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# Minnesota White-tailed Deer Management Plan

2019-2018

**DRAFT** 04/09/2018

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## Deer Management Plan Advisory Committee (2016-2018)

<u>Affiliation</u>	<u>Representative</u>
1854 Treaty Authority	Andrew Edwards
At-large Member	Ted Brenny
At-large Member	Jim Buchwitz
At-large Member	Daniel Butler
At-large Member	Kevin Goedtke
At-large Member	Yeng Moua
At-large Member	Bernie Overby
At-large Member	Becky Strand
Bluffland Whitetails Association	Marty Stubstad
Farm Bureau	Kevin Paap
Farmers Union	Bob Marg (replaced Rod Sommerfield)
Minnesota Association of County Land Commissioners	Nate Eide
Minnesota Conservation Federation	Art Reuck (replaced Gary Botzek)
Minnesota Deer Hunters Association	Craig Engwall
Minnesota Deer Hunters Association	Denis Quarberg
Minnesota Department of Health	Jenna Bjork
Minnesota Forest Resources Partnership	Dennis Thompson
Quality Deer Management Association	Pat Morstad
The Nature Conservancy	Meredith Cornett

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*Note: All at-large members were deer hunters. One organization, Women Hunting & Fishing in All Seasons, withdrew from participation due to scheduling challenges and limited staffing.*

## Executive Summary

The white-tailed deer (*Odocoileus virginianus*) is Minnesota's most pursued game animal. It is found in all habitats throughout the state, from the intensively farmed southwest to sub-boreal forests of northeastern Minnesota. Roughly half a million Minnesota citizens hunt deer each year and countless others enjoy seeing deer. Deer hunting generates nearly \$500 million annually in total economic activity to the state, and the habitats that sustain deer, sustain Minnesota's \$14 billion dollar a year outdoor recreation economy. However, because of their size, high reproductive ability in most habitats, and role as disease vectors, deer can also have negative impacts on other natural resource, social, and economic values.

The Minnesota Department of Natural Resources (DNR) began the process of developing a statewide deer management plan in 2016. To complete the plan, 20 individuals were selected to a Deer Management Plan Advisory Committee, which was authorized by the DNR commissioner to provide input and make advisory recommendations on plan content. Public input was also collected to inform plan development.

### I. Purpose

The purpose of this deer management plan is to communicate a vision for white-tailed deer management in Minnesota. The plan:

- Outlines strategic direction through deer management values, goals, and objectives that will be used to prioritize agency resources and activities;
- Describes DNR responsibilities and efforts related to deer management; and
- Provides a multi-level structure for engagement with partners and the full public to promote effective deer management.

### II. Strategic Direction

In brief, overarching direction for the plan is founded in the concept of managing wildlife as a shared resource, reflected in DNR mission statements and state statutes. The 2019 to 2028 deer management plan communicates a vision and guiding principles for deer management in Minnesota, supported by eight goals and associated objectives to guide management decisions over the next 10 years. Goals A through G reflect topic areas discussed during 2017 and subsequently recommended by the committee as the organizational structure within which to frame deer plan objectives; in particular, concerns about the potential impact of chronic wasting disease on the health of the wild deer population received substantial committee attention and is suggested as a high priority for management. Goal H reflects a DNR priority to practice continuous improvement.

**Goal A: COMMUNICATION, INFORMATION SHARING, AND PUBLIC INVOLVEMENT:** Foster trusting, respectful, and effective two-way communication between DNR and the public regarding deer management.

**Goal B: DEER STAKEHOLDER SATISFACTION:** Consider social dimensions of deer management decisions.

**Goal C: POPULATION MANAGEMENT, MONITORING, AND RESEARCH:** Manage deer adaptively, considering both biological and social information in decision-making.

**Goal D: HEALTHY DEER:** Support deer herd health by monitoring and addressing disease.

**Goal E: HEALTHY HABITAT:** Maintain natural wildlife habitat by protecting, enhancing, and restoring habitat and by managing for an appropriate number of deer.

**Goal F: IMPACT OF DEER ON OTHER RESOURCES:** Reduce negative impacts of deer to the land; resources; and other species, including people.

**Goal G: DEER MANAGEMENT FUNDING:** Seek sufficient funding and promote cost-effective deer management.

**Goal H: DNR DEER MANAGEMENT:** Practice and ensure continuous improvement within DNR's deer management program and supporting activities.

### **III. Transparency and Accountability**

The plan also includes 14 performance measures that DNR will use to help communicate management activities and track overall plan progress. Specific performance measures were selected to reflect the full scope of goals in this deer management plan as well as the stated deer management values. Performance measures include:

- Management inputs such as spending on deer management;
- Process components such as public engagement, timeliness of information, and chronic wasting disease (CWD) surveillance; and
- Management outputs and outcomes such as meeting local deer population goals and a harvest target of 200,000 deer harvested per year, managing habitat, addressing deer damage complaints, and adherence to public trust governance principles.

### **IV. Working with Stakeholders**

Minnesota DNR is committed to socially and ecologically responsive and responsible deer management for the benefit of Minnesotans now and into the future. Although the DNR has demonstrated a commitment to processes that provide an opportunity for stakeholders to influence deer management decisions, the plan more formally communicates our commitment to two-way dialogue and enhanced relationships between DNR staff and stakeholders at multiple spatial and temporal scales. Examples of enhanced communication opportunities are provided in Section VI, below.

### **V. Coordination with Tribal Nations**

Input and consultation on deer management also includes consideration of tribal interests and this is different than stakeholder input (Appendix B). Agency staff coordinate and work with tribes on deer management in accordance with reserved treaty rights, associated court decisions, federal laws, intergovernmental agreements, and shared interest in natural resource conservation. Coordination with tribes is handled on a nation by nation basis under terms and agreements with each tribe.

### **VI. An Overview of Deer Management Program**

Deer management is inherently complex due to the variety of biological and social considerations that factor into agency decision-making. The plan provides an overview of deer management in sections that describe deer management values, important trends, agency decision making, funding and staffing for deer management, and deer management activities by DNR program area. The plan also includes supplemental information, included in callout boxes, to address common topics of interest such as deer population modeling and relationships between deer, moose, wolves, and people.

### **VII. Next Steps**

An important next step is to take the direction developed from the goals and objectives and develop implementation strategies to operationalize the plan. While annual and multi-year operational planning will

follow, some near-term (2019 to 2021) strategies and actions identified during Plan development are described in Appendix A.

Although not all of the implementation strategies have been identified, examples of program enhancements and new investments include:

- A plan to increase staffing in support of the big game program with the addition of up to two staff focused on season management, communication, outreach, and social science (e.g., public surveys);
- Additional emphasis on providing accessible information, communicating management decisions, and tracking DNR progress in meeting deer management priorities;
- A focus on local opportunities for dialogue, including scheduled opportunities to meet with area managers at least twice a year to discuss deer management;
- Establishment of a statewide deer input committee;
- Clarification on DNR decision-making timelines;
- A commitment to more frequent deer stakeholder surveys;
- Funds prioritized for deer-related research, including a pilot bowhunter survey, a deer movement project, a deer winter habitat project, and more;
- Funds prioritized to address deer-related damage;
- Identification of priority winter deer habitat; and
- A commitment to spending at least \$16 of revenue from each deer license on management activities that benefit deer and deer hunting.

On an annual basis, DNR will use deer plan direction to inform annual work planning and reporting. Performance measures will be tracked and reported on an annual basis, with a broader mid-plan review scheduled for 2023 to 2024. If performance measures indicate a need or opportunities for deer plan improvement, suggested changes will be communicated, discussed publicly, and incorporated into the plan.

## **VIII. Committee Recommendations**

Over the course of 13 meetings, the Deer Management Plan Advisory Committee discussed numerous potential objectives and strategies; many of which informed and were ultimately incorporated into the plan. In cases where the committee deemed it important to make a collective statement on deer plan content or when there was a substantial range of opinions regarding an issue, the committee used a voting process to indicate committee support. Overall, seven issues were deemed significant enough by the committee to warrant a tally of support (Appendix C). Committee support for four issues resulted in official committee recommendations to (1) prohibit recreational deer feeding to minimize the risk of disease transmission among deer, (2) manage deer in the primary moose range at levels consistent with the Minnesota Moose Research and Management Plan, (3) remove any constraints on the level of population increase or decrease a goal setting team may recommend to DNR, and (4) minimize the risk of spreading chronic wasting disease from captive deer to wild deer through enhanced collaboration with the Board of animal health and pursuit of appropriate legislative measures.

- Due to substantial public interest in deer feeding, DNR is proposing continued work to identify opportunities to assess public support for the committee recommendation.
- The proposal to manage deer in a fashion consistent with moose management affirms DNR's current approach to deer management in primary moose range.

- Goal setting teams may collectively recommend population changes (increase or decrease) above 50 percent.
- DNR will continue to work with the Board of Animal Health and Legislature to minimize the risk of captive deer and wild deer interaction to limit the risk of disease spread.

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## Introduction

The purpose of this deer management plan is to communicate a vision for white-tailed deer management in Minnesota. The plan:

- Outlines strategic direction through deer management values, goals, and objectives that will be used to prioritize agency resources and activities;
- Describes DNR responsibilities and efforts related to deer management; and
- Provides a multi-level structure for engagement with partners and the full public to promote effective deer management.

Development of the plan began in 2016, using a process that involved DNR staff, deer stakeholders, and the public. The process involved information gathering from staff and stakeholders, establishment of a plan advisory committee, public meetings and input, monthly advisory committee meetings, plan development, and public comment.

Overarching direction for this plan is founded in the concept of managing wildlife as a shared resource, reflected in DNR mission statements and state statutes, and provided by a vision statement and guiding principles for deer management in Minnesota. Strategic direction for DNR deer management through 2028 is provided by eight goals and associated objectives, reflecting topic areas discussed by the advisory committee, and the DNR commitment to practice continuous improvement. As a strategic plan, this document does not specifically address many of the operational issues that are commonly raised by members of the public; rather, DNR aims to provide a framework for these conversations on an annual basis over the next 10 years.

In addition to providing direction for deer management over the next 10 years, this plan:

- Addresses the need to more formally communicate a management framework that encourages public engagement and two-way dialogue at multiple scales, and
- Identifies a suite of performance measures, selected to reflect the breadth of goals and deer management values, to help DNR and the public track progress in meeting deer management priorities.

An important next step in this statewide deer planning process is to take the direction developed from the goals and objectives and develop implementation strategies to operationalize the Plan. While annual and multi-year operational planning will follow, some near-term (2019 to 2021) strategies and actions identified during Plan development are described in Appendix A. The DNR will use deer plan direction to inform annual work planning and reporting.

## Purpose and Development of Minnesota's Deer Management Plan

The white-tailed deer (*Odocoileus virginianus*) is Minnesota's most pursued game animal. It is found throughout the state, from the intensively farmed southwest, to the sub-boreal forests of northeastern Minnesota, and in all other Minnesota habitats.

Roughly half a million Minnesota citizens hunt deer each year and countless others enjoy seeing deer. Deer hunting generates nearly \$500 million annually in total economic activity to the state, and the habitats that sustain deer, sustain Minnesota's \$14 billion dollar a year outdoor recreation economy. However, because of their abundance, geographic range extent, and size, deer can also have negative impacts on other natural resource, social, and economic values.

Balancing the numerous and diverse values and interests related to deer requires active management. Finding the right balance is arguably the most challenging aspect of deer management. However, it is necessary in order to maintain populations at levels that provide ample hunting and viewing opportunities, while at the same time minimize the negative effects deer can have on other values.

### Why a deer plan?

Over the past 15 years, the DNR has used a public engagement process to develop deer population goals. Those population goals, coupled with the Wildlife Section's comprehensive wildlife plan, provided direction for deer management. Recently, stakeholders<sup>1</sup> have communicated interest in a comprehensive means to effectively communicate DNR management direction and priorities for deer management. In 2015, DNR committed to developing a deer management plan to better communicate management direction and actions and to provide an opportunity for enhanced public involvement in identifying long-term priorities.

