporting of a crash. Four of the states in the region allow a crash to be reported as a DVC. The fifth only uses the more general animal-vehicle crash designation. Three minimum property-damage crash reporting thresholds are used. Several DVC-reduction countermeasures are being used and/or evaluated in the region. These countermeasures include exclusionary fencing, roadside reflectors, and an advanced sign/roadside detector system. Several DVC-related databases also exist in each state. These databases include white-tailed deer populations, DVCs, carcass possession/salvage permits, carcass removal reports, and/or traffic flow information. Not all of the states in the region record or summarize all of this data. The criteria that define each of the databases are contained in this document. The survey responses also show that there is a limited amount of communication between the DOT and DNR with respect to DVC-related activities. It is believed that better communication would improve the application of DVC countermeasures. The content of this report will be used to define regional databases, compare DVC data temporally and spatially, and also assist in the more proper identification of DVC-related data problems.			
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## **EXECUTIVE SUMMARY**

In March 2003 a survey was completed by the Deer-Vehicle Crash Information Clearinghouse (DVCIC). The objective of this survey was to investigate Department of Transportation (DOT) and Department of Natural Resources (DNR) activities related to the collection and management of deer-vehicle crash (DVC) and DVC-related data. The respondents to this email and telephone survey were the DOT and DNR representatives on the standing Technical Advisory Committee of the DVCIC. A total of 27 questions were asked, and the answers to these questions are summarized in this report.

Overall, each state DNR annually estimates either a pre-hunt or post-hunt deer population. DNR personnel are also involved with DVC-related activities, but only in a limited manner. For example, they issue carcass salvage tags/permits, and sometimes provide advice about DVC countermeasures (e.g., warning sign placement). The DNR in all five states is rarely consulted about potential or expected DVC problems from roadway projects.

In general, the DOTs, State Police, or Department of Public Safety maintain the database of officially reported crash data (which includes DVCs). The majority of the crash reports in each state are completed by law enforcement, but all five of the states also allow some form of citizen self-reporting of a crash to be done. The survey responses in this report confirm that only two states do not include this self-reported information in their official crash database. The status of this information in the other three states is unknown. The validity of crash information reported by the general public (away from the incident scene), however, should be questioned.

Four of the states in the region allow a crash to be identified as a DVC on their crash report. The fifth allows animal-vehicle crashes to be specified. Three minimum property-damage crash reporting thresholds are also currently used in the region. The minimum property-damage crash reporting threshold in Michigan is \$400, in Illinois it is \$500, and in Minnesota, Iowa, and Wisconsin it is \$1,000. In addition, the threshold in four of the five states has changed in the last 10 years. These variations complicate the combination and comparison of state-specific annual DVC data in the region, and confuse DVC trends within a particular state.

The DVC-reduction countermeasures being used and/or evaluated in the region include white-tailed deer exclusionary fencing, roadside reflectors, and an advance sign/roadside detector system. Typical deer crossing warning signs, of course, are also used in all five states. These signs are typically installed by DOT personnel without the use of a quantitative and official DVC-based installation policy.

There are several DVC-related databases in each state that may be helpful in the evaluation and definition of the DVC problem in each state and the region. These databases include data about white-tailed deer populations, DVCs, carcass possession/salvage permits, carcass removal reports, and traffic and travel information. Not all of the states in the region record or summarize all of this data, but the criteria that define each of the databases that do exist are contained in this document. This information will be used to more appropriately summarize, combine, and compare the DVC problem in the region and within each state during the last decade.

It is also clear from the survey responses that there is a limited amount of communication between the DOT and DNR in each state with respect to DVC-related activities. Better communication should improve, for example, the type, location, and effectiveness of DVC countermeasures (including typical deer crossing warning signs) that are installed. It is hoped that the existence of the DVCIC and the content of this report will increase the awareness and perspective of the professionals interested in the subject of DVCs. The DVCIC and report should also assist with the identification of areas in need of improvement when the collection and management of DVC-related data is considered.

## INTRODUCTION

In March 2003 a survey of five states in the Upper Midwest was completed. This survey contained questions related the white-tailed deer population, vehicle travel, and deer-vehicle crash (DVC) information collection and management methods/policies of each state.

Representatives from the Department of Transportation (DOT) and Department of Natural Resources (DNR) of each state were sent or emailed a hardcopy of the survey, and then called if additional detail was needed for their responses. The five states involved in this survey included Illinois, Iowa, Michigan, Minnesota, and Wisconsin. The DOT and DNR representatives surveyed from these five states comprise the Technical Advisory Committee of the Deer-Vehicle Crash Information Clearinghouse (DVCIC) located at the University of Wisconsin-Madison. All ten representatives responded to the survey.

