ADVOCATES FOR MICHIGAN WILDLIFE – POSITION STATEMENT SUMMARY

Local governments should establish a comprehensive traffic safety plan for the reduction of deer related crashes by using applicable "Local Road Safety Plan" and "Community-Based Deer Management" resources, and by primarily deploying nonlethal measures to reduce deer vehicle crashes before the use of the lethal reduction of a deer population.

The Department of Natural Resources (DNR) is the only Michigan agency which has the responsibility to reduce deer vehicle crashes (DVCs). But, the Wildlife Division of the DNR primarily manages the deer population to promote hunting and to support the hunting community. One of the agency's strategic goals is to reduce conflict between humans and deer with an objective of reducing DVCs. However, the DNR does not have traffic safety expertise.

DNR's policy to use and recommend only lethal measures to reduce the deer population has not recently decreased statewide DVCs. The average yearly 55,328 DVCs from 2019 through 2023 was an 11.2% increase over average yearly 49,776 DVCs from 2014 through 2018. And DVC fatalities have decreased 0.5% from 60 to 57 during these two five-year periods.

The Michigan Strategic Highway Safety Plan (SHSP) and the State Designated Planning and Development Regions' transportation safety plans do not include, as a priority traffic safety goal, the reduction of DVCs and the related fatalities and serious injuries. Based on the SHSP, the traffic safety agencies of the Michigan Department of Transportation (DOT) and the Office of Highway Safety Planning (OHSP) do not have any direction, strategic objectives or funding to reduce DVCs. Local governments also do not have any guidance or recommended countermeasures to reduce DVCs from regional transportation safety plans. And the DNR, which advises local governments on the issue, does not collaborate with these state traffic safety agencies or other traffic safety experts to reduce DVCs in their communities. Local governments are left to their own limited resources without a statewide and regional traffic safety plan to determine and primarily use effective nonlethal countermeasures to reduce DVCs. The reduction of DVCs in a community is incorrectly considered as only a wildlife conflict issue. DVCs do not occur randomly. It is clearly a traffic safety matter which can be resolved by using strategically developed countermeasures to specifically reduce DVCs by educating and messaging to motorists to effectively change their behavior to avoid deer related crashes. Local traffic safety plans can be developed to reduce DVCs by using applicable concepts from "Local Road Safety Plan" and "Community-Based Deer Management" resources.

Local governments should, if needed, implement the following recommendations to provide its community with a traffic safety plan to effectively reduce deer related crashes:

1. A local government should, if it determines there is a significant DVC issue, use applicable concepts from the "Local Road Safety Plan" and "Community-Based Deer Management" resources for the establishment of a traffic safety plan to reduce DVCs.
2. A local government should, in collaboration with public and private entities, review the effectiveness of temporary dynamic seasonal deer crossing warning signs, deer activated alert deer crossing warning signage and other such currently applied countermeasures for implementation in its jurisdiction to reduce DVCs.
3. A local government should, in collaboration with other local governments, create and implement a research-based, effective comprehensive educational program with public relations and media campaign elements to educate and change motorists driving behavior to prevent and reduce deer vehicle crashes.

POSITION STATEMENT DISCUSSION

The DNR's policy of promoting the primary use of hunting of deer to reduce statewide DVCs has not been effective during the past 5 years. Michigan's average yearly 55,328 DVCs from 2019 through 2023 is an increase of 11.2% over the average yearly 49,776 DVCs from 2014 through 2018. Deer vehicle crash fatalities decreased 0.5% from 60 to 57 during the sequential five-year periods. DVCs per 100 million vehicle miles traveled (VMT) has increased by 16.1% from 48.8 to 57.7 during these two sequential five-year periods. In comparison to this increase of total DVCs per 100 million VMT during these same periods, the total statewide crashes per 100 million VMT, not including the number of DVCs, actually decreased by 7% from 257.3 to 239.3.

The number of reported total DVCs for the current five years, from 2019 through 2023, was 276,642 (19.4% of total statewide crashes) resulting in 57 fatalities (1.0% of total statewide crash fatalities) during that five-year period. Eighty percent (80%) of DVCS in Michigan reported to the police have occurred on two lane roads between dusk and dawn.[1] In 2021, the number of DVCs comprised 40% or more of individual county total vehicle crashes in 46 out of 83 Michigan counties. See Attachment One.[2] The counties with the highest number of DVCs do not necessarily have the most serious deer vehicle crash problem based on DVCs per 100 million VMT within each county. For example, in 2021, Oakland County had the greatest number of DVCs (1,853) reported in Michigan's 83 counties, but had only 15.6 DVCs per 100 million VMT, the third lowest in comparison to all other counties. See Attachment One.

The following is the ten-year historical trend of the number of yearly statewide crashes and DVCs per 100 million vehicle miles traveled[3]:

	Statewide VMT (in Billions)	Statewide Crashes	Crashes per 100 million VMT	Statewide Crash Fatalities	DVCs	DVCs per 100 million VMT	DVC Fatalities
2014	99.1	298,699	319.8	876	45,690	46.1	6
2015	97.8	297,623	303.4	963	47,002	48.1	11
2016	99.2	312,172	315.3	1,064	46,870	47.2	12
2017	101.8	314,921	309.4	1,028	50,949	50.0	17
2018	102.4	312,798	305.1	974	53,464	52.2	14
5 years	**500.3**	**1,536,213**	**307.1**	**4,905**	**243,975**	**48.8**	**60**
2019	102.2	314,376	307.6	985	55,531	54.3	12
2020	86.3	245,432	284.4	1,083	51,103	59.2	5
2021	96.7	282,640	292.3	1,131	52,218	54.0	10
2022	95.9	293,341	305.9	1,123	58,984	61.5	11
2023	98.3	287,953	292.9	1,095	58,806	59.8	19
5 years	**479.4**	**1,423,742**	**297.0**	**5,597**	**276,642**	**57.7**	**57**

[1] Michigan State Police Website (2022), Deer-vehicle Crashes. Go to link at: https://www.michigan.gov/msp/divisions/ohsp/safety-programs/vehicle-deer-crashes

[2] Michigan Counties: 2021 Deer Vehicle Crashes (DVCs) & DVCs per 100 million Vehicle Miles Traveled. Subsequent years will have similar data.

[3]Michigan Office of Highway Safety Planning. Michigan Traffic Crash Facts, 2014 – 2023

The yearly average harvesting of 378,000 deer via hunting during the period of 2019 through 2023 was an increase of 7.1% over the yearly average harvesting of 353,000 deer during the period of 2014 through 2018.[4] However, according to the data reported by the DNR for the five-year period of 2019 thru 2023, the average annual doe to buck harvesting ratio was only 0.78 to 1.00 (or 78%) which is the lowest ratio for the past 20 years.[5] The following depicts five year average periods over 20 years for deer vehicle crashes and female deer harvested[6]:

Five Year Average for	DVCs	DVCs per 100,000,000 VMT	Antlerless Harvest	Doe to Buck Harvest Ratio	Total Deer Harvested	Number of Hunters	Est. Deer Population
2004-2008	61,048	59.4	215,000	0.88	461,000	690,000	1,806,000
2009-2013	53,814	56.3	205,000	0.96	418,000	661,000	1,686,000
2014-2018	48,795	48.8	152,000	0.81	353,000	587,000	1,630,000
2019-2023	55,328	57.7	165,000	0.78	378,000	537,000	1,890,000

In an "open letter to Michigan's deer hunters", Chad Stewart, the DNR's deer management specialist, warned hunters concerning their failure to harvest enough antlerless deer has resulted in a growing deer population and an increased number of DVCs. See Note 1. It is well known that, "Does are the population drivers of the deer species and harvesting does is an important element of deer management and conservation. Doe harvest is an effective way to manage deer density, balance the buck-to-doe sex ratio, increase fawn recruitment, and make room for young bucks."[7]

During the ten-year period of 2014 through 2023, Michigan had an overall total of 2,959,955 statewide crashes and 10,502 fatalities. While during that same period, 17.6% of all statewide crashes were 520,617 deer-related crashes, only 1.1% (117) of total statewide crash fatalities were deer related. And only 1.67% (905) of total statewide crashes resulting in a serious injury to a person were deer related. Of those 520,617 DVCs, 97.6% (or 508,294 crashes) resulted in only property damage to the motor vehicle involved. These deer related crashes resulted in a significant economic cost, most of which is covered by motorists' automobile insurance minus the deductible expense. According to the Michigan DIFS, "A recent study conducted by AAA reported that Michiganders pay an average of $130 million each year to repair vehicle damage caused by collisions with deer."[8] Nonetheless, DVCs have historically resulted in an extremely low incidence of fatalities and serious injuries compared to other crash

[4] Michigan DNR, Deer Harvest Survey Reports (2014-2023). See Attachment Two for the "20 Year Historical Trend in Michigan Deer Vehicle Crashes and Female Deer Harvested (2004-2023)."
[5] See Attachment Two.
[6] See Attachment Two for the yearly data during the past 20 years.
[7] Katie Ockert (2022). The Importance of harvesting does. Michigan State University Extension.
[8] Michigan Department of Insurance and Financial Services, "DIFS Encourages Drivers to Review Auto Insurance Policies to Understand Coverage for Vehicle-Deer Collisions", press release November 15, 2022.

factors such as alcohol or drug-impaired drivers, drivers aged 20 or younger, drivers aged 65 and over, and speeding.[9] speeding.

The Michigan Strategic Highway Safety Plan, the regional traffic safety plans and the state's traffic safety agencies provide no direction for local governments to reduce DVCs.

The Governor's Traffic Safety Advisory Committee (GTSAC), was formed in 2002 and developed the initial version (2006-2008) of Michigan's Strategic Highway Safety Plan (SHSP). The vision of the GTSAC[10] is to move "Toward Zero Deaths on Michigan Roads." The mission of the SHSP, according to the GTSAC, is to: "Improve traffic safety in Michigan by fostering effective communication, coordination, and collaboration among public and private entities."[11] The GTSAC has determined that the 2023-2026 SHSP should apply the enhanced Safe System Approach (SSA)[12] and continue to address key emphasis area crash factors, with a priority on the safety issues of distracted driving, impaired driving, safety roadway improvements, pedestrian and bicycle safety and inexperienced drivers, which have the greatest potential to direct mitigating countermeasures with limited funds to reduce fatalities and serious injuries the most over time.[13] The 2023-2026 SHSP safety priorities and goals are to eliminate traffic fatalities from 1,131 in 2021 to 0 in 2050 and eliminate serious injuries from 5,979 in 2021 to 0 in 2050.[14] Deer related crashes resulting in fatalities and serious injuries were not included as a key emphasis area in previous SHSPs or the current 2023-2026 SHSP priority traffic safety targets and planned strategic countermeasures. The Office of Highway Safety Planning (OHSP) and the Michigan Department of Transportation (DOT) take their guidance on traffic safety programs and investment from the Michigan SHSP.