Subsequently, Minnesota's Office of the Legislative Auditor (OLA) conducted an evaluation of DNR's deer population management. The final report affirmed much of the agency's work and supported the DNR's commitment to development of this plan:

*"We found that aspects of the Department of Natural Resources' management of deer populations in recent years were commendable and reflected local stakeholders' interests. However, the department does not have a formal plan that prioritizes DNR resources, goals, and objectives for managing deer statewide."*<sup>2</sup>

The purpose of this plan is to communicate a vision for white-tailed deer management in Minnesota. The plan:

- Outlines strategic direction through deer management values, goals, and objectives that will be used to prioritize agency resources and activities;
- Describes DNR responsibilities and efforts related to deer management; and
- Provides a multi-level structure for engagement with partners and the full public to promote effective deer management.

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<sup>1</sup> Stakeholders are broadly defined as any person or group who will be affected by, or will affect, fish and wildlife or fish and wildlife management. Deer stakeholders include hunters, landowners, land managers, wildlife enthusiasts, farmers, outdoor recreationists, and others. Many people are interested in deer management for multiple reasons.

<sup>2</sup> OLA. 2016. Evaluation Report: Department of Natural Resources: Deer Population Management. Accessed 29 January 2018 at <http://www.auditor.leg.state.mn.us/ped/pedrep/deermanagement.pdf>

As a strategic plan, this document does not specifically address many of the operational issues that are commonly raised by members of the public (e.g., desires for specific regulatory change); rather, DNR aims to provide a framework for these conversations on an annual basis over the next 10 years. During plan development, DNR identified an initial list of implementation strategies. Although not comprehensive, those strategies and near-term priorities are identified in Appendix A as a first step toward plan implementation.

### **Record of the planning process**

Development of the plan began in 2016, using a strategic planning process that involved DNR staff, deer stakeholders, and the public. The planning process involved six key components:

- Information gathering with agency staff and deer stakeholder groups (summer-fall 2016)
- Convening a plan advisory committee (December 2016)
- Public meetings and input period to identify key issues (January-March 2017)
- Monthly Deer Management Plan Advisory Committee meetings and plan development (January 2017-March 2018)
- Final public comment period to gather feedback on a draft plan (March-May 2018)
- Plan finalization (summer 2018)

The Deer Management Plan Advisory Committee (DMPAC) was a temporary committee authorized by DNR Commissioner Tom Landwehr to provide input and make advisory recommendations to the Wildlife Section on the deer management plan. Ultimately, decision-making authority on deer management rests with the Commissioner (Appendix B).

The committee discussed many potential objectives and strategies to include in the plan.<sup>3</sup> Discussion on six of these items was deemed significant enough to warrant a tally of committee support. These “votes” occurred either when the committee deemed it important to make a collective statement on deer plan content or when there was a substantial range of opinions regarding an issue. According to the committee charter, support of 13 or more members (out of 19; revised from 14 of 20 due to one resignation) would be documented as an official committee recommendation. Tallies of support related to the six issues are provided in Appendix C. Additional detail regarding the planning process is available in Appendix D.

### **Mission, Vision and Guiding Principles for Deer Management**

Overarching direction for this plan is founded in the concept of managing wildlife as a shared (i.e., public trust) resource, reflected in DNR mission statements and state statutes, and provided by the following vision statement and guiding principles.

Public trust demands that, we (DNR) as trust managers:

- Account for the values and needs of all Minnesotans, both present and future, and
- Are responsible and accountable for decision making.

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<sup>3</sup> Committee meeting notes and a list of discussion items is available online:  
<https://www.dnr.state.mn.us/mammals/deer/management/planning/committee.html>

## **Minnesota DNR mission**

The mission of the Minnesota Department of Natural Resources is to work with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life.

## **Minnesota DNR Wildlife Section mission**

The mission of the DNR Wildlife Section is to work with the people of Minnesota to conserve and manage wildlife populations and habitats, to provide wildlife-related recreation, and to preserve Minnesota's hunting and trapping heritage.

## **Vision for deer and deer management**

White-tailed deer have intrinsic value, are recognized for their importance to Minnesota, and are sustained on the landscape in perpetuity. The citizens of Minnesota, and especially deer hunters, are strong conservation partners who actively engage with DNR in managing deer for the benefit of Minnesota's natural resources and fellow citizens. Deer management benefits from stakeholder input, is transparent and broadly supported, and adequate funding is available to support priority management activities.

Natural habitats are of sufficient quantity, quality, and spatial distribution to maintain a strong deer hunting tradition throughout Minnesota, with ample opportunity and options for places to recreate on public and private land. Hunter recruitment, retention, and reactivation is sufficient to maintain the role of deer hunting in management and conservation of deer and deer habitat in Minnesota. Minnesota's deer population is in good physical condition and disease-free. The negative impacts from deer are minimized. Citizens have access to a wealth of public lands that offer an array of deer hunting and other recreational activities.

## **Deer management guiding principles**

Deer management practices that are scientifically based, ecologically sound, and socially and economically beneficial to Minnesota citizens, will result in sustainable deer populations that support robust recreational hunting. Deer management decisions must take into account both biological and social dimensions; therefore, a strong emphasis on biological and social sciences is critical to management success. A continuous improvement framework, using the best available information and recognition of uncertainty at all levels of the system, will be used to inform management decisions. Management strategies implemented for white-tailed deer will contribute to the overall sustainability of Minnesota's landscapes, natural systems, and economy, and deer hunting will continue to be the primary tool used to manage deer populations.

## **Deer Management Values**

Values are a statement of what people care about; they provide the basis for making judgements about whether something is better or worse than something else. It is important to identify values because they compel us to make decisions and take action. One expression of values is to specify the thing we care about and, in general, whether we want more (+) or less (-) of it. When managing for multiple values, it becomes apparent that management for one value may require tradeoffs for another.

Based on input gathered during the planning process regarding potential goals, opportunities, and challenges related to deer management in Minnesota, the following fundamental values and the main components of each were identified. Management of deer in Minnesota will aim to reflect all of these values.

We want to promote (+):	We want to limit (-):
 <p><b>Deer populations</b></p> <ul style="list-style-type: none"> <li>• Health</li> <li>• Abundance</li> </ul> <p><b>Deer-related recreation</b></p> <ul style="list-style-type: none"> <li>• Deer hunting heritage</li> <li>• Public access to land</li> <li>• Economy related to deer-based recreation</li> </ul> <p><b>DNR accountability to the public</b></p> <ul style="list-style-type: none"> <li>• Soundness of DNR decision making processes</li> <li>• Transparency</li> <li>• Integrity in collection and use of funds for deer management</li> </ul>	 <p><b>Negative ecological effects of deer</b></p> <ul style="list-style-type: none"> <li>• Damage to native plant communities</li> <li>• Wildlife disease transmission (e.g., brain worm impacts on moose)</li> <li>• Public health risk</li> </ul> <p><b>Socioeconomic costs related to deer</b></p> <ul style="list-style-type: none"> <li>• Costs of DNR, county, and city deer management activities</li> <li>• Deer damage to agricultural crops, forest regeneration, and private landscaping</li> <li>• Human injury and other costs resulting from car collisions with deer</li> <li>• Urban deer conflicts</li> </ul>

## 2019 to 2028 Direction: Goals and Objectives

Strategic direction for DNR deer management through 2028 is provided by the goals and objectives summarized below. The first seven goals (A-G) are a reflection of topic areas discussed by the committee during 2017 and were recommended by that committee as the organizational structure within which to frame objectives; in particular, concerns about the potential impact of chronic wasting disease on the health of the wild deer population received substantial committee attention and is suggested as a high priority for management. The eighth goal (H) reflects a DNR priority to practice continuous improvement.

An important next step in this statewide deer planning process is to take the direction developed from the goals and objectives below and develop implementation strategies to operationalize the plan. Although annual and multi-year operational planning will follow completion of this strategic plan, some near-term strategies and actions are described in Appendix A. Strategies listed describe a starting point for implementation and are not comprehensive.

### **Goal A: COMMUNICATION, INFORMATION SHARING, AND PUBLIC INVOLVEMENT: Foster trusting, respectful, and effective two-way communication between DNR and the public regarding deer management.**

Objective A.1 – Ensure deer management decisions consider public values, preferences, and concerns, and that input opportunities are transparent, inclusive, and responsive.

Objective A.2 – Provide relevant, timely, and accessible information about deer management.

Objective A.3 – Build upon and promote public engagement through communication and input opportunities at local, regional, and statewide levels.

Objective A.4 – Establish an ongoing, statewide deer input group, reflecting regional differences and the range of deer management interests, to enhance two-way dialogue with stakeholders on specific deer management topics.

Objective A.5 – Enhance local relationships through formal and informal discussion with area wildlife managers, including scheduled opportunities prior to annual season setting and prior to the deer hunting season.

Objective A.6 – Use an input process to identify public recommendations for deer population goals in individual DPAs, including the opportunity for goal-setting teams to collectively recommend population changes (increase or decrease) exceeding 50 percent.

**Goal B: DEER STAKEHOLDER SATISFACTION: Consider social dimensions of deer management decisions.**

Objective B.1 – Build and maintain broad support of deer stakeholders for DNR deer management.

Objective B.2 – Improve the DNR’s knowledge of factors that shape public satisfaction rates (e.g., through regular stakeholder attitude surveys).

Objective B.3 – Encourage new participation that builds upon Minnesota’s strong deer hunting traditions.

**Goal C: POPULATION MANAGEMENT, MONITORING, AND RESEARCH: Manage deer adaptively, considering both biological and social information in decision-making.**

Objective C.1 – Collect biological and social data to inform deer population goals and management.

Objective C.2 – Establish annual hunting seasons to meet deer population and management goals, including a harvest target of 200,000 deer harvested per year as a secondary check on performance in meeting population goals.

Objective C.3 – Monitor, evaluate, and adjust management as necessary to meet deer population goals.

Objective C.4 – Manage deer in the primary moose range at levels that are consistent with the DNR Minnesota Moose Research and Management Plan.

**Goal D: HEALTHY DEER: Support deer herd health by monitoring and addressing disease.**

Objective D.1 – Minimize, to the extent possible, the risk of new introductions of chronic wasting disease (CWD) to wild deer and strive to eliminate CWD in Minnesota’s wild deer population. This includes collaboration with the Board of Animal Health to limit the risk of disease spread from captive to wild deer.

Objective D.2 – Minimize, to the extent possible, the introduction, spread, and impact of other diseases that affect deer in Minnesota.

Objective D.3 – Work with the statewide deer input group to assess public support for the Deer Management Plan Advisory Committee recommendation to prohibit recreational deer, elk, and moose feeding statewide.

**Goal E: HEALTHY HABITAT: Maintain natural wildlife habitat by protecting<sup>4</sup>, enhancing, and restoring habitat and by managing for an appropriate number of deer.**

Objective E.1 – Increase the amount and quality of wildlife habitat in farmland regions.

Objective E.2 – Increase the quality, and amount where needed, of wildlife habitat in the forested regions.

Objective E.3 – Increase access to private land for deer population management and provide direction for landowners seeking conservation programs and technical advice to improve wildlife habitat quality on private land.

**Goal F: IMPACT OF DEER ON OTHER RESOURCES: Reduce negative impacts of deer to the land; resources; and other species, including people.**

Objective F.1 – Provide tools and technical assistance to mitigate deer depredation and urban deer problems.

Objective F.2 – Provide additional harvest opportunities in areas of localized, high deer densities.

Objective F.3 – Consider impacts to other wildlife, their habitat, and other socioeconomic resources when making decisions about deer and deer management.

Objective F.4 – In partnership with the Minnesota Departments of Health and Public Safety, share available information and resources that communicate deer impacts on public health.

**Goal G: DEER MANAGEMENT FUNDING: Seek sufficient funding and promote cost-effective deer management.**

Objective G.1 – Work to sustain and broaden the funding sources that support deer research and management.

Objective G.2 – Prioritize funding for deer research and management activities, taking into account the diversity of stakeholder interests, to provide long-term social, ecological, and economic benefits.

Objective G.3 – Commit to spending at least \$16 of revenue from each deer license on management activities that benefit deer and deer hunting, including habitat management and deer-related research.

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<sup>4</sup> WMA and AMA Acquisition & Management Strategic Plan (in preparation)  
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**Goal H: DNR DEER MANAGEMENT: Practice and ensure continuous improvement within DNR’s deer management program and supporting activities.**

Objective H.1 – Monitor and evaluate deer management program based on identified performance measures; propose changes to enhance performance as needed.

Objective H.2 – Increase DNR staffing in support of the big game program to advance plan objectives, with an emphasis on communication and social science needs.