The survey results described here show the similarities and differences in the practices and methodologies used to define statewide databases related to the subject of DVCs. Additional information was also gathered about other DVC-related databases that might be available in particular states (e.g., carcass removals), any countermeasure evaluation projects that might be ongoing in each state, and the methodologies, if any, used to locate deer crossing warning signs. The objective of the survey was to define the characteristics and criteria of the DVC-related databases in each state. Understanding the similarities and differences in these factors is needed for DVC-related data from various states to be appropriately compared and/or combined as a measure or analysis of the DVC issue in the Upper Midwest.

The survey was divided into two sections. The first section consisted of nine questions that were asked of the five DNR Technical Advisory Committee representatives. These questions primarily focused on the methods used to determine the white-tailed deer population in their state, and their procedures and recordkeeping related to DVCs. Other questions focus on DVC countermeasures. The nine questions asked are listed below.

1. Do you do estimates of deer populations in your state?
  - a. How frequent are estimates done? Are they done annually, semi-annually? Are estimates for the population done before and/or after hunting season(s)?

- b. Do you have a document that explains the procedures, data inputs, and methods used to do these estimates? If no document, can you please summarize the procedures?
2. If you do estimate your deer population, at what level of geographic accuracy do you estimate your herd? In other words, are the estimates for a specifically defined geographic area? County, management unit, state?
3. What is the procedure used in your state when a deer is hit by a vehicle? Does the DNR become involved with the incident? How?
4. Does your agency attempt to estimate the number of deer-vehicle collisions that occur in your state? If so, how do you complete this estimate of deer-vehicle collisions?
5. Have there been any recent projects where vehicle-animal collision concerns have been an issue of consideration?
  - a. If yes, how were they considered? Please explain the approach to determine the problem and a suggested solution.
6. How are deer carcasses removed from the roadside in your state? Are carcass counts maintained annually? By location?
7. Is the DNR involved in the location selection for deer warning signs? How?
8. Are you aware of any current deer-vehicle collision countermeasure implementations? Please describe the implementation to the best of your knowledge.
9. Are you aware of any deer-vehicle collision related research going on in your state? Please describe the research to the best of your knowledge.

The second section of the survey consisted of 18 questions posed to the DOT representatives of the Technical Advisory Committee. These questions focused on the estimation and/or collection of vehicle travel, DVC records, and deer crossing sign installation. They included the following:

1. Can you provide a copy of your crash report form? If not, please describe what the form includes; types of data collected.
2. Do all the crash recording agencies in your state use the same report form?
3. Does your crash data system include a specification for deer-vehicle crashes? Animal crashes? Other?
4. Does your agency attempt to estimate the number of deer-vehicle collisions that occur in your state? If so, how do you complete this estimate of deer-vehicle collisions?
5. Is all the crash report data from the report forms in electronic format? What is and what isn't?
6. Do you do an annual statewide/countywide crash summary? Can you provide a copy of that document?
7. What is the minimum damage criteria needed to report a crash? Have there been changes to this threshold over the past decade?
8. What are the methods used to report a crash that are included in the crash database? Crash report form, self-reporting mailer, internet? Are there other reporting methods that are not included in the state crash records?
9. How are your crashes located? [Segment, point, distance from nearest crossroad, milepoint, reference point?]



10. Do you have a GIS system for crash locations?
11. Do you do an estimate of unreported crashes? If so, how is the estimate prepared?
12. Do you list and/or rank high crash locations each year? Just intersections or intersections and segments?
  - a. If you rank high crash locations, how do you define a high crash location? Do you filter the database and only include locations with a specific number and/or type of crashes? What is that filter?
13. Are you aware of any type of deer-vehicle collision countermeasures that have been implemented in your state?
14. Is there a method to determine whether a non deer-vehicle crash was the result of a deer? Text recording or regular input?
15. Do DOT employees pick up deer carcasses? If yes, is it done by the state, county, district, or maintenance garage?
16. How do you determine where deer crossing warning signs should be installed?
17. How do you estimate and/or collect volume data for a roadway segment? Do you have a document that explains the procedure? Can you provide a copy?
18. What is required of a driver after a deer-vehicle collision in your state? Are they required to report it? To law enforcement, DNR, DOT? Can they keep the deer? Does it require obtaining a permit

The answers provided to each of the questions listed above are summarized in the following pages of this report.

## DNR SURVEY QUESTIONS AND RESPONSES

**Questions 1, 1a, and 1b: Do you do estimates of deer populations in your state? How frequent are estimates done? Are they done annually, semi-annually? Are estimates for the population done before and/or after hunting season(s)? Do you have a document that explains the procedures, data inputs, and methods used to do these estimates? If no document, can you please summarize the procedures?**

All the DNR respondents to this question indicated that their organization annually estimates the white-tailed deer population in their state. Three out of five respondents indicated that they do the actual estimation of the white-tailed deer population after the hunting season. Illinois and Wisconsin estimate their white-tailed deer population before the hunting season, but Wisconsin officially publishes post-hunt estimates. Minnesota publishes its pre-hunt (i.e., spring) deer density estimates. What, if any, white-tailed deer population estimates are published in the other three states is not known. The majority of the respondents indicated that white-tailed deer population estimates could be used along with harvest data, reproduction rates, and/or other data to approximate the same species population during different times of the year.