The OHSP, as a division of the Michigan State Police, is the state's principal traffic safety agency and serves as the administrator for the GTSAC. The primary mission of the OHSP is "to save lives and reduce injuries on Michigan roads through leadership, innovation, facilitation, and program support in partnership with other public and private organizations."[15] The Michigan State Police (MSP) has traffic safety goals and programs which are consistent with the current Strategic Highway Safety Plan's focus on reducing traffic fatalities and serious injuries which result from high-risk behaviors of motorists. The OHSP currently tracks and analyzes the core performance measures and targets for the prevention and reduction of traffic fatalities and serious injuries involving numerous emphasis areas.[16] However, the OHSP does not include the

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[9] For example, see Attachment Three for the 10-year history of resulting fatalities and serious injuries from DVCs relative to the other major crash factors in Oakland County.

[10] See Note 2.

[11] SHSP at Page vi.

[12] See Note 3 for an explanation of the importance of the Safe System Approach.

[13] GTSAC 2023-2026 SHSP, at page 8.

[14] GTSAC 2023-2026 SHSP, at page 1.

[15] FY2023 Michigan Highway Safety Plan (July 1, 2022)

[16] Emphasis areas include the following: unrestrained passenger occupants, driver or motorcycle operator with a blood alcohol concentration of .08g/dl or higher, speed, motorcyclists, helmetless motorcyclists, drivers aged 20 or younger, pedestrians, bicyclists, drug-impaired driver or motorcyclist, and drivers aged 65 and over. FY2021 Annual Report Michigan Office of Highway Safety Planning, Page 75

reduction of deer related vehicle crashes and fatalities in its core performance measures to determine the success of its safety programs. The OHSP has no yearly budgeted funds to promote either traffic safety educational programs or marketing campaigns to reduce DVCs during the fourth quarter when deer related crashes are the highest for the year.[17]
The DOT has indicated that the, "purpose of the SHSP is to identify key safety needs in the state and guide investment decisions that achieve significant reductions in highway fatalities and serious injuries."[18] The agency focuses on engineering infrastructure and system administration. The agency currently implements the Safe System Approach to achieve zero fatalities and serious injuries consistent with the Michigan SHSP.[19] However, the DOT currently takes no role or responsibility for the reduction of deer vehicle accidents in Michigan.[20] The DOT's official position is that the department has no role in reducing the incidence of deer related vehicle accidents unless the DNR requests the DOT to be involved. Furthermore, there is no DOT employee whose job responsibility includes the reduction of deer related crashes or as a liaison to the DNR on the issue of reducing DVCs. The DOT has provided assistance in the development of either a regional transportation safety plan or a "Local Road Safety Plan" (LRSP)[21] for the Michigan Planning and Development Regions. None of those plans include the reduction of DVC fatalities and serious injuries as a priority emphasis area with recommended countermeasures.

The DNR does not have traffic safety expertise or resources to give local governments direction for comprehensive traffic safety countermeasures to effectively reduce DVCs.

The Michigan Department of Natural Resources (DNR) issued the 2016 Michigan Deer Management Plan (DMP) that provides the agency's mission for the management of the State's white-tailed deer population which is, in part, to maximize "recreational opportunities while minimizing negative impacts on ecosystems, and other wildlife species and without creating undue hardship to private interests."[22] According to the DNR, deer hunting is the primary tool used by the agency to manage Michigan's deer population.[23]

The agency promotes the annual use of primarily recreational archery hunting throughout the state, and secondarily recommends the costly use of firearm sharpshooters, to kill deer to reduce deer conflicts with residents, including DVCs, in urban and suburban communities.[24] To encourage local suburban communities to implement lethal measures to reduce deer conflicts with residents, the State has enacted statutory provisions which have eliminated the restriction

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[17] The OHSP does provide a basic one page and a half page brochure "Watch for Deer all Year" available on its website. See Attachment Four. Go to link at:
https://www.michigan.gov/msp/divisions/ohsp/safety-programs/vehicle-deer-crashes
[18] MDOT 2021-2025 Five-Year Transportation Program, at Page 49.
[19] Go to link at: https://www.michigan.gov/mdot/travel/safety/efforts/safe-system-approach
[20] The DOT has previously funded research projects on how to reduce DVCs. See Note 4.
[21] The Federal Highway Administration has provided a blueprint for local governments to establish its own traffic safety plan: Developing Safety Plans: A Manual for Local Rural Road Owners, March 2012. Go to link at:
https://safety.fhwa.dot.gov/local_rural/training/fhwasa12017/
[22] 2016 Michigan Deer Management Plan, at page 1.
[23] 2016 DMP, at page 17.
[24] 2016 DMP, at page 27

for a 150-yard safety zone from an occupied residential building for archery hunting and firearm sharpshooting (pursuant to a DNR nuisance permit) near residential neighborhoods.[25]

According to the DNR's 2016 MDP, the agency's goal is to reduce conflict between humans and deer with an objective to reduce deer-vehicle collisions by taking two actions: (1) to "consider deer-vehicle collision rates when establishing regulations and setting antlerless quotas"; and (2) for the DNR staff as appropriate, "to continue to work with the Michigan Deer Crash Coalition (MDCC) to develop and implement programs designed to increase driver awareness and reduce deer-vehicle collisions."[26] However, in its Wildlife Division Strategic Plan 2021-2026, the DNR has not included the traffic safety goal of reducing DVCs as one of its current priority goals or objectives. In its recent 2022 and 2023 Wildlife Division Annual Reports, the DNR does not reference any information, data or results for the agency's strategy of using primarily recreational hunting to manage the deer population to reduce statewide deer vehicle crashes. And the DNR's commitment to "continue to work with the Michigan Deer Crash Coalition (MDCC)" is no longer feasible because the MDCC is no longer active.

Local communities and their government officials typically rely on the technical advice of the DNR's staff to resolve their deer conflicts with their residents. The DNR recognizes that when local governments have attempted to resolve deer conflicts with the use of lethal measures, the issue has become "polarizing" and "highly politicized".[27] The lethal option will cause one of the most divisive issues for community residents. Local governments may decide that the DNR recommended option of attempting to reduce DVCs by a lethal deer population reduction is not advisable, because lethal measures have not considered socially acceptable to its residents, not considered safe in their community or not found feasible to repeatedly and sufficiently reduce the number of deer over the long term to significantly reduce DVCs.

When a local government requests technical assistance to address the issue of reducing DVCs, the agency does not currently collaborate with the state traffic safety agencies or other private organizations to determine which effective countermeasures should be implemented to reduce DVCs other than the use of only lethal measures. The DNR does not have technical traffic safety expertise on the subject and does not elaborate in any detail concerning, or reference any studies on, nonlethal measures to prevent DVCs.[28] The agency does not address the effectiveness of educational or marketing countermeasures to change motorists' behavior to reduce DVCs during its presentations to a local community.[29] Overall, the DNR does not discuss other recommended countermeasures on its website, deer management plans, current Wildlife Division strategic plan or other reports.

A local government, with a significant persistent DVC traffic safety issue in its jurisdiction, should develop its own comprehensive traffic safety plan to reduce deer related crashes.

When a county, city, township or village has a number of DVCs which are a significant percentage of the total crashes in those jurisdictions or have been increasing by a significant

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[25] MCL 324.40111(7) and MCL 324.40114(5)
[26] 2016 Michigan Deer Management Plan, at Page 27.
[27] MDNR Wildlife Division, Urban White-Tailed Deer Conflict Management Policy and Procedures, Page 1.
[28] DNR Urban White-Tailed Deer Conflict Management Policy and Procedures, Page 2.
[29]See for example the presentation by DNR Deer, Elk and Moose Specialist Chad Stewart during his Farmington Hills public presentation (September 21, 2021). Go to the following link: https://youtu.be/8CLZ8MT-Geg

percent trend over a period of years, the local government should establish a traffic safety plan to address the DVC issue. The necessary reduction of DVCs in a local community should be primarily referred to as a traffic safety matter and not considered as only a wildlife nuisance issue. Deer related crashes do not occur randomly based on research studies.[30] There are effective countermeasures which can promote awareness of DVCs and influence driver behavior to reduce DVCs.

There are two excellent resources available for local governments to draw from to establish their own comprehensive structured traffic safety plan to reduce deer related crashes in the absence of any direction from a statewide or regional traffic safety plan to address the issue: 1. The Local Road Safety Plan (LRSP) guidebook[31] developed by the Federal Highway Administration (FHA);

2. The Community-Based Deer Management (CBDM) practitioners' guide developed by Decker et al. (2004).

While the LRSP process was intended for a county agency rural road owner, it should also provide a roadmap for all governmental entities with local roads to establish and implement a strategic road safety plan to reduce the number of DVC crashes and related fatalities and serious injuries. A local government which intends to establish a local traffic safety plan specifically for the predetermined emphasis area of the deer related crash factor may implement those plan development steps which are applicable from the LRSP process and enhanced by the Safe Systems Approach (SSA).[32]

States have applied the Safe System Approach to include deer related crashes in their Strategic Highway Safety Plan as an emphasis factor to reduce such crashes. Therefore, local government can also focus on reducing DVCs by applying the local road safety plan process to resolve the issue with the enhanced Safe System Approach. Illinois and Maine included the safety emphasis factor of animals in their Strategic Highway Safety Plans pursuant to the SSA.

In Maine's 2022 SHSP, the state included large animal crashes as one of its safety emphasis areas for "Safe Roads" and "Safe Users" based on the state's alignment with the "Safe System Approach". The state also has a multi-agency task force, the Large Animal Crash Study Group, which "evaluates the latest issues and possible crash mitigation strategies to reduce crashes with large animals, especially moose and deer."[33] See Note 5 for planned countermeasures to mitigate large animal crashes. The Executive Committee (EC) for the Illinois SHSP has included animal-involved (mostly deer related) crashes as one of the safety emphasis

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[30] Marcoux and Riley (2010) at page 53: "Most research to date within the range of white-tailed deer (e.g., Finder et al. 1999, Hubbard et al. 2000, Nielsen et al. 2003, Sudharsan et al. 2009), however, indicates that DVCs do not occur randomly."