**Performance Measures**

Performance measures are one form of quantitative metric. Minnesota DNR uses quantitative metrics for various purposes. For example, some metrics are collected and reviewed on an annual basis to inform annual harvest decisions, some are collected for only a few years or in a specific location to answer research or management questions, and some are collected over the course of multiple years to track trends or progress in meeting goals. All of these metrics support, in some fashion, adaptive and responsive management and continuous improvement.

Performance measures are primarily used to demonstrate transparency and accountability and can also inform management decisions. For example, performance measures are used in the context of DNR’s 10-year strategic plan<sup>5</sup> to communicate and track progress on management priorities. The specific performance measures listed below were selected to reflect the full scope of goals (Table 1) in this deer management plan as well as the stated deer management values. Performance measures will be used to help DNR and the public track progress in meeting deer management priorities.

**Table 1. Minnesota White-tailed Deer Plan Performance Measures**

Performance measures by goal area	
<p><b>Communication/Engagement</b></p> <ul style="list-style-type: none"> <li>Engagement opportunities</li> <li>Information timeliness</li> </ul> <p><b>Stakeholder satisfaction</b></p> <ul style="list-style-type: none"> <li>Index of public perceptions</li> <li>Public land access</li> <li>Private land access</li> </ul> <p><b>Population management</b></p> <ul style="list-style-type: none"> <li>Permit areas in goal range</li> <li>Deer harvest</li> </ul> <p><b>Healthy deer</b></p> <ul style="list-style-type: none"> <li>CWD surveillance success</li> <li>Size of CWD(+) core areas</li> </ul>	<p><b>Healthy habitat</b></p> <ul style="list-style-type: none"> <li>Deer habitat enhancement</li> </ul> <p><b>Impact on other resources</b></p> <ul style="list-style-type: none"> <li>Deer damage complaints</li> <li>Deer damage work completed</li> <li>Special hunt requests satisfied</li> </ul> <p><b>Deer management funding</b></p> <ul style="list-style-type: none"> <li>Spending on deer management/research</li> <li>Spending on deer disease management</li> </ul>

<sup>5</sup> [https://webapps8.dnr.state.mn.us/outcomes\\_reporting/conservation\\_agenda/](https://webapps8.dnr.state.mn.us/outcomes_reporting/conservation_agenda/)

The majority of performance measures identified below include a target that indicates a level of performance consistent with meeting plan priorities; however, targets are not applicable for spending-related performance measures (i.e., sufficient funding is needed to meet management objectives but should be used efficiently and as necessary). DNR will report on spending-related performance measures for transparency and accountability.

### **Performance measures and targets**

**Spending on deer management and research:** The money DNR spends on personnel time and projects related to deer management and research.

- Target: Not applicable

**Engagement opportunities:** Number of scheduled opportunities for in-person contact with deer stakeholders, including public meetings, presentations to public or stakeholder groups, and attendance of DNR wildlife staff at community events and meetings hosted by deer stakeholders where stakeholders have an opportunity for two-way dialogue.

- Target: Increase by 25 percent from 2019 to 2024

**Timeliness of information about deer season decisions:** Date when the DNR publicly communicates general population management direction by Deer Permit Area (DPA).

- Target: Annually before June 1

**Deer Permit Areas in goal range<sup>6</sup>:** Percentage of DPAs within goal range.

- Target: Greater than or equal to 75 percent

**Deer harvest:** Number of deer harvested by hunters.

- Target: 200,000 deer per year

**Deer habitat management:** DNR habitat enhancement activities that benefit deer on Wildlife Management Areas (WMAs).<sup>7</sup>

- Target: 100,000 acres per year

**Public land access for deer-related recreation:** Annual change in WMA acreage.

- Target: 6,000 additional acres per year

**Private land access for public hunting:** Number of private land acres enrolled in the Walk-in Access (WIA) program.

- Target: Increase WIA enrollment to 30,000 acres

**Deer damage complaints reported to wildlife damage program:** Number of deer-related animal damage complaints (Wildlife Complaint Inquiry Logs, WCILs).

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<sup>6</sup> This is also a performance measure for DNR's Conservation Agenda.

<sup>7</sup> Forest, grassland, and brushland management but excluding wetland enhancement. Annual acres harvested on state forests by cover type is not currently reported; however, forest management on many of these acres benefits deer. If a consistent means to report habitat enhancement benefitting deer across all state lands becomes available, DNR will refine this measure.

- Target: Less than 150 complaints per year

**Deer damage work completed:** Percentage of deer-related WCILs addressed, and plans for resolution developed, within a year of being filed.

- Target: 100 percent

**Special hunts:** Percent of special hunt requests (e.g., city or park hunts to address over-abundant deer) satisfied.

- Target: 100 percent

**Spending on deer disease management:** The money DNR spends on disease surveillance and management.

- Target: Not applicable

**CWD surveillance success<sup>8</sup>:** Percent of target samples attained per year.

- Target: 100 percent

**Size of CWD-positive core areas<sup>9</sup>:** Area of zones designated as CWD core areas with detections of CWD-positive deer in the free-ranging herd.

- Target: 0 square miles

**Adherence to public trust governance principals related to DNR deer management:** Aggregate index related to the public perceptions of DNR deer management (including soundness of decisions, transparency, engagement, and fiscal integrity).

- Target: Greater than 3.5 (1 to 5 scale)

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<sup>8</sup> Number of CWD samples is a Conservation Agenda performance measure.

<sup>9</sup> Target attainment will require increased hunter and landowner support for DNR CWD response.

**There has been a lot of discussion about a harvest target. How was it developed and how will it be used?**

Deer harvest is a tool used to meet deer population goals. As a result, harvest will naturally fluctuate over time as regulations are set to move the population toward goal. Additionally, harvest may fluctuate annually due to factors such as hunting season conditions and hunter pressure.

In response to interest expressed by some stakeholders, DNR will include annual deer harvest as one of multiple performance measures and will use it as a secondary check on performance in meeting population goals.

Over the timeframe of the plan, DNR will compare the annual harvest to a target of 200,000 deer harvested per year. This value was informed based on:

- Harvests observed when the statewide population was at a desired level and harvest was regulated to generally maintain stable populations ([committee summary](#)) and
- The diversity of values discussed by DMPAC (Appendix C).

In general, when annual harvest is below 200,000, it will indicate a need for conservative regulations that allow deer populations to increase, such that the harvest target can be achieved in the future. Similarly, when the annual harvest is above 200,000 deer, DNR will liberalize regulations to decrease deer populations, so subsequent harvests will be closer to the target. As an example, annual harvests may exceed 200,000 for a couple of years in a row in order to lower the population toward DPA goals consistent with the harvest target. We anticipate there will be times when management for local DPA goals and a statewide harvest target conflict with each other. When conflicts occur, DNR will prioritize management to meet publicly established population goals. At the mid-point of the plan, DNR will review all performance measures to assess whether changes are needed.

**Governance principles: Understanding public perceptions of DNR.**

The DNR measures public perceptions primarily by asking a suite of questions on human dimensions surveys of deer hunters and landowners. These questions measure “trust”, which can be broadly defined as willingness of the public to rely on those with formal responsibility for decision making and other actions related to management. Interestingly, previous deer hunter surveys indicated that only a small percentage of respondents personally know the decision-makers; thus, trust evaluations occur without personal knowledge of the individual making the decision. More often, these evaluations are based on perceptions about the agency as a whole.

DNR started asking deer hunters (in 2005) and landowners (in 2013) six questions related to agency trust on human dimensions surveys. In all cases, questions are organized on a five-point scale that ranges from “1 – strongly disagree” to “5 – strongly agree”, with “neutral” represented as a 3. These trust questions address the following,

- DNR does a good job managing deer in Minnesota
- DNR is open and honest about decision-making
- DNR can be trusted to make decisions that are good for the resources
- DNR makes fair decisions
- DNR has managers and biologists that are well-trained
- DNR listens to hunter concerns

In the mid-2000s when deer populations were at their peak, average trust metrics for the 6 questions hovered around 3.5 (out of 5), with “listening to hunters” ranked the lowest (3.4) and “well-trained biologists” the highest (3.6). As deer populations declined in the early 2010s, so did the trust metrics. For example, during the 2014-2016 surveys of deer hunters related to population goal setting, averages were slightly below 3 for 5 of the 6 questions; “Hiring well-trained biologists” is the one metric consistently reported above the mid-point. What this means is deer hunter evaluations of agency trust are influenced by factors such as perceptions of deer population size and overall hunt satisfaction. Consequently, DNR is mindful of the upper limits of how a person may evaluate trust in the agency. Any value at 3.5 or above would represent perceptions of agency trust at their highest recorded levels.

## **Are We Missing Some Metrics?**

### **Future Metrics**

There are some metrics DNR would like to incorporate into deer management but more work is needed to identify either, (1) a dataset that would provide useful information for the scale at which we make management decisions or (2) a cost-effective means to acquire the information. A good example is information on deer browse impacts to native vegetation. Some states have reported information from the United States Department of Agriculture Forest Inventory and Assessment (FIA) program. However, the FIA dataset was not designed to capture and document browse impacts on tree species regeneration for the purposes of deer population management; data on important ground-level plants are limited, and the number of plots for every deer permit area requires considerable caution in trend interpretation. Similarly, DNR does not currently have a monitoring system that collects this information at a scale relevant to deer management. For example, DNR forest inventory data are updated on a 15-to-20 year timeframe and are not spatially distributed in a manner that would provide useful information for deer management. However, deer impacts on native vegetation and associated wildlife habitat are important to DNR and we are committed to exploring monitoring options, including an ecological monitoring network currently being tested by DNR (i.e., Statewide Monitoring Network for Changing Habitats in Minnesota - <https://www.lccmr.leg.mn/projects/2016-index.html#201603d>) and a citizen science program under development through the University of Minnesota Extension (i.e., Assessing Vegetation Impacts from Deer - <http://avid.umn.edu/>).

## **Are We Missing Some Metrics?**

### **Stakeholder-desired Metrics**

There are other metrics that are of interest to many, or a portion, of our deer stakeholders but are not informative for management decisions at the level of state agency management. For example,

**Physical condition scoring:** Some stakeholders have communicated interest in DNR collection of physical condition indices, such as body weight and kidney fat, with an interest in correlating their relationship to deer densities and habitat condition. Unfortunately, the utility of this information is limited by the scale at which it can be used (e.g., it only applies to where the data were collected) and is confounded by factors such as timing of data collection, local habitat conditions, and recreational feeding. It is important to note that:

- Some states age, weigh, and collect other data on deer for informational purposes only. Others use youth or special seasons or deer management assistance programs to evaluate deer physical condition for participating landowners. These programs are typically associated with localized deer management that is focused on increased antlerless harvest.
- Kidney fat indices have been used as determinants of deer “health,” most often in controlled environments like a hunt club. In theory, deer with higher kidney fat indices are in better habitat and in better physical condition. In reality, there are many factors that influence body fat (e.g., sex, age, season, geographic scale, artificial feeding); a significant amount of data would need to be collected over a rather long period of time to detect a signal relevant for deer management.
- In Minnesota, deer are managed across a wide and diverse geographic area and physical condition would be difficult to incorporate into population management decisions. Recognizing that only a sample of harvested deer are registered in person (most are registered by phone or online), weighing deer or collecting organs for fat deposition could yield misleading information for management purposes.

**Antler measurements:** DNR has measured antlers when evaluating regulatory changes that would influence buck age structure; however, unless these data are part of a larger project with defined research and management questions, the information would have limited utility at the level DNR manages deer populations. In addition, antler point restriction regulations are currently prohibited outside of 300-series permit areas. A statutory change and substantial public support are necessary before DNR would collect this type of data to alter regulations that influence buck age structure.

**Pregnancy rates:** Research in Minnesota and other Midwestern states has consistently shown that the majority of breeding age females get pregnant and give birth to twin fawns. The management value of additional statewide data collection is unclear.

Unless the above metrics are associated with a specific research project (e.g., evaluation of a potential regulatory change), this type of data collection will not be a DNR priority for management. If there are organizations or groups of individuals interested in collecting the data, the DNR can support those efforts through consultation on monitoring protocols and statistically-valid methods for data collection.

## Important Trends and Challenges

As noted in Minnesota's Conservation Agenda<sup>10</sup>, several trends - if not reversed - have the potential to limit success in accomplishing natural resource management goals in Minnesota. For example, participation in outdoor recreation is changing; Minnesota's population is urbanizing, diversifying, and aging; and leisure activities are diversifying while time dedicated to leisure is declining. In general, younger Minnesotans have a different relationship with the outdoors than that held by previous generations. Nationally, hunting and fishing participation is declining, wildlife values are changing, and agencies are seeking ways to be more relevant to the full public.