The Illinois, Michigan, and Wisconsin respondents all indicated that they have a detailed and relatively significant document that explains how their DNR completes annual white-tailed deer population estimate. The details of their estimation approach can be found in those documents. The estimation methods varied from state to state with respect to the exact techniques, steps, and data used, but each of them generally seemed to be some variant of a sex-age-kill estimation technique. Data about the sex and age of the white-tailed deer killed during the annual hunting/harvest season are gathered through various methods (e.g., hunter registration), combined with other data like mortality and reproduction rates, and models to estimate the white-tailed deer population.

**Question 2: If you do estimate your deer population, at what level of geographic accuracy do you estimate your herd? In other words, are the estimates for a specifically defined geographic area? County, management unit, state?**

The answers to this question show that the DNRs from three of the states in the DVCIC area (Michigan, Minnesota, and Wisconsin) estimate annual white-tailed deer populations by deer management unit (DMUs), and other two states do their estimates by county. In Michigan,

however, the DMUs in the Lower Peninsula are typically bound by county lines. DMUs are generally geographic areas that vary widely in size and can include parts of two or more counties. DMU borders are based on the identification of landscape features (e.g., roadways and rivers) that surround areas of similar land use, soils and vegetative cover. The objective when defining a DMU is to identify an area of land that allows the monitoring of white-tailed deer populations. A point made by several of the survey respondents was that the reliability of deer population estimates generally improves as the area considered increases in size. Therefore, it was suggested that statewide or deer management unit estimates should be considered more reliable than the estimates done at the county jurisdictional level.

**Question 3: What is the procedure used in your state when a deer is hit by a vehicle? Does the DNR become involved with the incident? How?**

The procedure followed by motorists involved in DVCs is slightly different in each state. Overall, DVCs are subject to the same minimum crash reporting thresholds (See Question 7 of the DOT responses) as other crash types, and in most cases the DNR does not become directly involved in the processing or reporting of a DVC. In some cases, there is an occasional need for a conservation officer to kill a white-tailed deer injured in a DVC. In addition, the DNR in each state is also responsible for administering a salvage tag/permit program. These programs were created to allow drivers that collide with white-tailed deer (or the general public) the capability of possessing and using white-tailed deer killed along the roadway. In each state, salvage tags/permits are dispensed by DNR officers (and sometimes other law enforcement), and are a form of legal documentation that is necessary to possess a vehicle-hit white-tailed deer carcass. In Minnesota the reports for salvageable and unsalvageable removal permits include the location of the carcass and its sex or age. It does not appear that the total annual number of salvage tags/permits issued in four of the five states is currently summarized and/or published. The Wisconsin DNR does summarize this information and share it on the worldwide web.

**Question 4: Does your agency attempt to estimate the number of deer-vehicle collisions that occur in your state? If so, how do you complete this estimate of deer-vehicle collisions?**

The majority of the DNR representatives essentially answered “no” to this question. At least three of the DNRs (i.e., Iowa, Minnesota, and Wisconsin) record the number of salvage tags/permits issued annually, and this could be considered a partial estimate of the DVCs that occur in a state. In each of these states the annual number of white-tailed carcass removal reports from the DOT are also recorded. In Iowa, however, it is unclear whether these records are summed and/or published as an estimate of DVCs. In addition, in Minnesota the annual summary of these data sets as a DNR estimate of DVCs has been temporarily suspended. In Wisconsin, the number of possession or salvage tags/permits is combined with the number of carcasses removed by contractors to produce a DNR estimate of DVCs. This estimate is completed by county and periodically provided to the public with an explanation of its origins.

**Questions 5 and 5a: Have there been any recent projects where vehicle-animal collision concerns have been an issue of consideration? If yes, how were they considered? Please explain the approach to determine the problem and a suggested solution.**

The responses to this question generally indicated that the DNR representatives in the DVCIC Technical Advisory committee are rarely consulted to address DVC concerns along new or reconstruction roadway projects. This lack of consultation may be due to the fact that the DVC problem is rarely recognized or identified as a concern in the environmental impact analysis of new or reconstructed roadways. Another reason for the lack of consultation may be related to common difficulties with inter-departmental communications.

The DNR representative from Iowa did indicate that approximately two to three times a year his organization communicates with the Iowa DOT. This communication generally began when he and his Iowa DOT counterpart became involved with the DVCIC. The focus of these discussions has been about available countermeasure information. For example, the DOT and DNR in Iowa recently discussed white-tailed deer fencing matters. In Illinois, the DNR has been involved with projects focusing on deer within airports and municipalities. The survey respondents from the remaining three states did not identify any recent communication with the DOT about transportation projects where the number of DVCs was an issue of consideration.