[31] Federal Highway Administration (2012), Developing Safety Plans – A Manual for Local Rural Road Owners

[32] See Institute of Transportation Engineers (2023) ITE Technical Brief – Institutionalizing the Safe System Approach in Local Road Safety Plans. Go to link at https://www.fehrandpeers.com/safe-system-in-local-road-safety-plans/

[33] In Maine, deer crashes are more frequent than the moose crashes. Go to link at: https://maine.gov/mdot/safety/

areas for "Safe Roads" based on the EC's alignment with the "Safe System Approach" in the Illinois 2022-2026 SHSP. See Note 6 for planned countermeasures to mitigate severe animal crashes.[34]

The planned strategic countermeasures in SHSPs and LRSPs for all safety priorities, other than deer related, focus on the modification of motorist behavior which are not objected to by a significant percentage of a community's residents. In Michigan, however, the usual DNR recommended countermeasure to decrease DVCs is to primarily use archery hunting to reduce a local deer population. When hunting is typically not acceptable or feasible in the community, the DNR recommends the use of firearm sharpshooting to kill deer to reduce DVCs which is not supported by sound science.[35] Either option to lethally reduction of a deer population becomes a highly controversial public issue and results in significant divisiveness among residents of a local community. This issue requires a local government's concurrent use of the Community-Based Deer Management process provided by Decker et. al (2004) for guidance.

A local government would be prudent to apply the following essential elements of CBDM to constructively address the contentious public issue of proposing an option for the use of firearm sharpshooters to kill deer in an attempt to reduce DVCs in a local community:

- Inclusion of multiple perspectives
- A structured process for making community decisions
- Universally acceptable ground rules
- Shared understandings among stakeholders
- A shared, comprehensive information base
- Disclosure of stakeholder goals
- Belief within a community that generally acceptable goals and solutions are worth seeking
- An understanding that community-based deer management is an ongoing process, not a onetime event
- Commitment to systematic evaluation of the decision-making process and subsequent management program

A summary explanation of each of the above essential elements for a local community's collaborative resolution of its deer related crash issue may be found in Note 8.

Conclusion

Local governments are unfortunately left to their own limited resources without a helpful state agency or a statewide traffic safety framework to determine and implement the most effective nonlethal countermeasures to reduce DVCs. The Michigan SHSP and regional traffic safety plans are significantly shortsighted for not including the emphasis area of deer-related as a factor in crashes with a strategic direction for planned effective countermeasures for the

[34] Illinois Department of Transportation, Illinois Strategic Highway Safety Plan 2022-2026, Safe Roads 4-24.

[35] See Note 7 for a discussion of why observational studies, such as DeNicola & Williams (2008) which support the use of firearm sharpshooting to reduce a suburban deer population in order to cause a decrease in DVCs, are not scientifically sound for a local government to rely upon.

following reasons: (1) while deer-related crash fatalities have slightly been reduced, serious injuries have increased 30.9% (392 to 513) during the period from 2019 through 2023 over the previous five-year period; (2) the number of DVCs as a percent of all statewide reported traffic crashes has increased to 19.4% during the period from 2019 through 2023 over the previous five-year period from 2014 through 2018 which was only 15.9%; (3) and DVCs typically comprise approximately 40% or more of individual county total vehicle crashes in a majority of counties.

A local government should establish a local road safety plan committee or task force which will, as part of the LRSP/CBDM process, complete an in-depth review of deer related crash data to determine the high-risk time of day, month(s) and location of DVC hotspots along its local roads. Based on that data, the committee or task force will determine which effective countermeasures should be implemented to reduce deer related crashes. One of the options, based on available scientific studies, is the use of effective temporary deer crossing warning signage along DVC hotspots roads to reduce such crashes. The WVC Reduction Pooled Fund Study summarizes the current research results for innovative deer crossing warning signage and animal detection technology to prevent wildlife vehicle crashes.[36] See Addendum at pages 11-13.

Depending on the financial resources available to a city, township or village, it may have to partner with other local governments to collectively request a grant from the appropriate state department, federal agency, or private entity to fund a comprehensive strategic marketing and public relations plan to educate motorists about deer vehicle crashes. A local government may model its traffic safety campaign after the yearly traffic safety programs currently being implemented by the Office of Highway Safety Planning (OHSP).[37] And the plan should address the issue of establishing public education and awareness programs to have motorists understand deer vehicle crashes are not random and to alert drivers to slow down and be cautious year-round especially during the time of day and fall seasonal period when deer vehicle accidents most often occur. See Addendum at pages 13-15 for a discussion of these issues.

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ADDENDUM

Local governments should determine, in collaboration with Michigan traffic safety agencies and private entities, their local road safety plan to reduce DVCs which would include the implementation of nonlethal countermeasures. The following is a summary of the most effective temporary deer crossing warning signage and other physical countermeasures to prevent DVCs, for effective marketing messaging and educational programs on how motorists

[36] WVC Reduction Pooled Fund Study at pages 256-265. Go to link at:
https://www.wildlifeconnectivity.org/s/700-18-803-Final-Report-Manual.pdf
[37] Michigan OHSP FY2022 Annual Report. Go to link at:
https://www.nhtsa.gov/sites/nhtsa.gov/files/2023-05/MI_FY2022HSPAR-v2%20tag.pdf

can avoid collisions with deer and for a possible funding source for a seasonal statewide marketing program to effectively reduce DVCs.

A. Local governments should have clear guidelines for effective placement of deer warning signs.

Over the years, the message on the deer warning signs has changed from "DEER CROSSING" and "DEER AREA" to the current image of a leaping deer. Borton (1984)[38]. The standard deer warning sign seen below, W 11-3 (deer)[39], used throughout the State, is governed by the Michigan Manual of Uniform Traffic Control Devices (Manual). See Note 9.

Effective deer warning signage should increase a driver's awareness that deer may be near or may cross the road, especially during the higher deer vehicle crash months of October, November, and December. That awareness should cause a driver to lower their speed which will give them more time to react and decrease stopping distance when confronted with a deer about to cross or crossing the road. This should result in the driver's vehicle hitting the deer at a lower speed or missing the deer altogether. Effective deer warning signage should reduce motorists' speed and the incidence of deer vehicle accidents.

According to Huijser et al. (2015), wildlife warning signs will be effective only if motorists believe the signs are reliable:

> "For wildlife warning signs to be effective (i.e., result in fewer or less severe WVC), drivers need to respond to the warning, which occurs when drivers observe, understand and take the signs seriously. Reliability of the sign influences driver response . . . is primarily affected by two factors:
>
> (i)Location – Are wildlife warning signs installed at the road sections that have
>
> had the highest numbers of WVC or at road sections where animals cross the road most frequently? Do drivers perceive these sections as high‐risk areas?
>
> (ii) Time of year or day – Is this the season or time of the day when drivers are most at risk of WVC? Do drivers perceive an increase in movements across the road by the target species at the time of year or day indicated?
>
> Reliability is primarily achieved by installing signs at the correct location, which is usually based on reported crashes from law enforcement agencies or carcass removal data

[38] Borton, W. 1984. An Evaluation of Effectiveness of Deer Crossing Warning Signs. TSD – 550-84 Michigan Department of Transportation

[39] CHAPTER 5C. Section 5C.09 Vehicular Traffic Warning and Non-Vehicular Warning Signs (W11 Series and W8-6)

from highway maintenance personnel. . . . However, for the location or road section to be perceived as correct, drivers need to have confidence in the [organizations] that installed the signs (with or without providing supporting data to the public) or to regularly see the target species dead or alive on or near the road"

The review by Huijser et al. (2015) determined that the majority of studies on the efficacy of standard deer warning signs concluded that these signs are unlikely to be effective in reducing DVCs. Several states have discontinued the installation of new deer warning signs or the replacement of existing such signs if the sign is knocked down or removed for improvement projects. The transportation departments of Wisconsin and Minnesota both have this policy based on research which showed that the standard static deer warning signs were not effective in slowing drivers down, changing driver behavior or reducing deer vehicle crashes. See Note 10. In the absence of uniform criteria provided by the Manual for the installation and removal of deer warning signs, governmental entities will establish their own criteria. For example, the Washtenaw County Road Commission[40] has established its own "Deer Crossing Sign Procedure" on this issue. See Note 11.

Found and Boyce (2011) studied the historical incidence and location of DVCs in Edmonton, Alberta, using GPS coordinates of recorded deer carcass locations, to identify DVC hotspots for mitigation purposes. The researchers designed a scientifically rigorous "before–after control impact study, comparing the frequency of DVCs at signed versus un-signed locations before and after [deer] crossing signs." See Note 12. Based on their analysis of the resulting DVC data at the hotspots with signage versus the hotspots without signage, the researchers concluded that there was a 34% decline in DVCs during the first year after their installation of the deer warning signage, based on DVC hotspot analysis. The researchers did not, however, determine the long-term effectiveness of the placements of their deer warning signage.

B. Local governments should use seasonal temporary deer warning signs to reduce DVCs.

Temporary seasonal deer warning signage has been found to be effective in reducing deer vehicle crashes. Sullivan et al. (2004) evaluated the effectiveness of temporary prominently displayed signage on reducing motorist excessive speed and the number of DVCs during the mule deer migration in three western states. They used signs which had reflective flags and solar-powered flashing amber lights with the message "DEER MIGRATION AREA NEXT 3 MILES". Based on their study, they concluded that "temporary signing prominently displayed only at high-risk times resulted in an estimated 50% reduction in DVCs, although with wide confidence bounds." The researchers observed the following:

> "Signs used in this study were prominent and designed to command attention. They were expected to increase motorist alertness to presence of deer, manifested in part by lower vehicle speeds. Our results indicated that signs reduced the likelihood of high vehicle speeds, but some evidence from 2 sites suggested that the effect diminished over time. Thus, signs in the same location may lose their effectiveness over time. However, effects of signs on DVCs did not diminish. If effects were diminished, the percentage of DVCs that occurred in the treatment area relative to the control area would be expected to increase in the second year, and this did not happen."

[40] Washtenaw County Road Commission website. www.wcroads.org

Hardy et al. (2006) determined that seasonal wildlife advisory messages on portable dynamic message signs (DMSs) were effective, especially during dark conditions, in reducing motorist speed, thus reducing the safe stopping sight distance. They recommended the guidelines for enhanced animal advisory signs. See Note 13. The researchers also encouraged agencies "to use monitoring programs to assess how well enhanced signs may be reducing speeds or [animal vehicle collisions]. Driver surveys and driver simulator studies[41] may also provide useful insight into understanding how drivers perceive and respond to such advisory signs."