Overall, from 2000 to 2015, the percent of Minnesotans purchasing a resident hunting license declined by more than 15 percent, with much of the decline occurring among residents under the age of 44. The take away is that Minnesota's hunters are aging without adequate replacement from younger generations. Although the number of Minnesotans purchasing a deer license has not declined as much as in other states, the proportion of Minnesotans who hunt is declining. From 2000 to 2015, the percentage of Minnesotans purchasing a deer license declined by 15 percent and the percentage under the age of 44 who purchased a deer license decreased by 19 percent.

As the public agency responsible for management of game species, the DNR's Fish and Wildlife Division (FAW) is highly dependent on hunting participation. First, a substantial portion of management activities are supported by license dollars. Second, hunters and hunting organizations are important partners who dedicate significant resources to management activities, from habitat acquisition and enhancement to public advocacy in support of natural resources. In the case of deer management, deer hunting is also critical for population management. Reductions in hunter numbers not only compromise our ability to manage deer across the landscape, it could reduce support for management overall or require a smaller proportion of Minnesotans to fund wildlife management activities. Over time, Minnesota has developed programs that broaden the base of funding beyond license dollars (e.g., lottery support for the Environment and Natural Resources Trust Fund and the 2008 Clean Water, Land, and Legacy Amendment that dedicated a portion of sales tax to habitat protection, restoration, and enhancement); however, the disproportionate reliance on hunting license fees is increasingly inadequate to meet the breadth of wildlife and habitat management needs.

The increasing prevalence of chronic wasting disease (CWD) in North America, in wild cervids<sup>11</sup> as well as in farmed animals, presents a greater risk to the health of wild deer in Minnesota. New detections of CWD on deer farms across the state in 2017, increasing infection rates in surrounding states, and a potential geographic expansion of the disease among wild deer in southeast Minnesota all present a greater burden on Minnesota hunters and on DNR resources to limit the spread through active management.

Although the state of Minnesota has a substantial amount of natural habitat, competition for other uses continues to reduce the availability and quality of habitat on the landscape. In Minnesota's farmland, most of which is under private ownership, participation in programs that maintain habitat (e.g., Conservation Reserve Program) is waning. In more forested portions of the state, natural habitat continues to be converted and fragmented as land is developed for other uses. These changes not only reduce the habitat available for wildlife

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<sup>10</sup> <http://files.dnr.state.mn.us/aboutdnr/reports/conservationagenda/ca-full.pdf>

<sup>11</sup> Cervids are members of the deer family, including white-tailed deer, elk, and moose.

but also present challenges for the public and land managers as access to land becomes more limited for recreation and management.

The social, economic, and environmental changes described above provide a sampling of trends that deserve attention and could impact the agency's ability to meet goals for deer management in the near term as well as in the long run. Minnesota DNR is committed to working with all Minnesotans to support sustainable deer and natural resource management into the future.

## Deer Management Decisions

### Managing wildlife as a public trust resource

Deer management is inherently complex; it must annually take into account both biological (e.g., estimated population size, winter severity) and social (e.g., deer population goals, regulatory preferences) dimensions. Consequently, DNR uses a management framework whereby annual decisions are made using the best available information, realizing there is uncertainty at all levels of the system. By striving to use the best available data and processes, DNR staff use continuous improvement methodologies to make decisions. To make a good decision and account for needed information, we frequently ask the questions, "What is the problem," "Why is it happening," "How can we fix it," and "Did we achieve our goals?" These are important questions to ask as potential management actions are considered, assessed, implemented, and evaluated.

The consideration of stakeholder desires, along with guidance described in the *Mission, Vision and Guiding Principles* section above, provides direction and helps define what we want to achieve. Input and consultation on deer management also includes consideration of tribal interests and this is different than stakeholder input (Appendix B). Competing interests - and finding the most appropriate trade-offs and compromises - often make decisions difficult. While it is unlikely that all deer stakeholders will be satisfied with any particular decision or action DNR takes, it is important to consider and represent the range of interests in order to manage deer in a fashion that provides benefits to all over the long term.

DNR decisions about deer and how they are managed are made using a structured approach that incorporates both the biological and social sciences. To help make the best decisions, DNR uses science to inform a range of alternative management actions. Scientifically valid methods produce reliable, evidence-based information about how ecological and sociological systems work. Models of those systems, whether conceptual or mathematical, are essential for making predictions. The inherent uncertainty about the predicted outcomes can also make decisions difficult.

Deer stakeholders (both individuals and organized groups) and DNR staff, understandably, have different roles in informing decisions about public trust resources, like deer. In the language of "Public Trust" thinking, DNR staff are the "trust managers" and the public (current and future generations) are the "beneficiaries." This is analogous to a retirement fund manager making decisions in their client's best interest. DNR staff are required to have the technical expertise to implement the best practices related to the scientific and process components of decision making. Stakeholders, however, are essential to express the diversity of interests (and preferences) that exist about deer management. Though all final decisions made by DNR are statutorily required to rest with the commissioner, DNR is committed to incorporating public values into decision making. Active and productive

engagement between DNR staff and stakeholders is critical to making decisions that are well-supported and most likely to achieve the stated objectives.

**A commitment to publicly-informed management**

Minnesota DNR is committed to socially and ecologically responsive and responsible deer management for the benefit of Minnesotans now and into the future. The FAW Division uses a range of public engagement activities, each customized for the scope and nature of the decision or issue at hand. These activities may include soliciting public comment, holding public meetings, convening citizen advisory teams, hosting roundtable events, holding focus groups, or other methods.

Although the DNR has demonstrated a commitment to processes that provide an opportunity for stakeholders to influence deer management decisions across a range of temporal and spatial scales, (Table 2), this plan addresses the need to more formally communicate a management framework that encourages public engagement and two-way dialogue at multiple spatial and temporal scales (Figure 1).

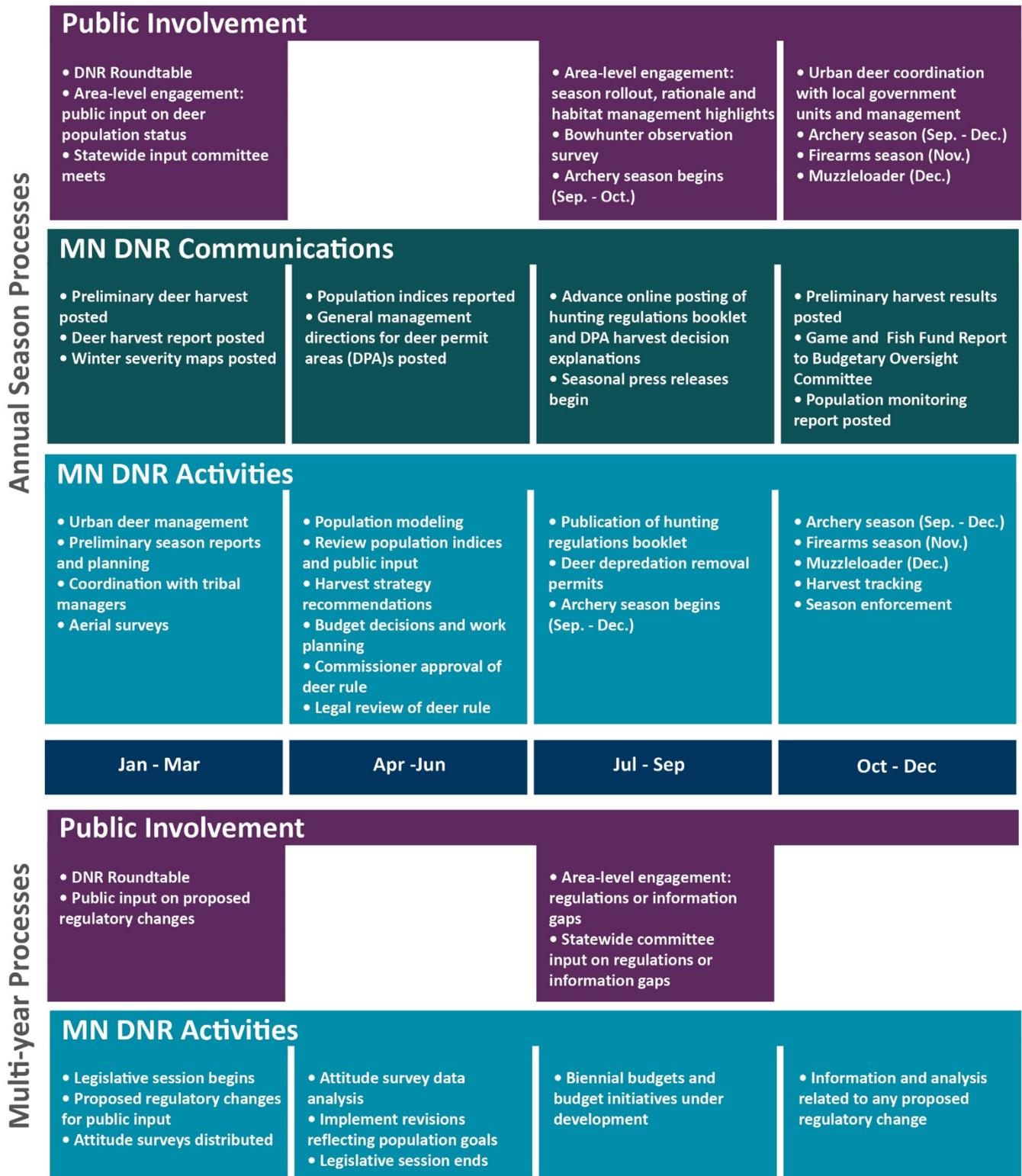
New DNR commitments in support of public engagement include a plan to increase staffing in support of the big game program with the addition of up to two staff focused on season management, communication, outreach, and social science (e.g., public surveys); additional emphasis on providing accessible information and communicating management decisions; a focus on local opportunities for dialogue, including scheduled opportunities to meet with area managers at least twice a year to discuss deer management; establishment of a statewide deer input committee; and clarification on DNR decision-making timelines.

**Table 2. Existing structures for deer-related outreach and public engagement**

Frequency	Spatial scale	Activity	Example	Accessibility
Day-to-day	Local-statewide	Informal contacts between stakeholders and staff	Field contact, phone, email, mail, office visits	All
Frequent/Irregular	Local-statewide	Staff attendance at/presentation to organizational, governmental and business meetings	Invitations to attend sportsmen’s club meetings  Outreach at agricultural conferences  Private landowner workshops  Outreach to non-traditional stakeholder groups (e.g., Southeast Asian communities)	Varies
Annual (January)	Statewide	1 day meeting	MN DNR Roundtable	By invite – diverse and representative audience

Frequency	Spatial scale	Activity	Example	Accessibility
Annual (February)	Regional-statewide	Public input process – focus on season management regulations	Public meetings, online, surveys, mail or phone comment	All
Annual (June)	Regional	Public review of proposed forest management	Annual stand exam comment	All
Annual (August)	Statewide	Staff presence at community fairs	Minnesota State Fair, county fairs  Game Fair  Farm Fest	All
Annual (November)	Regional-statewide	1.5 day gathering with deer hunting emphasis	Governor’s Deer Hunting Opener	All (with payment)
Annual (dependent on year, conditions)	Area-statewide	Disease surveillance	Check station availability for sampling	All
As needed/ Irregular	Local, WMA level	Habitat/land management comments	Online comment: WMA condition	All
As needed/ Irregular	Area-statewide	Issue-based public meetings/input opportunities	E.g., APR evaluation and implementation in SE MN	All
As needed/ Irregular	Area-statewide	Emerging issue/mgmt. action public meeting/info session	E.g., CWD surveillance/response in S. MN	All
Multi-year	Area-statewide	Strategic management direction	Population goal setting  Deer management plan  Section Forest Management Plan (SFRMP) review	All (varying involvement)

Figure 1. Deer Management Timeline with Enhanced Communication and Engagement



### Setting deer population goals

Since 2005, DNR has used a participatory public process to establish deer population goals for every DPA. Previous to that effort, deer population goals were established at the local level by area wildlife managers; similar information was considered and public input, while informal, was incorporated into decisions. The goal-setting process was specifically designed to enable public participation from a broad spectrum of interested stakeholders in a consistent manner, statewide. Although the process has been modified over time as DNR identifies opportunities for improvement, the general framework has included consideration of background information pertinent to the DPA, public information and input, online questionnaires or statistically valid surveys, public meetings, and discussions with a group of individuals selected to represent the range of deer stakeholders. An overview of the most recent process can be found in the Office of the Legislative Auditor’s Deer Population Management Evaluation report.<sup>12</sup>

The deer population goal-setting process emphasizes collecting broad public input through public comment periods and public meetings, and by convening citizen advisory teams that make recommendations to DNR on deer population goals. During this process, DNR seeks to engage a wide range of public interests in deer management, including hunting, recreation, farming, forestry, public health, and safety. By bringing in such diverse interests, the DNR is better positioned to identify deer population goals that are both ecologically sustainable and socially acceptable.