**Question 6: How are deer carcasses removed from the roadside in your state? Are carcass counts maintained annually? By location?**

In four of the five states participating, the DNR representative indicated that the state DOT and/or local transportation public works agencies were responsible for carcass removal. In Wisconsin, however, the DNR is the administrator of private vendor contracts for the removal of white-tailed carcasses within individual or multiple counties. The number of white-tailed deer carcasses annually collected in each county by each vendor is recorded. The number of salvage tags/permits issued annually to the public in Wisconsin is then added to the vendor numbers to calculate the total carcasses collected or salvaged. In Illinois and Michigan the state and local DOTs are responsible for carcass removal, but it does not appear that the number of carcasses collected is recorded or summarized in any manner. Iowa and Minnesota (until about 1995) record the number of white-tailed deer salvage permits issued and/or the white-tailed deer carcass removal reports of the DOT. Neither of these states currently summarizes and publishes this information. The roadway location (a more detailed level than the county) of the white-tailed deer carcass appears to only be recorded in Minnesota, within their carcass salvage and removal reports, but content of these reports is no longer summarized. In other words, locational data for white-tailed deer carcasses along specific roadways does not appear to be available in the region.

**Question 7: Is the DNR involved in the location selection for deer warning signs? How?**

None of the DNR representatives on the DVCIC Technical Advisory Committee indicated that they or the DNR in their state was regularly involved in the locating of deer crossing signs. In Iowa, it was indicated that conservation officers did sometimes recommend deer crossing sign locations to the DOT, but that this was only done when there was a request by the DOT and that the methodology used for recommending specific sign locations varied throughout the state. In Michigan, local DNR field officials also sometimes interact with DOT signing staff when signing placement decisions are made.

**Question 8: Are you aware of any current deer-vehicle collision countermeasure implementations? Please describe the implementation to the best of your knowledge.**

Three of the five DNR representatives surveyed had some knowledge of a few countermeasures implemented along the roadways in their state. The DNR representative from Iowa indicated that there had been an installation of “deer-proof” fencing at several locations in the state. The fencing was used to force white-tailed deer under existing bridges. He was also aware of several sites in Iowa that had roadside reflectors. In Illinois, the DNR representative also indicated that the DOT had installed several sets of roadside reflectors along an interstate roadway. In Minnesota, roadside reflectors have also been installed at several locations, and an advanced deer crossing warning sign system that detects animals on the roadside and prompts a series of flashing lights on warning signs is also currently being tested (unfortunately, for economic purposes, this test was recently discontinued). Some of these countermeasure installations have been studied somewhat.

**Question 9: Are you aware of any deer-vehicle collision related research going on in your state? Please describe the research to the best of your knowledge.**

In Iowa, the DNR and DOT are using infrared cameras to observe the number of white-tailed deer using an existing bridge along Interstate 35 near Dows, Iowa. The animals are being directed to this bridge by the installation of an 8-foot deer fence. The number of white-tailed deer that travel around the ends of the fence are also being observed. In Michigan, research will be initiated in the near future to address the development and impact of information and education programs that attempt to alleviate DVCs. Another program in Michigan will also evaluate the environmental factors that impact the frequency and rate of DVCs. Finally, the Wisconsin DOT is currently sponsoring the DVCIC to collect and disseminate research information. Two research projects by staff of the DVCIC have recently been completed. These projects were related to the relationship between the location of DVCs and deer crossing warning signs, and the relationship between the number of county DVC crashes and other factors (e.g., deer density, vehicle travel, and land use).

## **DOT SURVEY QUESTIONS AND RESPONSES**

### **Question 1: Can you provide a copy of your crash report form? If not, please describe what the form includes; types of data collected.**

All five states provided a copy or website address for their crash report form to the research team. These forms typically have some type of cover sheet or coding document that describes the completion of the form and/or an explanation of the inputs for some crash characteristics. The forms used by Michigan and Wisconsin include some responses that are designed to allow automated data collection through optical scanning. The forms from each state also include questions that require a written narrative, and sections for driver information and a crash diagram. The crash reports for all fifty states are available through the following crash form home page: <http://www.nhtsa.dot.gov/people/perform/trafrecords/crash2003/Default.htm>

### **Question 2: Do all the crash recording agencies in your state use the same report form?**

The same crash report form is used in each individual state for all reportable crashes. People in Illinois can self-report a crash using a portion of the crash report form, but this is done only for insurance purposes and not included in the official crash report information database. Minnesota and Iowa also allows the completion of a crash report by a driver, but it is unknown whether this information is included in its official database. Michigan citizens can report crashes at a police station (versus the crash scene) and by telephone in certain areas. No indication, however, was provided about whether this information was included in their official crash database. Wisconsin allows self-reporting also, but does not include it in their crash database.