The Virginia Transportation Research Council[42](VTRC) conducted a research study by Donaldson and Kweon (2019) to determine the effectiveness of temporary seasonal deer warning signs to reduce DVCs, in cooperation with the U.S. Department of Transportation Federal Highway Administration.[43] The VTRC designed a scientifically rigorous study on a 16.7 mile segment of I-64, an interstate highway in Virginia, by posting deer advisory messages on changeable message signs during three 2-month periods of peak deer activity. The researchers studied the difference between the number of deer carcass removals when deer advisory messages were posted versus when the deer advisory messages were not posted to determine whether DVCs were reduced by using the advisory sign messages. They had the following findings:

> "In an analysis of [carcass removals] for the three 2-month deer advisory posting periods for the entire 16.7 mile study area, [carcass removals] were 51% lower when deer advisories were posted than when they were not posted, and this difference was statistically significant. In the control segment that had no deer advisories, there was no statistically significant reduction of [carcass removals] during those same posting /non-posting time segments."
> "In a comparison of vehicle speeds during the posting of [changeable message signs] messages, speeds during deer advisories were 1.2 mph lower on average and up to 2.8 mph lower at individual sensor stations than speeds during periods other than periods of deer or fog postings. These reductions were statistically significant and equated to an average reduced stopping distance of up to 18 ft."[44]

The researchers concluded that deer advisory messages on temporary message signs along an interstate can be an effective DVC mitigation tool.

The Virginia Department of Transportation (VDOT) in collaboration with the Virginia Tech Transportation Institute (VTTI), conducted another research study to evaluate the reliability of a buried cable animal detection system (BCADS) wirelessly linked to activate a flashing deer warning sign to alert and slow down motorists based on the detected presence of a deer along a

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[41] Stanley, L. Driver Responses to Enhanced Wildlife Advisories in a Simulated Environment. In Transportation Research Record: Journal of the Transportation Research Board*, No. 1980*, Transportation Research Board of the National Academies, Washington, D.C., 2006, pp. 126-133.

[42] The VTRC is a partnership of the Virginia Department of Transportation and the University of Virginia since 1948.

[43] Donaldson and Kweon (2019) Effectiveness of Seasonal Deer Advisories on Changeable Message Signs as A Deer Crash Reduction Tool, found at: http://www.virginiadot.org/vtrc/main/online_reports/pdf/19-r8.pdf

[44] Donaldson and Kweon (2019) at Pp.16-17.

road segment with a relatively high rate of DVCs. Druta and Alden (2019)[45] The researchers determined that the BCADS was reliable in detecting deer crossing on or near the public roadway no matter what the traffic or weather conditions were, even with two feet of snow, during a 11-month period (November 2017 to September 2018). The study also ascertained that the animal detection and warning sign system had a significant impact on driver behavior. Approximately 80% of drivers, in response to the activated flashing warning sign, reduced their speed which indicated that the sign was effective. Based on the positive results of this study, the VDOT will determine in a subsequent related study the effectiveness of the BCADS to reduce a sufficient percentage of DVCs on a road segment to offset the installation and maintenance cost of the BCADS.

C. Local governments should use an educational awareness and marketing program directed at motorists to reduce DVCs.

Research has been conducted in Michigan to determine the most effective messaging to motorists to prevent DVCs. The MDOT funded three research projects concerning the issue of how to reduce deer vehicle collisions by changing motorists' beliefs about such collisions and educating them how to avoid having a collision with deer in southeastern Michigan. In the first study, Marcoux et al. (2005) observed the following:

> "Educating drivers about the specific factors that put them at a greater risk for involvement in a DVC (e.g., hourly, monthly, and seasonal timing of DVCs; speed; and reduced visibility) will give them the choice to modify their driving behavior therefore reducing their risk of involvement in a DVC. Based on our data, information directed towards motorists should focus on raising awareness of when they need to be driving more cautiously with deer in mind. These timing characteristics should include time of year: the risks of DVCs increases markedly in fall, with a peak in mid-November."

And the researchers concluded that future research is necessary: "All drivers should be educated about the risk factors that make an occurrence of a DVC more likely. Drivers can lower their risk of being involved in a DVC by using more caution, slowing their speed, and remaining alert and aware in areas and at times associated with increased DVC risk. Drivers fitting the 'at risk' gender and age profile should use extra caution at all times. Future research should focus on specific approaches for most effectively getting this information to drivers."

In a second study conducted by Riley and Marcoux (2006), the researchers surveyed drivers in Oakland, Washtenaw, and Monroe Counties in southeast Michigan. Based on their research, they recommended "how education and communication campaigns aimed at reducing the frequency of DVCs can be improved. Education messages should:

- Be aimed at middle-aged to older drivers in addition to initial messages taught in typical drivers education to teens
- Increase driver knowledge of how to recognize areas where deer are likely to be crossing
- Encourage proper driving behavior – mostly to slow down and stay alert – to reduce risk of DVC involvement

[45]Druta and Alden (2019) Implementation and Evaluation of a Buried Cable Roadside Animal Detection System and Deer Warning Sign, found at https://www.virginiadot.org/vtrc/main/online_reports/pdf/19-r28.pdf

- Communicate situations that provide the greatest risk, so drivers can be aware of and adjust driving behaviors accordingly to control their individual risk levels
- Be delivered by a cooperation between the Department of Transportation, the Office of Highway Safety Planning, the Department of Natural Resources, the Secretary of State, and individual insurance agencies to insure acceptance from a larger range of drivers
- Be implemented as a test initially to evaluate the effectiveness of any information and education campaign"

In the last study, concerning drivers' knowledge, beliefs and attitudes about deer vehicle collisions in Oakland, Washtenaw and Monroe counties, Marcoux and Riley (2010) stated that based on their research, the most important communications to drivers should be that DVCs are not random and can be avoided: "Conveying this message may enhance the probability of drivers' behavioral changes, which could lead to fewer DVCs." See Note 14.

These research learnings should be used to determine the most effective educational materials to be made available to local governments for their residents and statewide media key messaging to impact motorist behavior to reduce deer-related crashes especially during the critical months of October through December when the frequency of DVCs is the highest. The campaign should be modeled after the yearly traffic safety programs currently being implemented by the Office of Highway Safety Planning (OHSP). Pursuant to the Michigan SHSP, the OHSP has a budget of millions of dollars overall and designated staff for each campaign to implement the following 2022/2023 fiscal year traffic safety and enforcement campaigns[46] with paid social media ads, news releases and fact sheets:

- Teen Driver Safety Week (10/16-22/22)
- Pedestrian Enforcement (10/29-11/4/22)
- Elective Impaired Driving Enforcement (11/21-27/22)
- Speed Enforcement (12/1/22-2/28/22)
- Older Driver Safety Awareness Week (12/5-9/22)
- Drive Sober or Get Pulled Over (12/16/22-1/1/23, 7/1-7/30/23, 8/10-9/4/23)
- Distracted Driving Awareness Month (4/1-30/23)
- Click It or Ticket (5/15-6/4/23)
- Bicycle Safety Enforcement (8/7-13/23)
- Child Passenger Safety Week (9/17-23/23)

While the OHSP has no budget for paid media to promote traffic safety related to DVCs, it has posted messaging of "Don't Veer for Deer" on its Twitter account to reduce DVC related fatalities and serious injuries:

[46] Michigan Highway Safety Plan HSP FY2023 at pages Traffic Safety Campaigns. Go to link at: https://www.michigan.gov/msp/-/media/Project/Websites/msp/ohsp/1_January_2023/FY2023-Michigan-Highway-Safety-Plan.pdf?rev=c473a812f05b4a8b88381915df54e5c2

"A reminder to drivers: Firearm deer season starts tomorrow and continues through Nov. 30. There will be increased activity by hunters and movement by deer across many areas of the state. Please be alert on the roadways! Don't Veer for Deer. More at bit.ly/3StC9rF"
Tweet November 14, 2022.

The reference to "More" directs the Twitter reader to the Michigan State Police website "Deer-Vehicle Crashes" which allows the reader to access a copy of the OHSP's brochure titled "Don't Veer for Deer". See Attachment Four. The updated brochure correctly notes for motorists to notice where deer crossing signs are and to slow down to better prepare to stop if a deer crosses the road.

The City of Ottawa, Canada conducted a benchmarking successful extensive integrated media and public relations campaign titled "Speeding Costs You Deerly," during the fall time periods from 2006 through 2009. The number of DVCs was successfully reduced by 38% from a three-year average of 344, prior to the program, to 213 DVCs during the months of October and November over the four-year program.[47] The program encouraged motorists to be more alert for deer activity, to scan the roadway, to reduce speeds to increase reaction time and to never swerve if an accident with a deer is unavoidable. See Note 15 for a description of the successful program.

The campaign received an environmental award from the Ottawa-Carleton Wildlife Centre, and the Road Safety Achievement Award from the Ontario Ministry of Transportation. The campaign used billboard advertising, television interstitial ads (short duration commercials between two programs or ads of a longer duration), articles in community newspapers, variable message signs displaying "DEER ALERT - REDUCE SPEED" along roadways with high incidents of deer collisions, police enforcement of zero tolerance of speeding on the same roadways and motorist informational cards.

D. Local governments should request funding from the state for statewide educational and public awareness programs and research on effective DVC countermeasures.

The State already has a funding source model for an educational and media–based information program to reduce DVCs. The State established, in 2014, the Michigan Wildlife Council (MWC) to "[develop] and implement, in conjunction with a third-party marketing or advertising agency, a comprehensive media-based public information program to promote the essential role that sportsmen and sportswomen play in furthering wildlife conservation and to educate the general public about hunting, fishing, and the taking of game."[48] The source of the funding for the program is a $1 surcharge on all Michigan hunting and fishing licenses.[49] The DNR is collaborating with the MWC in its mission to promote primarily the importance of hunting to the conservation of wildlife in the State and the contribution of hunting to Michigan's economy.