Once the deer management plan is completed, DNR will re-initiate deer population goal setting in Minnesota. For the public process, DNR aggregates the 128 deer permit areas into regional, goal-setting blocks. Approximately four years will be needed to complete the goal-setting process statewide, based on the timeline described for each goal-setting block (Table 3). The goal setting process is anticipated to begin again in January of 2019, with the distribution of hunter and landowner surveys. DNR anticipates completion of goal setting by 2024. Goals will be established for a 10-year time period, with a mid-point evaluation to begin in 2025.

**Table 3. Deer population goal-setting timeline (16 months).**

Months	DNR activities	Public engagement	
		Advisory groups	General public
January	Hunter and landowner mail surveys		Public Input - Online Questionnaire
February			
March			
April	Compile background data		
May			
June			
July			
August			
September			
October	Review, select, announce		

<sup>12</sup> OLA 2016, pages 23-26

Months	DNR activities	Public engagement	
		Advisory groups	General public
November	teams		
December	provide/post background info	Advisory team meeting 1	
January	Public Meetings – Staff, teams, public		
February	Advisory team meeting 2 and recommendations		
March	Posting recommendations for public comment		Public Comment – Online Questionnaire
April	Public comment review, DNR decision and incorporation into Season-Setting		

## Funding and Staffing to Support Deer Management

The FAW Division is funded primarily through fees collected from license buyers. These fees are leveraged against Federal Aid reimbursements through the Pittman-Robertson Act<sup>13</sup>. In fiscal year 2017, Section of Wildlife expenditures, excluding special funding (e.g., bonding, partnerships, income agreements, other grants), totaled \$36.6 million. This funding is used directly to manage Minnesota’s wildlife resources, including (but not limited to) WMA acquisition, enhancement, and maintenance; wildlife populations and season setting; wildlife research, monitoring, and surveys; technical guidance, planning, and coordination; and public outreach and engagement. The Wildlife Section also competes for supplemental funding through Minnesota’s Legacy Amendment Outdoor Heritage Fund (OHF) and the Environment and Natural Resources Trust Fund (ENRTF). When acquired, these funds are used for specific projects as identified in the respective grant and supplement the Wildlife Section’s work.

Fully staffed, the Wildlife Section has approximately 255 full-time employees (including 28 OHF-funded positions) and a varying number of seasonal and temporary employees as needed. Currently, the Wildlife Section has approximately 40 staff vacancies but this number will fluctuate according to funding and staffing needs (Table 4).

**Table 4. Current Staffing for the Section of Wildlife; FAW Policy, Planning and Engagement Program, and FAW Outreach Section**

	Full Time Equivalents (FTEs)	% Fully Staffed	Vacancies
<b>Wildlife Section</b>			
Field Staff - Regions and Areas	121.7	81%	27.5
Habitat Program	24 .0	90%	2.8
Operations Program	38.8	95%	2.0
Population Management Program	3.0	60%	2.0
Research Program	26.5	84%	5.0
<b>FAW Division</b>			

<sup>13</sup> <https://www.fws.gov/laws/lawsdigest/fawild.html>

Policy, Planning & Engagement	2.0	67%	1.0
Outreach Section	14.0	88%	2.0

As of Fiscal Year 2017, approximately \$18 million is generated annually from the sale of deer hunting licenses (~600,000 hunters X \$30/license). Four dollars from each license sold is deposited into four dedicated accounts (Deer Management Account, \$2.00; Deer and Bear Management Account, \$1.00; Wild Cervid Health and Emergency Deer Feeding Account, \$0.50; and the Wolf Management Account, \$0.50) whose spending is statutorily determined, \$3.50 of which is spent directly on deer related activities. The remaining \$26 from each license, or approximately \$15.6 million annually, is deposited into the Game and Fish Fund where it is appropriated by the legislature and can be spent by the DNR for game and fish management, and for related activities under the administration of the DNR commissioner with some level of discretion. In 2017, expenditures on activities that benefit deer and deer hunters included \$2.1 million from the dedicated funds (excluding the Wolf Management Account) plus an additional \$16.2 million from the Game and Fish Fund. Therefore, total expenditures were \$18.3 million, roughly equivalent to 102% of deer license revenue.

In 2017, the Minnesota Legislature approved a \$4 increase in the cost of a deer license beginning in August 2018. This increase was requested to keep the Game and Fish Fund solvent through 2021. The recent deer license fee increase by itself does not increase the available budget to the Section of Wildlife until and unless the legislature appropriates additional dollars to the Wildlife Section.

## Deer Management Program - Activities

Deer management in Minnesota occurs at various scales. Most harvest-related laws, rules, and regulations are applied statewide (e.g., firearm deer season starts the Saturday closest to November 6) and by DPA (e.g., implementation of a lottery or hunter choice strategy). Minnesota DNR also reports annual harvests, by season, at the DPA and statewide levels. However, few management decisions are made at this broad level due to differences in land use, climate, topography, habitat, human population, hunter densities, deer densities, and social preferences throughout the state.

Differences in deer populations and management can also be interpreted and understood according to ecological landscape features. Minnesota DNR uses the Ecological Classification System (ECS) that separates the state into progressively smaller and similar landscape units based upon biotic and environmental factors (e.g., climate, soils, and vegetation). Habitat management activities, which influence deer densities, are implemented on a smaller scale based on more local landscape features and plans.

Deer population management decisions and strategies are implemented at regional and local scales that reflect both ecological and administrative boundaries. For example, the length of Minnesota’s firearm deer hunting season varies statewide by zone as a result of factors including differences in deer vulnerability related to habitat type, hunting pressure, and land ownership. In general, the finest scale at which populations can be reasonably estimated and monitored is at the DPA level; this is one reason deer population management is implemented by DPA.

Management activities are organized by DNR program area: an operational program, including regional and area staff; a research program; a population management program; and a habitat program. For the purposes of briefly describing deer management activities, management actions have been summarized topically below. In

the following sections, you will find sidebars, or “notes about,” that speak to common topics of interest for deer stakeholders. These additional notes are intended as a supplement to the plan content.

### **Population monitoring and research**

Minnesota DNR invests significant resources in the areas of deer research, monitoring, and population modeling. Much of that work is published in peer-reviewed literature, agency publications, and other documents. Historically, research projects have been generated through internal committees and are designed to answer specific, management-related questions. Those findings typically inform deer management, habitat protection, and potential regulatory alternatives. The nature and scope of these projects has varied through time; however, the DNR has always supported ongoing deer research in Minnesota.

At the DPA level, DNR primarily uses harvest data and a population model to track changes in deer abundance with a focus on estimating whether populations are increasing, stable, or decreasing. Where possible, staff include tribal harvest data in the calculation of indices and model estimates to monitor changes in the deer population. It is important to recognize that modeling is just one of several tools the DNR uses to help inform final decisions. The agency uses a combination of population indices (e.g., buck harvest and harvest success rates) and population estimation (i.e., population modeling) to assess population trends. Staff have higher confidence about population trends when multiple indices are in alignment. Staff and public observations are also compared to inferences from the data and can be particularly helpful when indices are suggesting contrary trends. Minnesota DNR also periodically uses independent surveys (e.g., aerial population surveys when snow conditions are adequate) to validate or recalibrate models. The recent evaluation of the deer population management program (OLA 2016) identified recommendations for DNR population monitoring and staff have been working to address many of the suggestions. Implementing those recommendations is already underway and will aid in population monitoring. Research and monitoring projects that have been developed since the audit report are noted Appendix A.

#### **A NOTE ABOUT POPULATION MODELING**

No population model can estimate or predict with 100 percent certainty the exact number of deer on the landscape at any given point in time. It is not possible due to uncertainty associated with harvest reporting and vital rates (e.g., annual productivity and survival). Vital rates vary naturally across space and time, and there is always some sampling uncertainty associated with estimates collected in a particular location and time period. Winter mortality of deer provides a good example of this point. We cannot know exactly how many deer die in a particular area during a severe winter, but we have reasonably good estimates of how, on average, mortality rates vary as a function of winter severity.

In Minnesota, deer population modeling is an annual process. In brief, the accounting or projection model (hereafter model) estimates the minimum number of deer that must be in the population to support the observed harvest over time and, more importantly, estimates annual variation in the population trend as a function of reported harvest and winter severity. Model inputs include estimates of the initial population size, age and sex ratios, annual productivity (births), reported harvest, and non-harvest mortality rates (e.g., associated with winter severity, predation, and non-reported harvest) for four sex-age classes (adult male, adult female, fawn male, fawn female). These inputs, provided by Wildlife research scientists, are based upon long-term research conducted here in Minnesota; including a 15-year deer survival study in Northern Minnesota. DNR uses winter severity data that are compiled weekly from weather stations statewide. Previous research allows us to estimate winter mortality for each age class as a function of minimum temperature and snow depth. Minnesota is fortunate to also have a long history of mandatory deer registration. Harvest and winter severity data form the basis for modeling populations. Without harvest or winter severity information, the model will result in an exponentially increasing (or decreasing) population. As a result, realistic year-to-year variation that deviates from the underlying exponential trend is informed by winter severity and harvest. Subsequently, inference is improved with more harvest data, particularly female harvest data, and the ability to accurately predict survival as a function of winter severity. Therefore, DNR waits until April to begin modeling and does not develop population estimates in DPAs that have low harvest levels or are small in size (e.g. Itasca Park – DPA 287).

Initially, the model is used retrospectively (looking back in time) to determine what population levels would support the observed pattern in harvest data. If the model output (e.g., trend in buck harvest rate) does not produce biologically reasonable estimates, the model gets modified (e.g., the starting population size) so the output is more in line with the observed harvest data. For example, in some cases the model would indicate a population declining to extinction; in others, it might appear the population is growing exponentially. Whenever the model structure is modified, adjustments are well-documented.

The primary use of the model is to come up with a biologically reasonable population trend given past harvest and winter severity trends. This also produces a population estimate for the current year, which serves as the starting point for projecting what the population is likely to do under various regulatory decisions over the next few years. In other words, what is the effect on deer populations if a one-deer vs. two-deer vs. three-deer bag limit regulation is implemented?

The model can provide a reliable estimate of the population trends. However, errors (uncertainty associated with estimated vital rates and starting populations) accumulate over time, which can confound reliability of the estimated trend. As a result, the models are run for the most recent ~5 years, requiring updates to the starting population values each year. This can lead to different results when models are updated with new harvest data, WSI values, and starting population values. However, model updates maximize the reliability of the population trend, which is sufficient for managing towards population goals that have been established within the most recent ~5 years. In the event goals are established as a population density (i.e., 15 deer per square mile) as opposed to a trend (i.e., increase 50 percent), aerial surveys can be used to validate deer densities from the model. However, it is important to note aerial surveys require adequate snow cover and deer sightability; because of this aerial surveys are not reliable in most DPAs across the southwest farmland and northeast forests of Minnesota. The take home is that all models, regardless of their application, contain assumptions that influence model output. Minnesota DNR strives to collect the best data possible to allow our models to be a useful tool in the decision-making process. The primary intent is to track changes in relative abundance over time rather than to estimate the exact number of deer in the population at any specific point in time.

