

REFERENCE

Huijser, M.P., J. Fuller, M.E. Wagner, A. Hardy, and A.P. Clevenger. *National Cooperative Highway Research Program Synthesis 370: Animal-Vehicle Collision Data Collection*. Transportation Research Board of the National Academies, Washington, D.C., 2007.

INTRODUCTION

The synthesis summarized in this document considered the extent to which animal-vehicle collision (AVC) data and animal carcass (AC) data are collected, analyzed, and used in the United States and Canada. AVC data generally came from crash reports filed by law enforcement and AC data from observations or removals of animal carcasses by various state and provincial agency personnel (i.e., DOTs and DNRs).

The synthesis includes an analysis of the AVC and/or AC data collection practices within literature and the results of a survey of Departments (or Ministries) of Transportation (DOTs) and Departments (or Ministries) of Natural Resources (DNRs). The literature review that was completed focused on documentation containing the parameters, methodological aspects, and applications of AVC and AC data collection. The survey was mailed to DOTs and DNRs in each U.S. state and their counterparts in each Canadian province. Both types of agencies were asked to share information about their AVC and AC data collection processes. The synthesis conclusions include successful examples of data collection practice, a description of the need for and benefits of data collection, and suggested approaches to improve or introduce AVC and/or AC data collection practices.

LITERATURE REVIEW AND RESULTS

The literature review portion of the synthesis gathered information from 54 AVC and AC research publications. The focus of this review was the AVC and AC data used in these publications and why it was collected. It was discovered that the following AVC- and/or AC-related data parameters were most often collected and/or used in research projects:

- Date and time
- Location
- Species (e.g., type of animal, sex, age, etc.)
- Crash Severity: Property damage, injuries or fatalities
- Fate and/or condition of the animal
- Roadway and traffic characteristics
- Surrounding landscape
- Location of existing AVC mitigation

In some cases, it was noted that the collection of this type of information is more difficult for an AC discovery (e.g., time of collision, etc.). However, the literature also indicated that AVC and/or AC data were generally collected by DOTs and/or DNRs to investigate the magnitude of a collision problem, identify hotspots, and define the factors that might be contributing to these incidents. Data were also collected by researchers and others to develop predictive models,

evaluate mitigation measures, and sometimes to help estimate wildlife species populations (e.g., white-tailed deer).

SURVEY AND RESULTS

A significant part of all NCHRP synthesis report is a discussion of the survey completed and its results. The survey for this synthesis is included in *NCHRP Synthesis 370* (see reference above) and mailed to the DOTs and DNRs in the United States and their counterparts in the Canadian provinces. The survey contained three sections: an introduction, a section on AVC data collection, and a section on AC data collection. The first section asked for contact information and included some general questions. The questions in sections two and three were generally identical but were worded to address AVC and AC data collection respectively. Each agency answered any of the questions that they believed were applicable to their data collection practices. The questions in the AVC and AC sections of the survey were related to the following:

- Purpose of data collection
- Data collected and reporting thresholds
- Training and/or instruction for data collectors
- Data analyses and data sharing practices
- Potential obstacles to data collection

Respondents were also asked to submit examples of their data collection sheets. These examples are included in *NCHRP Synthesis 370*.

The objective of the survey was to receive two survey responses from each state and province. One response was desirable from the state/province transportation agency and the other from its natural resources agency. The DOT response rate among the U.S. states and Canadian provinces was 63 percent and the DNR rate was 57 percent. Overall, 56 of the 63 states and provinces contacted were participants in at least portion of the survey. The respondents, however, did not necessarily answer all the questions in the survey. Overall, the survey results indicated that DOTs generally collect AVC data, DNRs collect AC data, but some agencies collect neither AVC nor AC data. There was also some overlap in the data collection efforts within particular jurisdictions.

Animal Vehicle Collision (AVC) Data Collection Results

The survey found that there were various reasons for collecting AVC data. DOTs primarily collect these types of data for public safety purposes and DNRs are interested in public safety and wildlife conservation. DNRs reported a longer history of collecting data related to AVCs. It is believed that this response is likely related to carcass collection.

It was found that AVC data is collected along all types of roadways. Twenty-four of the 25 DOTs that responded to the question about this subject indicated they collected AVC data along interstates and arterial roadways, 19 collected these data along collector roadways, and 13 along local roadways. Many DOTs collect AVC data along more than one roadway type. Ten DNRs indicated that they also collected AVC data along interstates and arterial roadways, six

collected these data along collector roadways, and eight along local roadways. DOTs normally indicate the location of the AVC by reference post, although some use GPS devices. The DNRs reported varied methods for locating the AVC data they collected.

The thresholds that were used to define whether an AVC was recorded or not were focused on crash severity (e.g., fatality, injury, and property damage) and whether a species had a special status (e.g., endangered). Most DOTs only recorded an AVC if a fatality or injury occurred or a certain level (e.g., \$1000) of property damage resulted. The DNRs were more interested in species. The responses to this question are related to the primary reason each agency collects these data and its typical focus (i.e., safety or conservation). The majority of AVC data collected by DOTs tend to be connected to official crashes that are reported to the police and those collected by the DNRs tend to be more species related (which may or may not result in an official crash report).