If the State can establish and fund a non-safety related statewide program about the benefits of hunting, then the State should be able to similarly establish funding (via a license

[47] 2009 Ottawa Roads Safety Results report
[48] MCL 324.43532b(18)(a)
[49] MCL 324.43532a

plate fee surcharge) to execute an effective comprehensive media-based public information program related to motorist safety to reduce deer vehicle crashes. The funding budget should also include allocated dollars for research on the most effective deer crossing warning signage for local government to implement. In the State of Michigan's fiscal year ending September 30, 2021, there were approximately 9,000,000 annual total passenger and motorcycle vehicle license plate transactions.[50] The annual license plate fee collections were $1,100,000,000. A minimal incremental $1.00 surcharge fee on every transaction would generate an annual fund of $9,000,000 to conduct an effective public awareness campaign to reduce deer vehicle collisions and to provide for important research on effective warning signage on two lane roadways where most DVCs occur.

There should be a 5-year strategic marketing and public relations plan to educate motorists about deer vehicle crashes, in that they are not random and that they can be avoided. There should be comprehensive research by a marketing firm, with the use of motorist surveys and focus groups to determine the most effective creative messaging to change the beliefs about deer vehicle collisions and how to prevent them. There should be the deployment, during the fall season, of this messaging campaign via billboards, radio, social and digital ads, and content marketing. And finally, the safety campaign should be measured through the tracking of paid media metrics and online surveying over the course of the campaign to gage the level of the awareness of the messaging.

NOTES

Note 1.
Chad Stewart stated the following in his "open letter to Michigan's deer hunters":

> "The other impact often associated with high deer numbers is the number of deer-vehicle collisions. According to traffic crash data, in 2022 there were nearly 59,000 reported deer-vehicle collisions, the highest number since 2009. Nearly 20% of the recorded collisions in Michigan involved a white-tailed deer."
>
> **The bottom line**

[50] Michigan Department of State, Vehicle Registration Transactions (October 1, 2020, through September 30, 2021)

“So, hunters, we simply need to do better with antlerless deer harvest.”
“Our harvest decisions we make between October and December can improve our deer herd, influence safety on our roads, support our farmers and benefit our forests.”
“We need to quickly, and substantially, increase our antlerless deer harvest across much of our Lower Peninsula.”
“Our reputation as conservationists may be defined by it!” [51]

Showcasing the DNR: An open letter to Michigan’s deer hunters
Michigan Department of Natural Resources bulletin (09/21/2023)

Note 2.
Michigan has had, for fifteen years, a Strategic Highway Safety Plan (SHSP) to reduce crash fatalities and serious injuries. The Governor’s Traffic Safety Advisory Committee (GTSAC), formed in 2002, developed the initial version (2006-2008) of Michigan’s Strategic Highway Safety Plan (SHSP). As stated in the 2019-2022 version of the SHSP, the Michigan traffic safety plan “is a data-driven, four-year comprehensive plan that establishes statewide goals and key emphasis areas. . . . The SHSP identifies Michigan’s key safety needs and guides decisions to achieve reductions in highway fatalities and serious injuries. The SHSP encourages highway safety programs to work together to align and leverage resources. It also positions the state and its safety partners to collectively address the safety challenges.”[52]

Note 3.
The Governor’s Traffic Safety Advisory Committee explained the importance of applying the Safe System Approach to the Michigan SHSP to achieve zero deaths on all roads:

> “The SSA represents an evolutionary step in addressing roadway safety as it is human centered. The SSA is founded on the principle that all humans make mistakes and that human bodies have a limited ability to tolerate crash impacts. It is a redundant system that strives to eliminate fatalities and serious injuries by reducing risks and anticipating mistakes. The responsibility of a crash is shared between road users, vehicles, speeds, roads, and post-crash care to ensure that crashes do not lead to fatalities or serious injuries. It requires all parts of the transportation system be strengthened, so that if one part fails, the other parts still protect people. It is critical to proactively design and operate a transportation system that is human-centric and accommodates human vulnerabilities. This SHSP implements the SSA to achieve [Toward Zero Deaths]. Strategies are evaluated for the six principles and five elements of the SSA for the evolution from the traditional view of safety to the SSA view of safety.”
> 2023-2026 State of Michigan Strategic Highway Safety Plan, at page13.

Note 4.
The DOT previously funded three research projects, published in 2005, 2006 and 2010, concerning the issue of how to reduce deer vehicle collisions by changing motorists’ beliefs about such collisions and educating them how to avoid having a collision with deer in southeastern Michigan. See Addendum at pages 12-13. The DOT was recently a financial

[51] “An open letter to Michigan’s deer hunters” by Chad Stewart on September 21, 2023. Go to the following link: https://content.govdelivery.com/accounts/MIDNR/bulletins/3716e4f
[52] GTSAC 2019-2022 SHSP, at page 1.

contributor ($20,000) for a multi-state "Pooled Fund Study – Wildlife & Transportation Planning Manuel" which updated the status of research on effective mitigation measures for wildlife-vehicle collisions.[53] Otherwise, the DOT has not been involved in seeking funding for and conducting research of any DVC countermeasures, in Michigan, including on the issues of reducing DVCs by means of using effective permanent or temporary road signage and the most effective placement of such signage along road DVC hotspots.

Note 5.

The current Maine SHSP discussed the following strategies for mitigating large animal crashes:

Large Animal Strategies

ID	Strategy/Activity	Lead	Safe Systems
LA-1	Identify high crash locations using crash reports, local knowledge, and crash hot spot analysis tools	MaineDOT / IF&W	roads
LA-2	Identify possible animal/vehicle crash reduction solutions	MaineDOT / IF&W	roads
LA-3	Continue public outreach activities	MaineDOT, BHS, IF&W	users
LA-4	Address special mitigation needs in seasonal crash areas	MaineDOT / IF&W	roads
LA-5	Use engineering solutions to mitigate animal-vehicle collisions at locations identified in LA-1 and incorporate these solutions into MaineDOT projects	MaineDOT	roads
LA-6	Work with local interests on special large animal safety concerns	MaineDOT / IF&W	users
LA-8	Continue to invest in technological strategies (message boards, thermal cameras for large animal detection, etc.) to convey large animal messaging	MaineDOT / IF&W	users

Note 6.

The Illinois SHSP discussed the following countermeasures for mitigating severe animal crashes:

> **ANIMAL STRATEGIES**
>
> "Extensive research has been conducted to determine proven effective strategies for mitigating severe animal crashes. Resources are focused on specific needs based on geography and conditions. The following strategies may be considered for reducing severe animal crashes:
>
> » Strategies that use technology and innovation in and outside of the vehicle.
>
> » Strategies that improve infrastructure such as wildlife crossings, fencing and roadside maintenance.
>
> » Strategies that educate the public on areas with wildlife and recommendations for driver actions."

[53] Nevada Department of Transportation, sponsoring agent, "The Strategic Integration of Wildlife Mitigation into Transportation Procedures: A Manual for Agencies and Partners" (June 30, 2022) (WVC Reduction Pooled Fund Study)

Note 7.

The DeNicola & Williams (2008) observational study has been referenced by Chad Stewart, Michigan DNR Deer Management Specialist, in his presentations to communities on the issue of whether the use of firearm sharpshooters to reduce a local suburban deer population over a several year period is effective to reduce DVCs.[54] In his presentation, he did acknowledge that, "Data linking deer herd reduction with reduced deer collisions is sparse."

The study's authors only concluded that there was a correlation, but not a proven causation, between a percentage reduction of the deer density in a community and percentage reduction of the number of DVCs. The observational study reported that a significant reduction of the deer population by 54 to 76%, by sharpshooting in the three suburban communities, resulted in a reduction of DVCs by 49 to 78%. Their observational study does not provide a scientific basis to conclude there exists a linear causation between a community's obtainment of a certain percentage reduction of a local community's deer population and a corresponding percentage reduction of DVCs over consecutive years of killing deer.

Researchers in an observational study only look at data that has already been collected. The DeNicola & Williams (2008) observational study, and other studies of similar deer population reduction protocols resulting in DVC reductions, fail to follow the appropriate design for scientific research studies for which the conclusions may be relied upon. Therefore, these studies will have a high level of uncertainty and a low strength of inference as to the effectiveness of DVC mitigation if the study design does collect critical data before, during or after the enabling measure, does not compare control sites to sites where the enabling measure is implemented or lacks replicate sites. (See Roedenbeck et al. 2007).

There are significant limitations for the application of their observational study results to other communities, because the researchers failed to use a rigorous scientific method to produce reliable knowledge and failed to present relevant data about its deer population reduction program in their study:

1. No use of the accepted scientific method which includes (a) the generation of a research question, (b) the development of a hypothesis, (c) the formulation of predictions, (d) the design and implementation of research to collect data, (e) the evaluation of whether their predictions are consistent with the collected data, and (f) the drawing of inferences based on their evaluation;
2. No geographic mapping of the kill sites of several thousand deer removed over multiple years of the firearm sharpshooting in the communities;
3. No geographic mapping of the DVC hot spots on the roadways in the communities before or after the firearm sharpshooting took place;
4. No determination of deer density near the DVC road hot spots in the three cities;
5. No indication of whether the culling of the deer took place on public or private properties;

[54] See slide titled "Example: Hopewell Valley, NJ", discussed during Urban Deer Biology and Management Options 2021 presentation by Chad Stewart, DNR Deer Management Specialist, in Farmington Hills, Michigan.

6. No indication of the number of female and male deer which were killed in each city;
7. No factual basis provided for the assumption that there was not any significant level of immigration of deer into or emigration of deer out of the communities involved;
8. No control sites used of other municipalities where no culling occurred which had similar deer densities, number of DVC road hot spots and number of overall DVCs for comparison purposes with the cities where the deer culling did occur.

In summary, without the implementation of the accepted scientific methodology and sufficient detailed critical information about the implementation of firearm sharpshooting in the study's three communities, the observational study's conclusions are scientifically unreliable. Decision makers in another community will not be able to reasonable rely on their study and determine if a firearm sharpshooting management plan will be feasible or successful in their community to significantly reduce DVCs.

Note 8.

The nine essential elements for a successful public issues explanation adapted for the management of the issue of resolving the number of DVCs in a community are as follows:

"Inclusion of multiple perspectives.

Deer problems evolve into public issues because a controversy develops over the problem. The root of controversy usually is a clash of values and the differing perspectives that arise from these values. Addressing the perceived needs of only one stakeholder group in a situation where a deer problem has risen to become a community concern will rarely result in resolution of the issue. What is needed to resolve community-based wildlife management issues is a process that includes multiple perspectives, encourages constructive interaction among people with diverse view points, and leads to new understandings and acceptable solutions.

A structured process for making community decisions.

Step-by-step decision-making processes that logically move a community from problem definition toward a mutually acceptable solution seem to be an essential element of successful problem resolution. An agreed upon, structured sequence of activity facilitates collective understanding of what is going on. Such a process imparts confidence in the effort and willingness to participate without injunction.