## **A NOTE ABOUT DEER, MOOSE, WOLF, AND HUMAN RELATIONSHIPS**

Wherever deer, moose, and wolves coexist, knowledge and understanding of their interactions, and often complex, ecological relationships, are absolutely integral to the most effective and ecologically sound management of all three species. This is true whether the “balanced management” of the three species involves objectives to increase or decrease numbers within their respective populations. Because these species are intricately linked, they have strong influences on each other’s population performance (i.e., survival rates and reproductive success), which directly affects annual variation in their numbers. Many other factors influence the degree of these interactions, including winter severity; non-winter precipitation; deer, moose, and wolf densities over the landscape; sex and age composition of their populations; hunter harvest; development; timber harvest; recreational feeding; and parasites and disease. These species and their relationships have received more long-term study in the Northern Great Lakes region, and in Minnesota specifically, than anywhere else in North America. This research provides extremely valuable information for wildlife management in Minnesota.

Throughout most of northern Minnesota, deer and moose are the primary and secondary prey of wolves, respectively. Where deer densities are extremely low, such as the Boundary Waters Canoe Area Wilderness, moose can be the primary prey. Hunting by humans has the greatest impact on deer numbers statewide, as can easily be seen from annual harvest statistics. However, winter severity is commonly the primary cause of natural deer mortality, with substantial population impacts most frequently observed in northeastern Minnesota. In local cases, wolf predation can be the primary cause of natural deer mortality. The greatest impact of fall hunter harvests is on young deer and prime age adults, whereas wolf predation has its greatest influence on newborn fawns and the older adults. Of course, the percent mortality of deer attributable to hunters varies notably from year to year depending on the number and types of permits issued, the spatial distribution of deer densities and hunting pressure, and associated weather conditions. Similarly, annual deer mortality by wolves also varies markedly depending on factors such as winter severity, deer and wolf densities and their distributions over the landscape, and sex and age composition of the regional deer populations. Most deer mortality by wolves occurs in late winter, is directly related to winter severity, and much of it is compensatory, particularly during the more severe winters. Specifically, vulnerable deer are already dying from other causes (e.g., starvation) when preyed upon. Deer and moose numbers may also influence the predation pressure imposed by wolves on each of their populations. Because wolf populations depend on prey availability, the presence of two large prey species sharing the same range benefits wolves by helping them to maintain or increase their numbers as the densities of either prey population fluctuates over time.

A noteworthy interaction that contributes to the complexity of deer/moose relationships at the population level in northeastern Minnesota is associated with the life cycle of the brainworm. The role of deer and moose in this cycle has received a great deal of historic research attention in this part of the state, but recent aggressive research efforts have indicated that this parasite, which is relatively harmless to deer, is a major mortality factor for moose and has contributed to their population decline since 2006. From a moose management perspective, the most feasible and potentially effective management strategy to reduce this negative impact on the moose population is to maintain deer densities on their shared range as low as practical; this is why deer population goals in the primary moose range must be consistent with direction in the Minnesota Moose Research and Management Plan. DNR agrees with the Deer Management Plan Advisory Committee recommendation to continue management of deer in the primary moose range in a manner that is consistent with the moose plan. Recognizing the agency’s multiple management objectives, DNR will continue to establish deer population goals that support the moose management plan and are informed by broad stakeholder input during the public goal setting process.

**How do white-tailed deer thrive in northern Minnesota, despite relatively heavy and consistent hunting pressure across most of their range, and the presence of an estimated population of nearly 3,000 wolves?** Flexible, informed, and deliberate population and habitat management strategies have a great deal to do with the general success of these deer populations, but it is also largely attributable to their relatively high capacity for survival and reproductive success and to their relatively high densities. Specifically, in Minnesota’s northern forests, DNR has documented that most (about 90 percent) female deer become pregnant as yearlings, and pregnancy rates for does 2.5 years old and older, up to at least 15.5 years old, is between 95 and 100 percent; most of these does give birth to twins. These biological traits, critically supported by good nutrition, enable a high resilience in our northern white-tailed deer, so that when they do experience intermittent declines that may be related to a combination of unpredictable severe weather conditions and predation, their inherent capacity for population recovery over the subsequent several years is strong.

## Population management

In Minnesota, and across North America, deer hunting is the primary tool used to manage white-tailed deer populations. Deer populations are managed using harvest regulations designed to stabilize populations or influence population direction (increase or decrease). On an annual basis, DNR develops harvest regulations to meet publicly-established population goals, based on an assessment of the population status, the regulatory options available, and the likely deer population response over the next few years.

Area wildlife managers, the big game program leader, and wildlife researchers consult annually to determine the management designation and, if the DPA is designated “lottery,” the number of either-sex permits offered for each DPA. The information considered in this process includes annual harvest statistics including hunter success rates, population trend data, staff observations, hunter comments and deer damage complaints. When deer population goals are revised for DPAs, management strategies are adapted to move the population toward new goal levels.

In general, opportunities to harvest antlerless (does and fawns) deer are increased when the goal is to reduce the population and are limited when the goal is to increase the population; this is because antlerless deer (the majority of which are female) represent the reproductive potential of the population. When DNR is working to reduce populations, harvests will tend to be higher and comprised of a relatively large proportion of antlerless deer. When working to increase the population, harvests will be low with a greater proportion of antlered deer being killed.

Population management is accomplished at the level of a DPA using season length and management designations that generally range from the ability to harvest one deer in a DPA (bucks-only, antlerless lottery, or hunter choice strategies) to up to three antlerless deer (intensive strategy). Additional harvest opportunities are infrequently offered through early antlerless seasons, disease management seasons, and depredation deer antlerless permits that also aim to increase antlerless harvest. In addition to coordination with tribal biologists regarding deer management, the DNR also works with other governmental units to meet local needs in more developed areas or public lands not regularly open to hunting (e.g., through development of special hunts).

### **A NOTE ABOUT CARRYING CAPACITY**

The term carrying capacity is often used when speaking about deer numbers and goals, but it must be defined to be useful as there are a range of common uses. Ecologists use the term carrying capacity to define the maximum population of a particular species that a given area of habitat can support over a given period of time. The ecological principles that govern a habitat's carrying capacity are the same for all species. A sustainable supply of resources – including nutrients, energy, and living space – defines the carrying capacity for a particular population in a particular environmental system. This population level is generally referred to as the “biological carrying capacity” (BCC).

It is important to note that as a deer population increases, so does competition for quality forage and other habitat components, and the quality of habitat degrades over time. This increased competition leads to lower reproductive output (productivity) and fawn survival. The fawn recruitment rate eventually reaches a point where it equals the natural mortality rate (excluding hunter harvest) and the population stops growing. This is also a definition of BCC. At this point, the physical condition of the herd is usually poor, body and antler size is diminished, disease problems may be chronic, winter survival is reduced, and no female deer can be harvested. This is one reason why populations are not managed at the BCC. However, BCC is a useful theoretical benchmark in deer management.

The term “social carrying capacity” (SCC) is also commonly used when discussing deer populations. The SCC focuses on the impacts deer may have on people and the things people value; essentially, it is the maximum number of deer that humans will tolerate. A challenge with using SCC is that people's tolerance varies greatly depending upon their social context. However, social tolerance is always lower than the biological maximum. Negative impacts of deer that contribute to SCC include degraded natural ecosystems and associated negative impacts on other wildlife species, loss of biodiversity, deer-vehicle collisions, agricultural damage, and damage to residential landscaping; hence, agencies strive to manage deer populations at the level society will tolerate.

## **Wildlife health**

The risks of deer-related disease for deer, people, other wildlife, and domestic animals are an important consideration in deer management. The DNR Wildlife Health Program (WHP) was established to monitor and protect the health of Minnesota's wildlife populations, with a focus on game species. The extent of work ranges from large-scale surveillance efforts, such as for CWD, bovine tuberculosis (bTB), and avian influenza, to individual case investigations. Structured within the DNR's Wildlife Research Unit, the WHP also conducts research into current wildlife health issues. Since 2002, DNR has spent approximately \$8 million on surveillance and management of CWD and over \$4 million on the eradication of bTB in Minnesota's deer.

## **Related Public Health Concerns**

Despite their close association with humans, deer pose few direct disease risks to humans or livestock. Most diseases known to be found in deer occur naturally and are endemic to the U.S. Although direct transmission of CWD from infected deer to humans through venison consumption has not been documented, the U.S. Centers for Disease Control and Prevention now recommends hunters in areas where CWD is known to be present to consider testing harvested deer before eating the meat. In part, this is due to recent research that reported

CWD transmission to closely related primates that were fed venison from CWD-positive deer.<sup>14</sup> DNR also encourages hunters to use non-toxic ammunition to eliminate the risk of lead consumption by people or scavenging wildlife. Because of the significance of CWD and bTB, and the human health implications of tick-borne disease for deer management in Minnesota, summaries about these diseases are provided on the DNR deer management webpage<sup>15</sup>. More information on the MN DNR health program is available online.<sup>16</sup>

#### **A NOTE ABOUT DEER FEEDING**

The Deer Management Plan Advisory Committee recommended that DNR pursue a statutory change to prohibit recreational feeding of deer, elk, and moose statewide to minimize the risk of disease transmission. Due to high levels of public interest in deer feeding, a recreational feeding ban is not included in this plan. Rather, DNR will work with the statewide deer input group to develop a plan to assess public support for the recommendation.

**Why is this important?** Feeding deer is often viewed as an enjoyable recreational experience to individuals who partake in the activity. However, the near consensus opinion of wildlife biologists is that deer feeding does far more harm than good. White-tailed deer evolved in North America to survive a host of conditions. As they are extremely adaptable and have high productivity rates compared to other ungulates, there is no need to provide recreational or supplemental feed at any time of the year. DNR fully recognizes that, in the short-term, winter has an effect on deer populations. However, the negative effects of supplemental feeding far exceed the short-term (and often perceived) benefits to the deer population. Some of the negative aspects of recreational feeding include,

- Disease Transmission: Supplemental feeding closely congregates animals that would otherwise feed apart on natural foods. Tight concentrations of deer dramatically increase the odds of disease transmission.
- Increased risk of predation: Deer are more likely to get killed by predators if they are concentrated around feeding sites.
- Behavioral changes: Feeding can make wild animals less fearful of humans, delay or prevent winter migration, and even result in starvation if animals have not migrated to wintering areas before feeding ceases.
- Increase in deer-vehicle collisions: Feeding often draws animals away from their natural feeding and bedding areas; accidents increase because deer are crossing roads more frequently to get to feeding locations.
- Habitat and crop depredation: High concentrations of deer can hinder forest regeneration, change plant species composition, and cause significant crop depredation in the areas where supplemental feeding occurs.
- Carbohydrate toxicity: The disease termed acidosis can occur anywhere when deer ingest large quantities of readily digestible carbohydrates; e.g., death from corn toxicity can occur within 24 to 72 hours.

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<sup>14</sup> <https://www.cdc.gov/prions/cwd/transmission.html>