### **Question 3: Does your crash data system include a specification for deer-vehicle crashes? Animal crashes? Other?**

Four of the five states have a crash report form that includes a DVC as a crash type classification input. In Iowa the crash report form includes an animal-vehicle collision designation as a crash type classification. A large portion of the animal-vehicle collisions reported in Iowa is believed to be DVCs.

**Question 4: Are the crash records all kept in a common database? Is this located within the DOT/State Patrol/Both? Is it kept on a mainframe? How many years of data exist in your database?**

In Iowa, Illinois, and Wisconsin the crash record database is located at the DOT (in Wisconsin, the DOT includes the State Patrol). In Michigan and Minnesota, the crash data is physically located within the State Police and Department of Public Safety (Office of Traffic Safety) structure, respectively. Michigan, however, is in the process of transferring the responsibility for this database back to the DOT. In all five states the crash record database is kept on a central mainframe, but the number of years of crash data actively maintained varies. Iowa maintains 10 years of data and Illinois seven years plus the current year. Michigan actively maintains three years plus the current year (10 years of crash data will be available in 2004 or 2005), and Minnesota has 17 years of crash data in their database. The Wisconsin crash report database includes the active maintenance of nine years of crash data (from 1994 to present). Wisconsin crash report data is available back to 1987, but a different report form was used between 1987 and 1994. This change in the reporting form makes the data collected before 1994 incompatible and inconsistent with the last nine years of data in the current mainframe database.

**Question 5: Is all the crash report data from the report forms in electronic format? What is and what isn't?**

The crash report forms used by the five states include areas for hand written responses to include an explanation and/or diagram of the crash being reported. All of the forms however, also include questions that can be answered with fill-in circles or boxes that can be put into the computer electronically. These are the type of data normally included in the electronic mainframe database. At least one of the states is also experimenting with the automatic download of vehicle and driver information (by inputting license and/or vehicle identification number) to an electronic crash report form. At least two states are experimenting with the use of global positioning systems on enforcement vehicles for determining crash location.

The hand-written narratives, diagrams, and most personal vehicle passenger/driver information included in the crash report are not normally scanned and included in the electronic crash database. Two of the survey respondents, however, did indicate that the narrative and diagram



information are sometimes used to clarify confusing data as it was entered. Each state also includes varying amounts of hand-written responses within their electronic database.

For DVCs, like many property damage only crashes, the data collected for the incident is most commonly related to the vehicle and the driver. For example, a DVC scene is rarely sketched. In general, reports for property-damage-only crashes also often do not include the level of detail that would typically be included if there were injuries or fatalities involved in a crash. In many cases, the report is primarily completed for the purpose of having an official record of the crash (for insurance purposes, etc.), but the details of how the crash occurred are often not available. In Wisconsin, for example, an abbreviated crash report form can be used for property damage crashes.

**Question 6: Do you do an annual statewide/countywide crash summary? Can you provide a copy of that document?**

All five states annually summarize their reported crashes. Each provided a current hardcopy of their annual crash facts summary or an address to their on-line summaries. All five states produce an annual crash facts summary book (in hardcopy and/or electronically) that generally includes the amount of vehicle travel and describes the number and severity of the crashes along the summarized roadways. DVCs or animal-vehicle crashes are one type of incident typically summarized. Some of the states also do more general five-year crash summaries. DVCs by county are also available from Iowa, Illinois, Michigan, and Wisconsin for a varying number of years. At least two of the states have been summarizing statewide crashes in some form or another since the early 1960s.

The current version of the annual reports from all five states are available on-line, and some of these webpages also include a few archived annual reports. The web sites for these reports are listed below:

- Iowa: <http://www.dot.state.ia.us/mvd/ods/>
- Illinois: <http://www.dot.state.il.us/trafficsafety/crashdata.html>
- Michigan: <http://www.michigantrafficcrashfacts.org/>

- Minnesota: [http://www.dps.state.mn.us/OTS/crashdata/crash\\_facts.asp](http://www.dps.state.mn.us/OTS/crashdata/crash_facts.asp)
- Wisconsin: <http://www.dot.wisconsin.gov/safety/motorist/crashfacts/index.htm>

**Question 7: What is the minimum damage criteria needed to report a crash? Have there been changes to this threshold over the past decade?**

The minimum property-damage threshold for reporting a crash varies among the five states surveyed. In Iowa, Minnesota, and Wisconsin, the current property-damage reporting threshold is \$1,000. In Illinois, the minimum threshold is \$500 in property damage to any one vehicle. In Michigan, the current minimum property-damage threshold is \$400. All five states require the reporting of any crash that meets their minimum property-damage threshold or includes an injury or fatality.