Universally acceptable ground rules.

Stakeholders should establish firm ground rules to guide their interactions in addressing a deer issue. Ground rules can be simple agreements about how people will interact. These can be as simple as respecting one another's point of view, agreeing to disagree without being disagreeable, deciding that decisions will be made based on consensus (or some other rule), and agreeing that decisions can reflect both scientific fact and stakeholders' values. In certain situations, it may be necessary to develop fairly complex ground rules to govern the process and ensure that all parties are treated fairly.

Shared understandings among stakeholders.
Reaching shared understandings of a community-based deer management situation typically requires stakeholders to expand their perspectives beyond personal viewpoints. This is a natural outcome of dialogue and deliberation, and can be aided and abetted by expert facilitation.

A shared, comprehensive information base.
Recent articulations of the wildlife management process (e.g., Decker et al. 2002) underscore the importance of an information base that includes biological and human dimensions information and insights. Such an information base is developed from scientific research, systematic evaluation, and professional experience. However, stakeholders' values, experiences, and local knowledge also are components of an information base. A robust information base is useful only to the extent that it is shared among those seeking solutions to community-based deer issues.

Disclosure of stakeholder goals.
A good starting point in community-based deer management is acknowledging that differences in initial goals may exist, and disclosing them in the spirit of collaboration. A potentially harmful move would be to oversimplify such differences. Facilitators should avoid this contrivance because the consequences almost certainly will be negative.

Belief within a community that generally acceptable goals and solutions are worth seeking.
Finding solutions with which most stakeholders will be content is not an easy task. In most local deer management controversies, quick and easy solutions are not in the offing. However, solutions can be found, and community commitment to finding generally acceptable solutions is a requisite for success. This may require creativity and inventiveness, tinkering with the details, or developing packages of actions. The vital ingredient in this recipe is a willingness to look at consequences from multiple viewpoints.

An understanding that community-based deer management is an ongoing process, not a onetime event.
This guide focuses on the process leading to a decision to undertake some management action. Professional wildlife managers and community members need to recognize from the outset that decision making is likely to be an ongoing activity. That is, even with a course set for management actions, the need persists for evaluation of progress and for fine-tuning. Treating decision making as an ongoing process is part and parcel of an adaptive impact management approach (Riley et al. 2002) to community based deer management. Engagement in community-based, collaborative decision making involves continuous learning at the community level.

Commitment to systematic evaluation of the decision-making process and subsequent management program.
As described above, the process of community-based deer management, building to

enable that activity, is an ongoing process. Adopting an evaluative approach to community-based deer management is vital to (1) practicing adaptive impact management, (2) developing communities' capacity for sustained involvement, and (3) increasing knowledge of community-based management for the benefit of the profession.
Decker et al (2004)[55], pages 8-10. See also the other resources for the management of conservation and environmental conflict resolution.[56]

Note 9.
According to the Manual, the general function of warning signs is to "call attention to unexpected conditions on or adjacent to a highway, street, or private roads open to public travel and to situations that might not be readily apparent to road users. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations."[57] The warning signs should be located so as to provide adequate Perception-Response Time (PTR), which is the "time needed for detection, recognition, decision, and reaction."[58] The Manual is clear that the "use of warning signs shall be based on an engineering study[59] or on engineering judgment."[60] And The Manual is also clear that signs "required by road conditions or restrictions shall be removed when those conditions cease to exist or the restrictions are withdrawn."[61] The Manual does not offer guidance as to where to place a deer warning sign or when a county or municipality should install or remove a deer warning sign on one of its roads.

Note 10.
Both the Wisconsin Department of Transportation, Traffic Guidelines Manual (2009), Chapter 2,

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[55] A Practitioners' Guide: Community-Based Deer Management (2004), Pp. 7-9. Daniel Decker, Daniela Raik and William Siemer, Human Dimensions Research Unit, Cornell University (Copy attached).

[56] See also A Practitioners' Guide: Human-Wildlife Conflict Management (2002), Daniel Decker, T. Bruce Lauber and William Siemer, Human Dimensions Research Unit, Cornell University; Understanding and Managing Conservation Conflicts (2013); Steve Redpath et al., Trends in Ecology & Evolution, Vol. 28, No. 2.; and Environmental Conflict Resolution: Evaluating Performance Outcomes and Contributing Factors (2009), Kirk Emerson, Patricia Orr, Dale Keyes and Katherine McKnight, Conflict Resolution Quarterly, Vol. 27, No. 1.

[57] CHAPTER 2C. Section 2C.01. Function of Warning Signs
[58] CHAPTER 2C. Section 2C.05. Placement of Warning Signs
[59] An engineering study is defined as, "the comprehensive analysis and evaluation of available pertinent information, and the application of appropriate principles, provisions, and practices as contained in this Manual and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device." CHAPTER 1A. Section 1A.13 Definitions of Headings, Words, and Phrases in this Manual
[60] CHAPTER 2C. Section 2C.02. Application of Warning Signs Standard
[61] CHAPTER 2C. Section 2A.03. Standardization of Application

Section 3, Subject 41, "Deer Crossing Signing" and the Minnesota Department of Transportation (2017) "Deer Crossing Signs" referenced these studies:

> 1. Assessing the Effectiveness of Deer Warning Signs (Published by Kansas Department of Transportation and University of Kansas at Lawrence, April 2006).
> 2. Wildlife –Vehicle Collision and Crossing Mitigation Measures: A Toolbox for the Montana Department of Transportation (Published by Montana Department of Transportation and Montana State University, May 2007).
> 3. An Ecological Landscape Study of Deer-Vehicle Collisions in Kent County, Michigan (Published by Kent County Road Commission and White Water Associates, Inc., January 2004).
> 4. Deer Crossing Signs and Technologies (Published by Deer-Vehicle Crash Information Clearinghouse, maintained by Texas Transportation Institute) www.deercrash.org
> 5. Deer Avoidance: The Assessment of Real World Enhanced Deer Signage in a Virtual Environment (2004) (Published by University of Minnesota, sponsored by Minnesota Department of Transportation)"

Note 11.

Washtenaw County Road Commission[62] "Deer Crossing Sign Procedure":

> "A deer-car accident history is researched for the stretch of road in question. Installation of deer crossing signs is warranted if five deer car related accidents have occurred in a twelve-month period. Placement of the signs should be reviewed every third year. Any necessary adjustments in the placement or removal of the sign should be made according to the following guidelines:
>
> - A deer-car accident study should be conducted for the stretch of road encompassing the deer crossing area and one mile to either side of the area.
> - The placement of signs shall be adjusted to reflect any change in the concentration of deer-car accidents in the study area.
> - When the accident study shows that no deer-car related accidents have occurred in the study area in a minimum of twelve-month period, the sign may be removed at the discretion of the WCRC.
>
> This policy shall be superseded by any and all changes to the Michigan Manual of Uniform Traffic Control Devices which affect the criteria and/or placement of deer crossing signs."

Note 12.

Found and Boyce (2011) described their research project as follows:

> "We used 2002–2007 carcass data to identify 28 locations of high DVC frequency within the city limits of Edmonton. Each such location was termed a DVC ''hotspot,'' and was defined as an 800-m-radius buffer around locations from which deer carcasses were retrieved in $\geq$3 of the 6 years of data collection, and multiple carcasses were retrieved from the location in $\geq$1 of those years. We installed warning signs around 14 of these hotspots, and left the other 14 hotspots un-signed. Treatment and control groups were randomly chosen from among the 28

[62] Washtenaw County Road Commission website. www.wcroads.org

hotspots. By June 2008, we installed a pair of warning signs at 14 of these hotspots, and left the other 14 hotspots un-signed. Each pair of signs was installed 1,600 m apart, facing opposite directions. This 1,600-m warning-sign range was based on Pojar et al. (1975) who found that drivers reduced their speed for up to 1.6 km past a warning sign, while the effect deteriorated precipitously beyond that. The 1,600-m range also matches the township grid system used in Alberta and elsewhere throughout North America in which road right-of-ways are designated every 1.6 km or 3.2 km. Because carcass locations are defined using this system, this signed range also matches the approximate precision of DVC locations. Where smaller, low traffic-volume [side roads] were present within the hotspot, signage was installed on the main road as defined by higher traffic volume. Signs were made from highly reflective yellow Diamond Grade 3 (3M, St. Paul, MN) sheeting, in a standard-sized (90 cm x 90 cm) diamond shape, mounted on 3-m-high posts (Fig. 2). To enhance the specificity of the warning, we mounted a "1.6 km" tag mounted under the main diamond of each sign (Knapp 2004)."

Note 13.
Hardy et al. (2006) recommended the following guidelines for enhanced animal advisory signs:

- "If a [dynamic message sign] is used to deliver animal advisory messages, follow the guidelines on message construction provided by Dudek and Ulmann [(2001)] and Dudek [(2002)].
- If enhanced standard signs are used, use formats that are larger than usual; and consider the inclusion of flashing lights, bright flagging, and reflective backing.
- Apply signs only where there is documentation of concentrated animal movements or AVCs, understanding that driver responses will be the greatest over shorter distances [0.3 to 0.6 mi (0.5 to 1.0 km)] after they pass the signs. Enhanced signs may be used alone in high-risk areas or in conjunction with other mitigation measures, such as at the ends of animal fencing, where clusters of animal movements and AVCs may occur.
- Apply or activate signs when animal movements and AVCs peak, typically at night during the fall months. Examine data on animal movements and AVCs to confirm when the risk of an AVC is the highest at the site in question. Remove enhanced signs when this peak period of high risk has passed.
- Consider the characteristics of the driving population and favor the use of enhanced signs in areas where local motorists may be more aware of AVCs and animal movements.
- Consider the application of enhanced signs in conjunction with education outreach or public relations campaigns advising drivers of the risks of AVCs."