<sup>15</sup> <https://www.dnr.state.mn.us/mammals/deer/management/index.html>

<sup>16</sup> <http://www.dnr.state.mn.us/wildlife/health/index.html>

#### **A NOTE ABOUT DEER VEHICLE COLLISIONS**

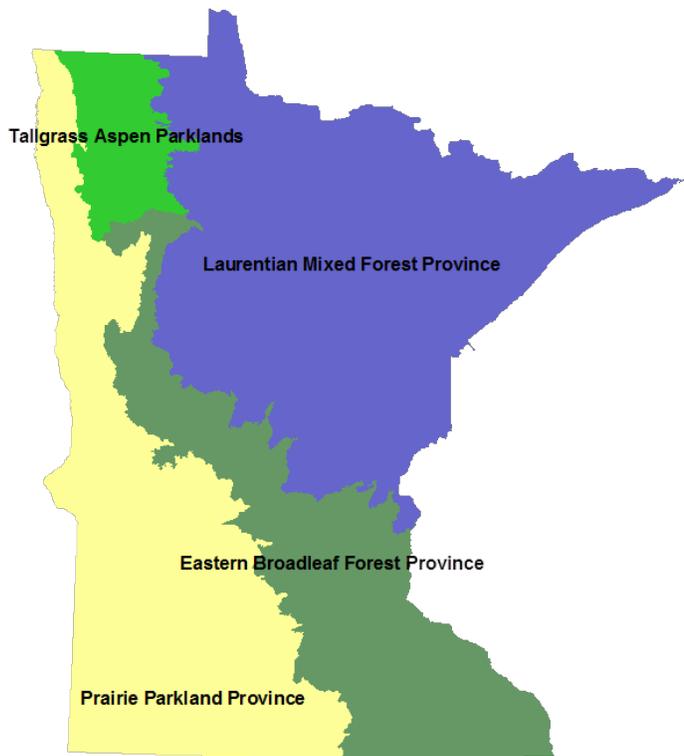
Deer Vehicle Collisions (DVCs) are a substantial public safety concern. Prior to 1987, DNR enforcement officers were responsible for picking up vehicle-killed deer. Data collected on the number of collisions in each deer management unit provided an index for population monitoring. In 1987, the Minnesota Legislature passed legislation mandating vehicle-killed deer removal by local road authorities. Since 1986, reporting of DVCs has been unreliable due to inconsistent reporting across the state. In recent years, DVC data have been reported to DNR through two methods: (1) salvage (possession) permits filed when people take a deer carcass from a DVC for personal use or (2) DVCs reported by state and county transportation districts when a carcass is removed from the road. MN DNR currently receives less than 5,000 reports of DVCs per year versus the State Farm Insurance annual estimate of roughly 40,000 DVCs in Minnesota. Neither estimate is perfect, but the State Farm estimate is standardized across the United States and is likely more accurate. Reasons for the discrepancy include seasonal variation in salvage permits (seasonal differences in travel and willingness to use a deer carcass), limited funding for local road authorities, decomposition prior to removal, and DVC deer mortalities that occur after impact and beyond the visible roadway. To illustrate the poor reporting, in 2003 we harvested 290,000 deer and 9,000 reports were filed with DNR. In 1986, 137,000 deer were harvested and collisions totaled 12,500. While the intent decades ago may have been to assess the relationship between collisions and deer population trends, the data have not been usable for that purpose since 1986. Additionally, DVCs are influenced by factors such as miles traveled (impacted by weather, fuel costs, and overall economic conditions) and are thus indirect and imperfect indices of deer populations. Fortunately, mandatory registration of harvested deer, supplemented by other indices and estimates of deer population trends, provide more useful and cost-effective deer population monitoring data for MN DNR. While data are not collected for monitoring purposes, public safety is considered in deer management and is frequently a factor in the establishment of local, special hunts for deer.

### **Habitat management**

Regional and Area DNR staff have the primary responsibility of protecting, enhancing, and restoring habitat. Minnesota DNR strives to manage habitat on state land in an ecologically appropriate manner based on natural community types representative of the region. The DNR seeks to enhance deer habitat in a wide variety of ways across the state, mostly dependent on land ownership and location within the four Ecological Provinces of Minnesota (Figure 2). Habitat management on WMAs and on State Forests provides deer habitat and public hunting lands; these lands are foundational to deer populations and hunting in Minnesota. Vegetation management on forested state lands, primarily administered by Forestry or FAW Divisions, is guided by Section Forest Resource Management Planning (SFRMP)<sup>17</sup>, which identifies long-term forest composition goals and shorter-term treatment plans, including timber harvest. Through these plans, DNR aims to improve forested deer habitat by planning for a number of different forest age classes, enhancing the diversity of forest stands, and improving the forest's spatial arrangement for game species, while also benefitting multiple users, native plant communities, and species. A significant challenge in areas of higher deer densities is regenerating conifers, such as white cedar and jack pine, to provide future deer winter cover despite current browsing pressure.

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<sup>17</sup> <http://www.dnr.state.mn.us/forestry/section/index.html>



**Figure 2. Ecological Provinces of Minnesota**

Within the more forested parts of the state, some special habitat management projects that benefit deer include establishing winter conifer cover, shearing or mowing brush for browse, prescribed burning to create earlier successional habitats, maintaining forest wildlife openings, controlling terrestrial invasive species (e.g., buckthorn), and enhancing hard mast production (e.g., acorns) through timber stand improvement. DNR wildlife staff also participate in county and federal natural resource management planning processes to promote deer and other wildlife habitat improvement projects. Participation in the DNR Forest Stewardship Program<sup>18</sup> is the primary way in which private woodland owners receive assistance to meet their land management goals, which often include creating wildlife habitat.

In more open and agricultural portions of the state, one of the primary goals is to manage large prairie/grassland/wetland complexes and to work with the agricultural community on conservation practices, especially through the USDA Farm Bill programs. Some of the habitat management practices implemented by DNR staff to benefit deer in this landscape include wetland and prairie restorations to create permanent habitat, prescribed burning to promote new growth, controlling terrestrial invasive species, enhancing hard mast production along floodplain forests and wooded river corridors, and protection of key wintering areas. Although not commonly considered deer habitat, wetlands provide drinking water, foraging habitat, and cover.

A threat in the farmland portion of the state is the loss of permanent and protected deer habitat, such as land enrolled in CRP, through conversion to agricultural fields. Resource managers, including DNR staff and Farm Bill

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<sup>18</sup> <http://www.dnr.state.mn.us/foreststewardship/index.html>

biologists, provide technical assistance on deer habitat management to private landowners across the agricultural parts of the state. More information on private land management for habitat, statewide, is available on the DNR website.<sup>19</sup>

In addition to strictly habitat management activities, DNR supports deer-related recreation through access to WMAs, gated hunter walking trail systems on some state and national forests, non-motorized areas on state and federal lands, state game refuges/state parks with special deer hunting regulations, and walk-in access (WIA) on private land. Staff activities to support access include WMA boundary sign posting, establishment and maintenance of parking lots and trails, and printed or interactive mapping to help the public identify opportunities throughout the state.

### **Deer damage management**

Minnesota DNR has a wildlife damage program with staff committed to working with landowners to reduce wildlife damage. Complaints of deer damage occur in all areas of the state and may occur at any deer density. Complaints of depredation by deer in Minnesota include, but are not limited to, consumption or damage of stored livestock forage and standing forage as well as damage to specialty crops such as orchards, row crops, private forest stands, and landscaping or ornamental vegetation.

Management tools to address specialty crop and stored forage damage include technical assistance, damage management abatement materials and removal permits for animals actively causing damage to a point they are causing an economic hardship. Minnesota does not compensate farmers financially for crop damage caused by deer. Wildlife damage program staff and area wildlife staff work cooperatively with agricultural producers to recommend the best long-term and short-term management tools. In most cases, the most effective way to reduce deer damage is by exclusion (i.e., a 10 foot woven wire fence) coupled with population management. Farmers who enter into a Cooperative Damage Management Agreement (CDMA) are eligible to receive material assistance from the Section of Wildlife. Other exclusion tools, such as temporary corral panels, are available; however, in most cases these solutions are not the most cost-effective way to resolve damage over the long run. Wildlife damage program staff can provide technical assistance by creating a fence diagram and material list, ordering materials, loaning specialty installation tools, and providing instruction on how to erect the fence. Staff also recommend a hunt management plan, a very important tool for damage management. Short-term management tools (e.g., sound/visual deterrents and taste/smell repellents) are often ineffective for reducing deer damage over the long run.

Typically, agricultural fields are too large in area to deploy exclusion strategies cost effectively. To minimize damage to row crops in Minnesota, techniques including hunter recruitment and regulations providing higher antlerless deer permits during the hunting season are used to decrease deer numbers where they are causing damage. If hunting is utilized to the fullest extent and damage is still causing an economic hardship, the Section of Wildlife may issue permits to agricultural producers to shoot deer outside of hunting seasons. This option is also available to those with stored forage and specialty crop damage. In addition, a statewide program that provides additional antlerless deer permits (i.e. deer depredation permits) to specific properties with ongoing damage was instituted in 2015. Depredation permits allow increased limits for licensed deer hunters to harvest

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<sup>19</sup> <http://www.dnr.state.mn.us/privatelandhabitat/index.html>

additional antlerless deer during regular hunting seasons on lands identified in a CDMA. Shooting and depredation permits are considered the last tool in resolving depredation situations when all other efforts have proven inadequate. Minnesota DNR is committed to working with agricultural producers, and strategies to reduce deer damage will continue to be adapted to be effective with changing agricultural practices.

## **Outreach and communication**

The “information age” has, on one hand, made it easier to get detailed information to people. On the other hand, it has created complexities and increased workload in information dissemination. Society has come to expect immediate and constant information, from an increased variety of media channels, placing ever increasing demands on limited communications staffing.

The FAW Division currently relies heavily on statewide news releases, DNR web pages, and the annual Hunting and Trapping Regulations booklet to broadly share information about deer and deer management. These information sources are reinforced with a “Deer Notes” email newsletter and a “Minnesota Hunting” newsletter, both of which are sent to people who subscribe to them by adding their email addresses to the newsletter distribution lists.<sup>20</sup> Additionally the division manages social media accounts on Facebook and Twitter and includes timely deer and deer hunting information on numerous radio shows annually to emphasize and reinforce certain deer topics.

Minnesota DNR’s Recreation Compass<sup>21</sup>, WMA web pages<sup>22</sup>, and interactive deer maps<sup>23</sup> are specific web-based tools that the agency has developed to assist citizens in locating and accessing public lands for hunting, other recreation, and information purposes. The interactive deer maps are DPA maps that include information specific to each DPA, including summaries of deer hunting season information, land and cover type information, past deer harvest information, winter severity information, and a brief note from the wildlife manager regarding management.

### *Hunter Recruitment, Retention, and Reactivation*

The DNR Hunter Recruitment, Retention, and Reactivation Program recognizes the importance of hunters as conservationists and the important role they play in the North American model of wildlife conservation. To recruit people new to hunting, DNR annually conducts a variety of learn-to-hunt programs individually and in partnership with other organizations. Examples of Minnesota’s work to recruit hunters include free or reduced price youth hunting licenses; mentored adult, youth, and family hunts; youth hunting seasons; state park archery programs and hunting opportunities, and outreach focused on diverse communities. Marketing and information efforts focus primarily on hunter reactivation and retention. More information on the DNR recruitment, retention, and reactivation program is available online<sup>24</sup>.

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<sup>20</sup> <http://www.dnr.state.mn.us/emailupdates/index.html>

<sup>21</sup> <http://www.dnr.state.mn.us/maps/compass/index.html>

<sup>22</sup> <http://www.dnr.state.mn.us/wmas/index.html>

<sup>23</sup> <http://www.dnr.state.mn.us/hunting/deer/map.html>

<sup>24</sup> <http://www.dnr.state.mn.us/harr/index.html>

## Plan Implementation, Monitoring and Revision Timeframe

This plan provides strategic direction for deer management over the next 10 years. As stated at the beginning of this Plan (p. 4), an important next step in this statewide deer planning process is to take the direction developed from the goals and objectives and develop implementation strategies to operationalize the Plan. While annual and multi-year operational planning will follow, some near-term (2019 to 2021) strategies and actions identified during Plan development are described in Appendix A. These steps are a starting point for implementation and are not comprehensive.

Although near-term strategies have been identified based on current management needs and funding, we can anticipate that emerging issues, new information, changing management needs, and shifting funding opportunities may shift priorities between identified plan goals and objectives from year to year. On an annual basis, Minnesota DNR will incorporate deer plan implementation monitoring into annual work planning and reporting. That is, management actions in support of the goals and objectives will be communicated annually. Additionally, performance measures will be tracked and reported on an annual basis, with a broader mid-plan review scheduled for 2023 to 2024. If performance measures indicate a need and opportunities for deer plan improvement, suggested changes will be communicated, discussed publicly, and incorporated into the plan.

## **Appendix A – Operational Planning: Strategies and Recommended Actions**

Strategies listed below describe a starting point for implementation of the Minnesota DNR White-tailed Deer Management Plan (2019-2028) and are not comprehensive. Because strategies and management actions are dependent on annual funding, as well as partner support, the DNR has identified near-term strategies (**in bold**) that will be incorporated into work planning for fiscal years 2019 to 2021. It is important to note that absence of a strategy or action in this appendix does not mean it will not be considered. DNR will continue to develop implementation strategies to accomplish Plan goals through annual and multi-year operational planning. Strategies are numbered for identification purposes only.

### **GOAL A: Communication, Information Sharing, and Public Involvement**

**Strategy 1: Communicate the use and oversight of public funds for fish and wildlife management.**

**Strategy 2: Describe and document rationale for deer management decisions.** For example, annually publish, on the DNR website, the rationale for the selected season management strategies in each Deer Permit Area.

**Strategy 3: Improve timeliness and accessibility of deer harvest information during and immediately after the season.**

**Strategy 4: Provide effective and meaningful opportunities for broad public input about deer management.**

For example,

- Target outreach for public input opportunities toward historically underrepresented communities in addition to traditional stakeholders.
- Pilot one new process, or enhancement of an existing process (e.g., population goal setting), for the interested public to engage in deer management decision-making.