In many of the states surveyed, the minimum property-damage reporting threshold has changed during the last decade. Clearly, this threshold has an impact on the number of crashes reported in a state, and may have an even larger impact on the number of DVCs reported (which are primarily property-damage-only in nature). In Illinois, the minimum property-damage threshold changed from \$250 to \$500 in January 1992. In Michigan, the minimum property-damage threshold has not changed for more than 30 years. In Minnesota the minimum property-damage reporting threshold changed from \$500 to \$1,000 on August 1, 1994. In Wisconsin the threshold changed from \$500 to \$1000 on January 1, 1996. No information was provided (or obtained) about when the change in the Iowa minimum property-damage reporting threshold occurred in the last decade.

The differences in minimum reporting thresholds from state to state can make direct crash comparisons between these states more difficult, and also limit the ability to combine crash data. Additionally, temporal changes in this threshold within a state make long-term crash evaluations and comparisons more difficult.

**Question 8: What are the methods used to report a crash that are included in the crash database? Crash report form, self-reporting mailer, internet? Are there other reporting methods that are not included in the state crash records?**

The electronic crash database in all five states appear to only contain information from crash report forms that are completed by a law enforcement officer. However, in Iowa and Minnesota a motorist can self-report a crash through the mail and/or in person, and it is unknown whether this information is included in the official database. In Michigan, crashes can also be reported at the police station (versus the crash scene), and by telephone in certain areas. No indication was provided about whether this information is included in their official crash database. Wisconsin and Illinois also allow the self-reporting of a crash, but the information from these “crash reports” are not currently kept in the official database. The value and validity of some of the information (e.g., location, cause of crash, etc.) contained in a self-reported or “off-crash-site” incident report should be questioned with respect to its comparability to typical law enforcement records. The purpose of these reports is typically for non-evaluative purposes.

**Question 9: How are your crashes located? [Segment, point, distance from nearest crossroad, milepoint, reference point?]**

The location of crashes in Illinois is reported by roadway and nearest mile point. In Wisconsin, Minnesota, and Michigan the roadway name and a DOT reference point system is used to locate the crashes in the database. Michigan and Wisconsin police officers report crashes as a certain distance from an intersection, and this information is then replaced with a reference point number when the crash is entered into the database. In most states, the DOT reference point numbers typically increase from west to east and south to north, and an individual series of reference point numbers typically starts or ends at changes in roadway cross section, intersections, construction project limit, and/or a jurisdictional changes. The reference point system must be considered to physically or geographically locate a crash from the database information.

In Iowa, law enforcement personnel can currently record crash locations using two methods. One method is the use of longitude and latitude coordinates and a route label. Some officers have global positioning system units on their vehicles. The second method includes a physical

description of the crash location that includes its distance from the nearest crossroad, mile point, or other identifiable roadway characteristic. These locations can then be translated into a coordinate-route crash location for entry into the crash database.

**Question 10: Do you have a GIS system for crash locations?**

Iowa, Illinois, and Minnesota each have a geographic information system (GIS) that can be used to plot the physical location the crashes in their database. In Illinois, this capability is available for state and federal roadways at this time. It is unknown whether this is actually done on any regular basis. Michigan does not currently have a GIS program with which it can combine and plot its crash information, but the implementation of a system is expected in three to five years. In Wisconsin a GIS system exists, but plotting crash locations with the system is not currently believed to be possible. The respondent from Wisconsin also indicated that the location information on many DVC report forms is so poor that it is not useable.

**Question 11: Do you do an estimate of unreported crashes? If so, how is the estimate prepared?**

None of the surveyed state DOTs attempt to officially estimate the total number of unreported crashes that might occur.

**Questions 12 and 12a: Do you list and/or rank high crash locations each year? Just intersections or intersections and segments? If you rank high crash locations, how do you define a high crash location? Do you filter the database and only include locations with a specific number and/or type of crashes? What is that filter?**

Iowa ranks its high crash locations every two years for both intersections and segments. In Illinois and Minnesota, a high crash location list is prepared each year for intersections and segments. Michigan and Wisconsin do not rank high crash locations.

Iowa's methodology is described on the webpage at the following address:

[http://www.dot.state.ia.us/crashanalysis/pdfs/sicl\\_methodologies.pdf](http://www.dot.state.ia.us/crashanalysis/pdfs/sicl_methodologies.pdf). The ranking in this state generally includes information about crash rate (i.e., crashes per vehicle-miles-traveled), crash frequency (i.e., total crashes), and crash loss (i.e., cost). Illinois did not provide an explanation of its intersection and segment location high crash ranking process, however, DVCs are not

included in the data used to determine high crash locations. Minnesota uses a system that ranks locations by crash costs (i.e., the number of crashes at each location, by severity, multiplied by a crash value for each category assumed by the state). None of the states officially evaluate or rank high crash locations for DVCs.