Note 14.
Marcoux and Riley (2010) further stated that,

> "Efforts to reduce or mitigate DVCs require effective information and education programs aimed at changing driver behaviors (Stout et al. 1993, West 2008). Previous studies suggested education as a means for reducing DVCs (Allen and McCullough 1976, Groot Bruinderink and Hazebroek 1996, Romin and Bissonett 1996). Our data indicate, however, that communication planners will need to overcome underlying beliefs about DVCs before driver behaviors can be expected to change; the most important of these beliefs is about the perceived randomness of DVCs. Communication that informs drivers that DVCs are not random events and that enables drivers to recognize environmental and

other characteristics factors associated with DVCs may help them identify areas of greater risk and lead to safer driving behavior. Although participants in our study held themselves, as opposed to an agency, responsible for preventing DVCs, most also believed DVCs were unavoidable because they also believed DVCs occurred randomly. That is, drivers believe there was not much that could be done to avoid them. Most research (e.g., Finder et al. 1999, Hubbard et al. 2000, Nielsen et al. 2003, Sudharsan et al. 2009) to date within the range of white-tailed deer, however, indicates that DVCs do not occur randomly. Conveying this message may enhance the probability of drivers' behavioral changes, which could lead to fewer DVCs."

Note 15.

According to Ottawa's awareness campaign website, "Wildlife/Vehicle Collision Prevention: be alert, reduce speed, stay in control", the messaging for the program was the following*:*

"Be alert

- Scan, side-to-side, the roadway and its shoulders
- Use your high beams where possible
- Look out for light reflection from an animal's eyes
- Take notice of yellow wildlife warning signs

Reduce your speed

- This increases your time to safely react
- This decreases the distance to stop
- This decreases the possibility or severity of personal injury, should a collision be unavoidable

If wildlife crosses your path, stay in control

- Brake
- Sound your horn
- Never swerve suddenly

If you lose control, you can suffer a far greater consequence – such as a head-on collision with another vehicle.

Your best [defense] is slowing down. So, remember, Speeding Costs You . . . Deerly!"[63]

"As reported in the campaign submission to the Ontario Ministry of Transportation for the Road Safety Achievement Award, the "Speeding Costs You . . . Deerly" program, in its first year, had the following results in raising awareness of DVCs and how to prevent the crashes:

Both through earned media and advertising, the campaign created almost 28,000,000 possible impressions. Radio created 20,000,000 impressions and, due to frequency of four

[63] Go to link at: https://ottawa.ca/en/parking-roads-and-travel/road-safety/road-safety-action-plan/safer-roads-ottawa-program/awareness-campaigns

ads per day on three stations, television created 6,930,000 impressions while earned media generated almost 500,000 impressions.

A Decima Research assessment of *Speeding Costs You . . . Deerly* found that 62% of Ottawa residents recalled the campaign, and the key messaging resonated with 71% of those respondents. The survey also helped to determine how the residents received the campaign messaging. Television rated 48%, radio and the Ottawa Citizen recorded 43%, while community papers were at 16 % and the billboards had a 14% rating. Such recall is even more impressive considering in our early consultations with Decima, that considering the dollar value of the campaign's resources, staff were advised to expect a 10% or less recall. However, the survey surpassed those expectations with 43 per cent of the residents - who drive - clearly recalling the campaign. In addition, 71 per cent clearly recalled the main message to reduce speed to avoid deer collisions. And, 53 per cent of those respondents considered deer/vehicle collisions a risk on Ottawa's roadways." [64]

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ATTACHMENT ONE

Michigan Counties: 2021 Deer Vehicle Crashes (DVCs) & DVCs per 100 Million Vehicle Miles Traveled

Top 25 Counties: Highest 2021 Deer Vehicle Crashes (DVCs) with Corresponding DVCs per 100 Million Vehicle Miles Traveled (VMT)

Michigan Counties: 2021 Deer Vehicle Crashes (DVCs) & DVCs per 100 Million Vehicle Miles Traveled

County	Total of All Crashes	Only DVCs	DVCs as % of All Crashes	DVCs per 100 Million VMT
Huron	1,395	950	68.1	287.5
Sanilac	1,541	1,080	70.1	268.0
Alcona	496	340	68.5	263.6
Presque Isle	549	418	76.1	260.0
Hillsdale	1,737	936	53.9	227.8
Iron	479	326	68.1	224.8
Mason	1,193	646	54.1	210.0
Missaukee	602	380	63.1	209.9
Manistee	915	516	56.4	194.0
Tuscola	1,723	953	55.3	189.5
Charlevoix	962	508	52.8	186.1
Dickinson	873	421	48.2	182.3
Barry	1,525	720	47.2	173.1
Oceana	957	553	57.8	172.8
Gratiot	1,606	931	58.0	172.4
Newaygo	1,460	661	45.3	171.1
Montmorency	341	205	60.1	163.3
Branch	1,704	808	47.4	163.2
Mecosta	1,765	790	44.8	162.2
Gladwin	710	396	55.8	159.7
Ontonagon	284	186	65.5	159.2
Lapeer	2,841	1,355	47.7	138.6
Isabella	2,381	998	41.9	137.0
Cass	1,625	657	40.4	136.6
Baraga	270	166	61.5	135.0
Antrim	805	421	52.3	134.9
Osceola	1,039	557	53.6	131.0
Lake	309	160	51.8	126.0
Shiawassee	2,106	986	46.8	124.7
Ogemaw	791	395	49.9	124.4
Cheboygan	1,051	563	53.6	121.1
Benzie	566	243	42.9	115.2
Montcalm	1,877	758	40.4	115.2
Oscoda	209	113	54.1	112.7
Arenac	711	384	54.0	112.6
Delta	1,075	467	43.4	112.5
Emmet	1,237	419	33.9	110.1
Kalkaska	681	295	43.3	110.1
Clare	991	458	46.2	109.6
St. Joseph	1,702	565	33.2	106.7
Schoolcraft	344	182	52.9	105.6
Leelanau	588	289	49.1	104.3

County	Total of All Crashes	Only DVCs	DVCs as % of All Crashes	DVCs per 100 Million VMT
Alpena	820	291	35.5	103.2
Clinton	2,201	1,116	50.7	102.4
Houghton	885	259	29.3	98.5
Midland	2,353	864	36.7	98.5
Iosco	610	256	42.0	95.5
Jackson	5,239	1,544	29.5	95.0
Mackinac	496	268	54.0	94.0
Wexford	1,277	429	33.6	94.0
Lenawee	2,385	730	30.6	87.4
Crawford	561	278	49.6	86.3
Allegan	3,900	1,288	33.0	82.1
Van Buren	2,219	853	38.4	82.0
Calhoun	4,512	1,247	27.6	77.7
Otsego	863	305	35.3	74.3
Chippewa	781	271	34.7	74.0
Ionia	1,740	533	30.6	69.2
St. Clair	3,626	1.012	27.9	67.9
Roscommon	696	290	41.7	67.8
Grand Traverse	3,275	642	19.6	64.8
Luce	126	58	46.0	63.3
Marquette	1,544	390	25.3	60.9
Eaton	2,787	720	25.8	59.4
Ottawa	7,651	1,391	18.2	56.2
Berrien	4,385	1,013	23.1	50.4
Alger	233	78	33.5	47.6
Keweenaw	67	22	32.8	47.0
Bay	2,938	578	19.7	46.1
Kalamazoo	8,236	1,137	13.8	46.1
Ingham	7,887	976	12.4	45.6
Saginaw	5,428	941	17.3	45.2
Muskegon	4,673	663	14.2	45.1
Gogebic	225	66	29.3	42.9
Livingston	4,389	948	21.6	41.5
Genesee	10,601	1,254	11.8	31.8
Kent	20,091	1,810	9.0	30.8
Washtenaw	8,664	1,080	12.5	30.1
Menominee	308	61	19.8	23.6
Monroe	3,553	448	12.6	22.4
Oakland	32,038	1,853	5.8	15.6
Macomb	21,871	589	2.7	9.0
Wayne	50,490	511	1.0	3.6
Total	**282,640**	**52,218**	**18.5**	**54.0**

Source: Michigan Office of Highway Safety Planning, 2021 Michigan Traffic Crash Facts – County/Communities

Top 25 Counties: Highest 2021 Deer Vehicle Crashes (DVCs) with Corresponding DVCs per 100 Million Vehicle Miles Traveled (VMT)

County	2021 Highest DVCs/Rank	2020 Population	Ratio of DVCs to Licensed Drivers	Licensed Drivers	2021 VMT (Thousands)	Average VMT per Licensed Driver	DVCs per 100 Million VMT/Rank
Huron	950 (18)	31,407	1:27	25,278	330,446	13,072	287.5 (01)
Sanilac	1,080 (11)	40,611	1:29	31,311	403,126	12,875	268.0 (02)
Hillsdale	936 (21)	45,746	1:36	33,388	410,859	12,306	227.8 (03)
Tuscola	953 (17)	53,323	1:43	40,824	503,253	12,327	189.5 (04)
Gratiot	931 (22)	41,761	1:30	27,553	540,058	19,601	172.4 (05)
Lapeer	1,355 (05)	88,619	1:52	69,996	977,856	13,970	138.6 (06)
Isabella	998 (14)	64,394	1:40	40,406	728,300	18,025	137.0 (07)
Shiawassee	986 (15)	68,094	1:53	52,495	791,150	15,071	124.7 (08)
Clinton	1,116 (10)	79,128	1:54	60,786	1,090,526	17,940	102.4 (09)
Midland	864 (23)	83,494	1:75	64,950	877,858	13,516	98.5 (10)
Jackson	1,544 (03)	160,366	1:73	113,058	1,625,617	14,379	95.0 (11)
Allegan	1,288 (06)	120,502	1:71	91,300	1,568,234	17,177	82.1 (12)
Van Buren	853 (24)	75,587	1:66	56,016	1,040,427	18,574	82.0 (13)
Calhoun	1,247 (08)	134,310	1:75	93,777	1,604,328	17,108	77.7 (14)
St. Clair	1,012 (13)	160,383	1:122	123,920	1,491,182	12,033	67.9 (15)
Ottawa	1,391 (04)	296,200	1:156	216,446	2,477,795	11,448	56.2 (16)
Berrien	1,013 (12)	154,316	1:110	110,967	2,010,076	18,114	50.4 (17)
Kalamazoo	1,137 (09)	261,670	1:156	182,064	2,467,969	13,556	46.1 (18)
Ingham	976 (16)	284,900	1:190	185,678	2,139,071	11,520	45.6 (19)
Saginaw	941 (20)	190,124	1:143	134,279	2,080,040	15,490	45.2 (20)
Livingston	948 (19)	193,866	1:167	158,404	2,284,684	14,423	41.5 (21)
Genesee	1,254 (07)	404,208	1:232	291,327	3,947,732	13,551	31.8 (22)
Kent	1,810 (02)	657,974	1:259	468,433	5,875,932	12,544	30.8 (23)
Washtenaw	1,080 (11)	372,258	1:235	254,262	3,592,973	14,131	30.1 (24)
Oakland	1,853 (01)	1,274,395	1:530	981,257	11,915,057	12,143	15.6 (25)
Total*	28,516	5,337,636	1:137	3,908,175	52,374,549	13,401	54.4
SEMCOG**	6,441	4,830,489	1:531	3,422,672	41,954,463	12,258	15.4
Michigan	52,218	10,077,331	1:139	7,256,488	96,744,489	13,332	54.0