Animal Carcass (AC) Data Collection Results

The survey also showed that agencies collect AC data for a variety of reasons. The DOTs collected these data for public safety and crash accounting purposes. Some were also interested in the wildlife conservation aspect of the problem. DNRs, on the other hand, collected these data for wildlife conservation reasons. Half of DOTs and 64% of DNRs saw AC data collection as a mandatory exercise.

AC data were also collected along different types of roadways. These data were collected along interstate roadways by all nine DOTs that responded to the questions about this activity, eight collected AC data along arterial roadways, five along collector roadways, and one along local roadways. Of the twelve DNRs that responded to this question, 11 collected data on interstates, 11 along arterial roadways, 10 along collector roadways, and seven along local roadways. The locations for the AC data, unlike the AVC data, were rarely collected at more precision than the nearest 0.1 mile. The location of the carcass (e.g., type of roadway) and the type of species (along with its status) were often the thresholds for whether a DOT and/or DNR collected this data.

DATA COLLECTION CONCLUSIONS

The following conclusions were reached by the *NCHRP Synthesis 370* authors based on the results of their literature review and survey.

- Forty-nine of 50 states and all Canadian provinces allow AVCs to be reported on their crash forms, but only 65 percent of the responding DOTs and 36 percent of DNRs responded that they collected collision data. The crash report forms often did not include a space to identify the species hit.
- Half of DNRs and 37 percent of the DOTs that responded to the survey indicated that they collected AC data. The authors concluded that the following were essential AC data characteristics:
 - Date of observation

- Name and details of observer
 - Roadway
 - Location
 - Species
 - Whether or not the carcass was removed
- Both DOT and DNR respondents emphasized the importance of spatial accuracy for the incident location. DOT engineers typically used the data to identify AVC hotspots while DNRs used biologists to analyze wildlife conservation trends. The following were identified as obstacles to the implementation of AVC and AC data collection and the use of its results for evaluation purposes:
 - Lack of demonstrated need
 - Overall underreporting
 - Potential for poor data quality
 - Potential for delays in data entry
- It was concluded that the needs and benefits of AVC and AC data collection programs include:
 - Documentation of incidents that impact human safety, natural resource conservation, and include large monetary losses
 - Documentation of temporal and spatial changes in AVCs
 - More effective use of resources for mitigation efforts
 - Evaluation of the effectiveness of mitigation measures
- Based on the survey results, the following data collection practice guidelines were also suggested:
 - Increased AVC spatial accuracy
 - Crash report forms with a space for AVCs and species identification
 - Data collection coordination between agencies, municipalities, and insurance companies
 - Standardized identification of AVC characteristics and data collection procedures
 - AC data collection practices that concentrate on large and easily identifiable species that may be a safety and conservation concern
 - Establishment of a central database of AVC and AC information
 - Direct entry of AVC and AC data in the field
 - Procedures for data analysis of AVC and AC information
 - Improved data collection personnel training
 - More use of data management and analysis resources (e.g., GIS)
 - Improved AVC and AC data and summary report sharing
 - Use of AVC and AC data to understand problem and execute mitigation measures
 - Evaluation of AVC and AC data collection programs on a regular basis

DATA COLLECTION RECOMMENDATIONS

The NCHRP Synthesis 370 report concluded with the following recommendations about AVC and/or AC data collection within the United States and Canada:

- It was recommended that AVC or AC data collection practices should be supported and understood by the personnel completing the task. Results should also be used to analyze and report the impacts of mitigation efforts.
- Crash report forms should include checkboxes for AVCs and also a place for species type designation.
- Motivated and trained data collection personnel for AC data collection, combined with user-friendly forms and a more precise referencing system through the use of GPS, would improve the collection of this type of information.
- The completion of regular and timely AVC data entry and quality checks was suggested.
- The use of GPS and statistical evaluation software was recommended.
- The incorporation of AVC data into the general safety evaluation of roadways for mitigation measures was suggested.
- It was recommended that AVC and/or AC data collection should be standardized and the results made more readily available.
- It was suggested that data collection results could also be used for long-term monitoring of the impacts related to AVCs and for improved public outreach and education efforts.

DVCIR CENTER FINDINGS

This synthesis is a good summary of the AVC and AC data collection efforts currently being completed within the United States and Canada. The results also appear to support the confusion that is often experienced when DOTs and DNRs are asked about animal collision data. These two entities, in many states, use similar terminology to describe databases and/or data collection activities that are significantly different (e.g., police-reported animal-vehicle collisions and DNR law enforcement documented carcass or roadkill incident reports). AVC and AC data were specifically in the survey, but it appears that some of this confusion may still have occurred with some of the answers.

The recommendations in the synthesis document are not unexpected. They generally include various suggestions to address the need for more comprehensive and locationally precise data about AVCs and ACs. The same type of recommendation has been made in other documents focused on the data available for crashes that are primarily property-damage. It was also recommended that AVC data be included in the general safety analyses of roadways. This type of information is needed to locate or consider safety improvement measures that might reduce AVCs.