**Question 13: Are you aware of any type of deer-vehicle collision countermeasures that have been implemented in your state?**

The DOT responses to this survey question show that a variety of DVC countermeasures have been implemented throughout the Upper Midwest. All five states have installed typical deer crossing signs. The Iowa and Illinois DOTs have also installed deer fencing and roadside reflectors. In Iowa, the DNR and DOT are using infrared cameras to observe the number of white-tailed deer directed by an 8-foot fence to an existing underpass along Interstate 35. The number of white-tailed deer that travel around the ends of the fence are also being observed. Michigan has also installed roadside reflectors, and several temporary deer crossing warning signs. Some of these installations are being evaluated. Minnesota has installed reflectors, and is also evaluating the impact of an advance deer crossing warning sign system that includes flashing lights when white-tailed deer are present. Wisconsin has installed reflectors, and evaluated their effectiveness to a limited degree.

**Question 14: Is there a method to determine whether a non deer-vehicle crash was the result of a deer? Text recording or regular input?**

All the DOT representatives indicated that reading the narrative or text in a crash report is the only method of determining whether a white-tailed deer actually caused what appears in the database to be a non-DVC (e.g., run-off-the-road, obstacle hit, crossed centerline, or rollover). This type of information, however, is not normally included in the electronic crash database and must be done on an individual crash basis. For the most part, reading the crash reports is the only method of determining whether a non-DVC occurred because of a white-tailed deer. In addition, within Michigan, DVCs are only coded in the report form if white-tailed deer contact is evident on the vehicle.

**Question 15: Do DOT employees pick up deer carcasses? If yes, is it done by the state, county, district, or maintenance garage?**

In Iowa, Illinois and Minnesota, the DOT will generally remove deer carcasses on state and federal roads. In these states, staff located at state maintenance garages throughout the state complete this removal process. In Michigan, the collection of carcasses is generally done by municipal and county governments, and not by the DOT. In Wisconsin, deer carcasses are collected by private contractors that are funded by the DNR. In all of the states, local agencies also remove carcasses as appropriate.

**Question 16: How do you determine where deer crossing warning signs should be installed?**

All five states follow the general guidance in the Manual on Uniform Traffic Control Device (MUTCD) and/or their own state MUTCD supplement when placing deer crossing signs. None of the five states, except Iowa, appear to have any type of official DVC or carcass quantity-based policy to locate deer warning signs. In Iowa, deer crossing signs are located with the help of the DNR, and the segment to be signed must have two or more carcass reports per mile (the time period of evaluation was not provided). In Wisconsin, a rule of thumb that has sometimes been followed for the installation of deer crossing signs was the existence of five DVCs per mile per year. The Michigan respondent also indicated that they located these signs in relation to the number of DVCs occurring along a segment, but no specific minimum number of DVCs (for a specific time period) was provided. In Minnesota, the installation location of deer crossing signs appears to be based on requests/suggestions by the public or others.

**Question 17: How do you estimate and/or collect volume data for a roadway segment? Do you have a document that explains the procedure? Can you provide a copy?**

None of the DOT respondents interviewed for this survey were responsible for the collection and estimation of roadway traffic volumes in their state. However, it is typical for a DOT to annually collect traffic volume information for portions of the roadway system under its jurisdiction. In Wisconsin, for example, volume data is collected along one-third of the state roadway system each year, and the entire system is covered in three years. All DOTs also have a number of permanent traffic volume recorders in the roadway pavement that operate continuously

throughout the state. Using the most recent volume data collected that is available, combined with the data from the permanent volume counters, some states estimate the volume information along all state (and sometimes local) roadways each year. Others states simply update the volume count locations as current volume data becomes available. Each state does produce a summary of their most current statewide traffic volume estimates each year. These are available in either hard copy or from the internet.

**Question 18: What is required of a driver after a deer-vehicle collision in your state? Are they required to report it? To law enforcement, DNR, DOT? Can they keep the deer? Does it require obtaining a permit?**

Motorists in all the states are required to report a DVC to law enforcement if they believe the minimum property damage threshold has been met, or if there is an injury or fatality. In Illinois and Minnesota, motorists are also required to report DVCs if they plan to submit an insurance claim. All states indicated that a permit must be obtained from law enforcement or the DNR in order to keep the deer carcass once it has been killed in a DVC.

## **SURVEY RESULTS SUMMARY**

The DNR and DOT responses to the survey questions described in this report illuminate the wide variety of DVC-related information collection and management methods used in the Upper Midwest. These responses are briefly summarized below, and some general conclusions offered.