*Total represents the combined DVCs of the 25 counties having the highest number of 2021 Deer Vehicle Crashes (DVCs) in Michigan.
**SEMCOG represents the combined 2021 DVCs in the counties of Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw and Wayne.
Data source: U.S. Census 2020 and Michigan Office of Highway Safety Planning, 2021 Michigan Traffic Crash Facts – County/Communities

ATTACHMENT TWO

20 Year Historical Trend in Michigan Deer Vehicle Crashes and Female Deer Harvested

20 Year Historical Trend in Michigan Deer Vehicle Crashes and Female Deer Harvested (2004-2023)

	DVCs	DVC Fatalities	Statewide VMT (in Billions)	DVCs per 100 Million VMT	Antlerless Harvest	Doe to Buck Harvest Ratio	Total Deer Harvested	Number of Hunters	Est. Deer Population
004	62,707	3	101.8	62.0	227,000	0.99	456,000	713,000	1,850,000
005	58,741	9	103.2	57.0	199,000	0.91	417,000	671,000	1,700,000
006	60,875	12	104.0	58.5	190,000	0.71	456,000	691,000	1,670,000
007	61,907	11	104.6	59.2	217,000	0.81	484,000	683,000	1,890,000
008	61,010	12	100.9	60.5	242,000	0.96	490,000	694,000	1,920,000
Year Ave.	**61,048**	**9**	**102.9**	**59.4**	**215,000**	**0.88**	**461,000**	**690,000**	**1,806,000**
009	61,486	10	95.9	64.1	229,000	1.07	444,000	686,000	1,790,000
010	55,867	11	97.6	57.2	206,000	0.97	418,000	657,000	1,660,000
011	53,592	8	94.8	56.5	209,000	0.98	422,000	648,000	1,680,000
012	48,918	8	94.3	51.9	198,000	0.89	420,000	654,000	1,700,000
013	49,205	12	95.1	51.7	182,000	0.90	385,000	662,000	1,600,000
Year Ave.	**53,814**	**10**	**95.5**	**56.3**	**205,000**	**0.96**	**418,000**	**661,000**	**1,686,000**
014	45,690	6	99.1	46.1	151,000	0.85	329,000	615,000	1,400,000
015	47,002	11	97.8	48.1	143,000	0.74	335,000	607,000	1,500,000
016	46,870	12	99.2	47.2	152,000	0.78	348,000	586,000	1,750,000
017	50,949	17	101.8	50.0	160,000	0.71	386,000	574,000	1,750,000
018	53,464	14	102.4	52.2	156,000	1.03	368,000	554,000	1,750,000
Year Ave.	**48,795**	**12**	**100.1**	**48.7**	**152,000**	**0.81**	**353,000**	**587,000**	**1,630,000**
019	55,531	12	102.2	54.3	160,000	0.76	371,000	540,000	1,750,000
020	51,103	5	86.3	59.2	201,000	0.92	420,000	565,000	1,700,000
021	52,218	10	96.7	54.0	180,000	0.80	404,000	537,000	2,000,000
022	58,984	11	95.9	61.5	142,000	0.70	346,000	516,000	2,000,000
023	58,806	19	98.3	59.8	146,000	0.70	354,000	527,000	2,000,000
Year Ave.	**55,328**	**11**	**95.9**	**57.7**	**165,000**	**0.78**	**378,000**	**537,000**	**1,890,000**

ources of information:
lichigan Department of Transportation: Vehicle Miles Traveled (VMT); Michigan OHSP: Michigan Traffic Crash Facts.
lichigan Department of Natural Resources: Michigan Deer Harvest Survey Reports (2002-2023) and the informal estimate of yearly re-hunt deer population by the DNR and other sources. The numbers for Antlerless Harvest, Total Deer Harvested (which includes the eer taken with DMA permits) and Number of Hunters were rounded to the nearest 1,000.

Ten Year History of Oakland County Traffic Crashes, Fatalities, Serious Injuries and Crash Factors

Factor Involved	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average	Total
Deer												
Total Crashes	1,801	1,750	1,873	1,847	1,747	1,851	1,928	1,854	1,853	2,009	1,853	18,531
Fatalities	0	0	0	0	1	0	0	0	0	1	<1	2
Serious Injuries	0	1	3	4	2	3	2	4	10	1	3	30
Alcohol												
Total Crashes	1,079	1,091	1,087	1,088	1,060	1,058	979	915	944	972	1,027	10,273
Fatalities	12	18	18	26	22	14	14	20	20	24	19	188
Serious Injuries	70	74	84	66	71	64	78	73	72	64	72	716
Drugs												
Total Crashes	250	258	252	292	298	279	241	300	263	239	267	2,672
Fatalities	13	14	13	14	19	8	11	8	11	12	12	123
Serious Injuries	25	19	37	37	38	36	32	26	27	27	30	303
Younger Driver												
Total Crashes	7,576	7,458	7,837	8,215	8,005	7,261	7,123	4,610	5,959	5,922	6,997	69,966
Fatalities	7	5	9	5	12	4	9	5	13	11	8	80
Serious Injuries	101	80	85	75	87	44	61	50	72	62	72	717
Older Driver												
Total Crashes	5,936	6,412	6,777	7,364	7,515	7,608	7,715	4,871	6,243	6,920	6,736	67,361
Fatalities	13	19	19	20	17	16	24	14	11	23	18	176
Serious Injuries	100	119	92	83	71	67	92	62	96	112	89	894
Speeding												
Total Crashes	2,684	3,214	2,428	2,673	2,443	2,436	2,369	1,827	2,000	2,250	2,433	24,327
Fatalities	7	8	4	9	7	9	8	7	13	18	9	90
Serious Injuries	59	65	25	37	38	47	45	47	50	43	46	456
Distracted Driver												
Total Crashes		(not provided)		1,634	3,179	2,875	3,034	1,871	2,207	2,163	2,423	16,963
Fatalities		(not provided)		2	5	3	2	4	1	11	4	28
Serious Injuries		(not provided)		32	35	38	42	26	29	28	33	230
All Crash Factors												
Total Crashes	37,283	39,951	39,843	42,660	41,783	40,814	40,394	26,316	32,038	34,185	33,348	333,484
Fatalities	57	63	67	80	69	54	68	62	66	79	67	665
Serious Injuries	499	498	413	414	421	399	416	379	433	416	429	4,288

Source: SEMCOG Crash and Road Data and MSP Office of Highway Safety Planning – Michigan Traffic Crash Facts: Data Query Tool

ATTACHMENT FOUR

OHSP website page “Deer-Vehicle Crashes”

MSP

Deer-Vehicle Crashes

Nearly 2 million deer make up Michigan's deer herd. Deer are most active from April through June and from October through December. During those months, most vehicle-deer crashes take place, although such crashes are a year-round problem.

In 2021, more than 50,000 vehicle-deer crashes occurred across Michigan in rural, suburban, and city settings. About 80 percent of those crashes were on two-lane roads. Because deer are most active at dawn and dusk, it is not surprising that most traffic crashes involving deer happen from 5 a.m. to 8 a.m. and 5 p.m. to 10 p.m.

Avoiding Deer

A vehicle crash with a large animal can be just as destructive as one with another vehicle. The most serious vehicle-deer traffic crashes occur when drivers veer to avoid the animal and hit another vehicle or a fixed object such as a tree or the vehicle rolls over.

- Stay alert, awake, aware, and sober, and drive at safe speeds.
- Notice where deer crossing signs are posted, which alert drivers of the possible presence of deer.
- Be aware of your surroundings, and be prepared for deer to dash out in front of you.
- Scan the roadside while driving, especially woodlots, fencerows, field edges, and areas near water, which deer use for feeding.
- Slow down. Be prepared to stop if deer are near the road. If a deer stops and stays on the road, do not try to go around it.
- Deer typically follow one another in single file, so if you see one deer, there are likely more nearby.
- Use high-beam headlights and additional driving lights to see the road better.
- Look for the reflection of headlights in a deer's eyes and deer silhouettes on the shoulder of the road.

Motorists

- Always wear your seat belt, and make sure your passengers wear their seat belts.

If a crash is unavoidable…

- Do not veer! It is instinct to do this, but trying to avoid a deer may cause a loss of control of the vehicle and a more serious traffic crash.
- Brake firmly, and try to stay in your lane.
- Hold the steering wheel with both hands, and bring your vehicle to a controlled stop.

Motorcyclists

- Cover the brakes to reduce reaction time.
- Avoid riding at night and during dawn and dusk, the peak hours of deer movement.
- If riding in a group, spread out in a staggered formation. If one rider hits a deer, it will lessen the chances that other riders will be involved.
- A rider's best response when approaching a deer is to use both brakes for maximum braking. Keep your eyes and head up to improve your chances of keeping the bike upright.

If a crash is unavoidable…
- Use both brakes progressively, and come to a quick complete stop. If stopping is not an option, then without using brakes, swerve in the opposite direction the deer was heading, and slow down or come to a complete stop.

What to Do if You Hit a Deer

Motorists
Turn on your emergency flashers, stay buckled up, and move your vehicle to the shoulder of the road if you can. If you cannot drive your vehicle, carefully exit it, and stand at the side of the road out of the way of oncoming traffic.

Motorcyclists
If you can, remove your bike from the road. Get yourself to a safe place away from the road and oncoming traffic.

Motorists and Motorcyclists
Call the police to report the vehicle-deer crash. Be prepared to tell them:
- Your location.
- If there are any injuries to you and/or your passengers.
- If other vehicles have also been involved.
- If you think the deer is alive or dead and if it is blocking the road.
- Stay away from the deer. A wounded, frightened deer could be dangerous.
- After help arrives and if possible, document the incident, damage, and injuries in photographs.
- Do not assume your vehicle is safe to drive. Look for damage. Be prepared to call for a tow truck.
- Call your insurance company to report the vehicle-deer crash. You may need a police report number to start your claim.

Remember to buckle up. Seat belts are motorists' best defense in the event of a crash.

Deer brochure available
The OHSP has produced a brochure titled "Don't Veer for Deer," with helpful information about deer-vehicle crashes and how to avoid them.