### **DNR Response Summary**

- Each of the state DNRs annually estimates either a pre-hunt or post-hunt deer population. The methods used for these estimates are similar in many respects from state to state, but the areas covered by the populations estimates vary between county and DMU.
- DNR personnel involvement with DVC-related activities is typically limited. They issue white-tailed deer carcass salvage tags/permits, kill the deer if necessary, and provide some advice about warning sign placement. Some of the DNRs also attempt to estimate DVCs in their state by summing the number of salvage or possession tags/permits they issue and the number of carcass removal reports they are provided. In Wisconsin, the DNR is also responsible for negotiating with contractors for carcass removal.
- In almost all cases, the DNR is rarely consulted about the potential or expected DVC problems from roadway projects. In some cases, they are consulted about DVC countermeasures or the location of deer crossing sign on a case-by-case basis. They are also only somewhat unaware of the DVC countermeasures and/or research being conducted in their state. It appears that the level of communication between DNR and DOT personnel may have increased in some states due to the DVCIC.

### **DOT Response Summary**

- The DOTs, State Police, or Department of Public Safety in each state maintain the database of officially reported crash data. The forms used in each state are different, but is the only one used in each individual state. All five of the states allow citizens to self-report a crash by completing the crash report form themselves or reporting it to an officer at the station or by telephone. At least two of the states, however, do not include this



information in their official crash database. The validity of crash information reported by the general public (away from the incident scene) should be questioned.

- The crash report forms in four of the states allow a crash to be identified as a DVC. The crash report form in Iowa specifies animal-vehicle crashes. It is assumed that most of these animal-vehicle crashes are with white-tailed deer.
- The crash databases maintained by the DOT, State Police, or Department of Public Safety is electronic in nature, kept on the mainframe computer, and includes almost all the information on a crash report. Personal information about the people involved in the crash, and handwritten narratives or diagrams are normally not entered into the database. All of the states summarize the total number of DVCs (or animal-vehicle collision in the case of Iowa) reported each year and the traffic volumes on their roadways. In most cases, the crash summaries are reported in a crash facts document, and the volume summaries in a count report.
- Three minimum property-damage crash reporting thresholds are currently used in the region. The minimum property-damage crash reporting threshold in Michigan is \$400, in Illinois it is \$500, and in Minnesota, Iowa, and Wisconsin it is \$1,000. In addition, the threshold in four of the five states has changed in the last 10 years. This variation between states and over time complicates the combination or comparison of DVC data in the five states surveyed. It also confuses DVC comparisons that are made in the same state over certain time spans. Changes in the minimum property-damage reporting threshold can have a large effect on the number of DVCs reported because the majority of these that occur are included in this category of crash.
- The most common system for locating DVCs in the Upper Midwest is an internal DOT referencing point number. This reference point is typically determined by location description (e.g., 300 feet from the Main Street intersection with Highway 50) provided in the crash report. Several states have also implemented or begun to implement GIS systems, and at least one state has begun to plot crash locations geographically.

- Most of the DOTs are also responsible for collecting (and sometimes reporting) the collection of white-tailed deer carcasses along roadways in their jurisdiction. In Wisconsin, the DNR, through private contractor, is responsible for carcass collection and records. Other local agencies remove carcasses along their roadways. Salvage or possession permits must be obtained if someone wants to keep a white-tailed deer killed by a vehicle.
- A number of DVC countermeasures are being used and/or evaluated throughout the region. At least two states have used white-tailed deer exclusionary fencing, and several have installed roadside reflectors. Some of these countermeasures are also being evaluated with respect to their impact on DVCs. Typical deer crossing signs are used in all five states, and these signs are typically installed by DOT personnel without the advice of DNR personnel or a formal official DVC-related installation policy. Three of the states do consider the DVC or carcass history of a roadway segment in some manner.

## **GENERAL CONCLUSIONS**

In general, there are several databases in each state that might be helpful for the evaluation and definition of the DVC problem in the region. These databases include white-tailed deer populations, DVCs, carcass possession/salvage permits, carcass removal reports, and traffic and travel information. Not all of the states in the region have or summarize all of these databases, and the criteria that define each of the databases have changed in the last decade. Many of the differences in the databases from state to state and year to year are explained in this document. This information will be used to more appropriately summarize, combine, and compare the DVC problem in the region and within each state during the last decade.

It is also clear that there is limited communication between the DOT and DNR in each state with respect to DVC-related activities. DVC-reduction countermeasures have been installed in each state and in theory are based on information related to the driving public and the white-tailed deer population. In addition, these countermeasures are also expected to either impact the behavior of either the driving public or the white-tailed deer population. Better communication between agencies should improve the type, location, and effectiveness of DVC countermeasures (including typical deer crossing warning signs) that are installed. In addition, the coordination (and/or combination) of reporting DVC data to the media and general public not only improves their understanding of the problem, but also increase the credibility of both organizations.

In general, it is hoped that the existence of the DVCIC and the content of this report will increase the awareness and perspective of the professionals interested in the subject of DVCs. It should also assist in the identification of areas of improvement in the collection and management of DVC-related data in each state and within the region.