**Strategy 5: Use social science survey methods to regularly assess deer stakeholder values, attitudes, and preferences about deer management.**

**Strategy 6: Work with stakeholders to identify deer management information needs and preferred communication strategies.**

**Strategy 7: Use digital tools (e.g., social media, email, DNR website), in addition to more traditional methods, for information sharing and to enhance communication/engagement opportunities.**

**Strategy 8: Improve access to information about values (e.g., public health and safety, natural communities, resource economies) that are impacted by deer management decisions.**

**Strategy 9: Continue to improve relationships and coordination with tribal nations on deer management.**

### **GOAL B: Deer Stakeholder Satisfaction**

**Strategy 10: Use social science methods to regularly assess hunter and public satisfaction with deer management at a regional level.** For example,

- Determine and implement a schedule of regular deer hunter and public attitude surveys regarding deer management.
- Develop a research proposal for a study to determine the factors that influence public satisfaction rates, particularly related to non-hunting experiences, regarding deer and deer management in Minnesota.

**Strategy 11: Foster continuation of Minnesota’s deer hunting heritage and support for hunting as the primary deer population management tool.** For example,

- Support the DNR recruitment, retention, and reactivation (R3) program to ensure hunting and other deer-related recreation opportunities exist for future generations.
- Propose, and take public input on, a statewide youth-only deer season. Implement the season if publically supported.

### **GOAL C: Deer Population Management, Monitoring, and Research**

**Strategy 12: Annually monitor deer population trends to inform deer management decisions.** For example,

- Continue to require mandatory deer registration.
- Monitor population trends through population modeling and review of other population indices, including harvest trends, aerial surveys, and area observations.
- Continue to develop and refine methods (e.g., aerial and ground surveys) used to inform population monitoring and, specifically, deer population modeling.

**Strategy 13: Invest in priority deer research to inform issues identified by the Deer Population Management Report (OLA 2016) and other information needs.** For example,

- Evaluate the use of a statistically robust, bowhunter observation log as a population monitoring tool.
- Evaluate ground-based distance sampling as an additional population monitoring method in Farmland DPAs.
- Implement research to better understand potential CWD prion transmission relative to deer movements.
- Implement research to inform winter habitat management for white-tailed deer in northern Minnesota.
- Implement research to monitor variation in white-tailed deer vital rates and movements to improve accuracy of population estimates and inform appropriate spatial resolution of estimates.

**Strategy 14: Continue to implement deer harvest strategies to meet and maintain established population goals.**

**Strategy 15: Collect baseline biological and/or social data, as needed, to inform decisions about population management or substantial changes to hunting regulations (e.g., considering new antler-point restrictions, contingent upon legislative authorization).**

**Strategy 16: Increase funds available for deer population surveys to validate the population model (e.g., aerial surveys or distance sampling techniques).**

## **GOAL D: Healthy Deer**

**Strategy 17: Implement management actions, as outlined in the CWD Response Plan, to limit the geographic spread, prevalence, and distribution of disease across the landscape.** For example,

- Conduct surveillance of wild deer for CWD to allow for early disease detection and management.
- Enforce MN Rules that restrict importation of whole, wild cervidae carcasses into the state, including taxidermy heads.
- Prohibit recreational feeding (including salts and minerals, but excluding food plots) of deer, elk, and moose in disease management zones.
- Implement internal DNR carcass disposal directive.
- Reduce deer densities in disease management zones, when established, following the detection of disease-positive, free-ranging deer.

**Strategy 18: Seek revenue from the General Fund to support CWD monitoring, management, prevention and other activities that reduce risk.**

**Strategy 19: Follow Wildlife Health Program protocols to monitor and opportunistically sample deer exhibiting suspect health conditions.**

**Strategy 20: Collaborate with the Minnesota Board of Animal Health to minimize risk of interaction between captive cervidae and wild deer.** For example,

- Pursue legislation to require mandatory double fencing of cervid farms to better ensure containment of farmed cervidae and exclusion of wild deer and to eliminate through-the-fence contact between farmed cervids and wild deer.
- Pursue legislation to require mandatory marking of farmed cervids at birth.

## **Goal E: Healthy Habitat**

**Strategy 21: Identify, define, and prioritize for management and protection deer wintering areas on public lands using information including winter severity, traditional use, and habitat requirements.** For example, promote management on state land that enhances and preserves winter habitat (upland and lowland) in priority areas.

**Strategy 22: On School Trust lands, where maximizing the long-term economic return is the primary objective of management activities, promote management that enhances habitat whenever possible.**

**Strategy 23: Manage state land, and provide direction for all-lands management, to maintain all important deer habitat components (including managing for the full range of forest communities and age classes) reflective of Minnesota's native plant communities.** For example,

- Continue to use Section Forest Resource Management Plans (SFRMPs) and collaborative forest planning to utilize forest management as a mechanism to maintain all important deer habitat components; share public input opportunities on proposed SFRMPs with deer management interests. Important deer habitat components include mast producing hardwoods, upland conifers, and brushlands.
- Participate in Minnesota Forest Resource Council landscape planning.

- Work with partners to seek funding that enables management of non-productive forest land for wildlife values that include deer.
- Maintain third-party forest certification (e.g. FSC and SFI) to document and demonstrate DNR's commitment to sustainable forest management.
- Support private forest management technical assistance provided by MN DNR and other partner agencies.
- Address deer habitat and hunting/recreational opportunities in updates to major-unit WMA management plans.

**Strategy 24: Target, for Wildlife Management Area Acquisition, land that meets deer wintering and other critical deer habitat needs in the Prairie Province.** For example,

- Utilize existing programs (e.g., Reinvest in Minnesota, Environment and Natural Resources Trust Fund, OHF) to support acquisition, protection, and maintenance of priority deer habitat in the Prairie Province. Couple these efforts with other established DNR and wildlife habitat plans.
- Support, and encourage use of, established Farm Bill programs (e.g., Conservation Reserve Program) and other initiatives to retire marginally productive and environmentally sensitive agricultural land to increase the availability and quality of natural habitat in the Prairie Province.

## **Goal F: Impact of Deer on Other Resources**

**Strategy 25: Minimize, to the extent possible, depredation in agricultural settings through efficient and timely depredation resources and technical assistance to address deer-related damage.** For example,

- Increase depredation program funding to better address deer damage.
- Explore statutory or programmatic changes to improve management of deer depredation (e.g., through non-lethal hazing).
- Explore opportunities to facilitate the development of a hunter/landowner connection program between non-governmental organizations, local governmental units, private landowners, and hunters to increase deer harvest, where needed, on private and traditionally non-accessible public lands.

**Strategy 26: Provide assistance to local units of government and agricultural landowners to develop deer population management strategies, including specialized hunt opportunities, removal permits, and information.** For example,

- Facilitate and assist in implementation of special deer hunting opportunities where excessive negative impacts from deer are documented and use of regular hunting seasons is inadequate (e.g., on county lands).
- For local government units with deer management needs resulting from discharge ordinances, provide effective and efficient ways to implement removal permits and appropriate disposition of deer.
- For landowners with extreme crop damage, provide effective ways to increase take of deer causing damage.

**Strategy 27:** Explore cost-effective strategies to monitor habitat condition in relation to deer population management.

### **Goal G: Deer Management Funding**

**Strategy 28:** With partner support, encourage Lessard-Sams Outdoor Heritage Council (LSOHC) support of forest, prairie, and wetland habitat acquisition and enhancement proposals that will benefit deer and other species.

**Strategy 29:** With partner support, encourage continued opportunities to support forest, prairie, and wetland enhancement activities through the use of the Conservation Partners Legacy grant program.

**Strategy 30:** Work with the legislature to dedicate \$16 of each deer license to the deer management account.

**Strategy 31:** Make funding and work planning decisions consistent with priorities outlined in the FAW Strategic Plan, DNR Conservation Agenda, Statewide Deer Plan, and other strategic direction documents.

**Strategy 32:** Work with internal DNR committees, research and management staff, and universities to identify priority deer research needs such that biological and social questions can be answered and management programs can be developed or enhanced.

### **Goal H: DNR Deer Management**

**Strategy 33:** Monitor, evaluate, and adjust management as necessary to meet deer plan goals.

## Appendix B – Deer Program Authority and Responsibilities

The DNR is the state agency responsible for overseeing deer management in Minnesota. Minnesota Statute 84.027 subdivision 2 states the DNR commissioner has “*charge and control of ...wild animals of the state and of the use, sale, leasing, or other disposition thereof...*”. State statutes (84, 86A, 97A, 97B, others) extensively outline DNR’s wildlife management authorities and responsibilities.

Minnesota DNR consults with 11 Tribal Nations on natural resource issues within reservations, communities, and ceded territories. Agency staff coordinate and work with tribes on deer management in accordance with reserved treaty rights, associated court decisions, federal laws, intergovernmental agreements, and shared interest in natural resource conservation. Coordination with tribes is handled on a government to government basis under terms and agreements with each tribe. Although treaties differed, language often included the preservation of off-reservation hunting, fishing, and gathering rights in ceded territory. In 2014, Governor Mark Dayton signed Executive Order 13-10 ([https://mn.gov/governor/assets/EO-13-10.pdf\\_tcm1055-92492.pdf](https://mn.gov/governor/assets/EO-13-10.pdf_tcm1055-92492.pdf)) with the intent to improve relationships and coordination with tribal nations.

The Section of Wildlife, as part of the Division of Fish and Wildlife, is responsible for state deer population management. However, nearly all the divisions within the DNR contribute to, or are affected by, deer management. The Division of Enforcement is responsible for enforcing game and fish laws, while land managers from the Divisions of Parks and Trails (PAT), Ecological and Water Resources (EWR), and Forestry affect deer habitat through their actions. PAT as well as EWR also are actively involved with deer population management on lands they manage.

The land management Divisions of the DNR have different purposes which are defined in the Minnesota Outdoor Recreation Act (MN Statute 86A). These differences result in differing management approaches. For instance State Parks are “*...administered by the commissioner of natural resources ... to preserve, perpetuate, and interpret natural features that existed in the area of the park prior to settlement and other significant natural, scenic, scientific, or historic features that are present. Management shall seek to maintain a balance among the plant and animal life of the park and to reestablish desirable plants and animals that were formerly indigenous to the park area but are now missing.*”

State Scientific and Natural Areas, managed by the Division of Ecological and Water Resources, are “*...administered by the commissioner of natural resources, ...to preserve, perpetuate and protect from unnatural influences the scientific and educational resources within them.*”

State Forests are managed to be consistent with the state’s forest management policy which is to “*pursue the sustainable management, use, and protection of the state's forest resources to achieve the state's economic, environmental, and social goals.*”

State wildlife management areas are “*... administered by the commissioner of natural resources... to perpetuate, and if necessary, reestablish quality wildlife habitat for maximum production of a variety of wildlife species. Public hunting, fishing, trapping, and other uses shall be consistent with the limitations of the resource, including the need to preserve an adequate brood stock and prevent long-term habitat injury or excessive wildlife population reduction or increase. Physical development may provide access to the area, but shall be so developed as to minimize intrusion on the natural environment.*”

In its management evaluation of the DNR's deer population management in 2016, the Office of the Legislative Auditor (OLA 2016) writes that **“DNR manages deer for several reasons: to conserve and protect deer as a wildlife resource, balance citizen’s interests, provide and regulate hunting opportunities, preserve the ecosystem, and protect public safety.”** The OLA also notes **“DNR manages deer populations to serve diverse public interests and desires.”**

As a result of these different and sometimes competing management responsibilities, it is important that this plan establishes a guiding management principle that is consistent with all the DNR's management responsibilities, and fits within the overall mission of the DNR.

## Appendix C – Record of DMPAC Recommendations

The Deer Management Plan Advisory Committee was a temporary committee authorized by DNR Commissioner Tom Landwehr to provide input and make advisory recommendations to the Wildlife Section on the deer management plan. Ultimately, decision-making authority on deer management rests with the commissioner. According to committee charter, the following was required for a recommendation to be officially submitted to the DNR on behalf of the committee:

- All 20 committee members must have had notice of the issue at hand, access to relevant information on which to form a recommendation, and opportunity to discuss the issue with other members and DNR staff;
- The recommendation must have had support (i.e. “I support it” OR “I can live with it”) from at least 14 committee members (*Note: this was revised to 13 members with the resignation of one DMPAC member*);
- Dissenting or minority opinions were to be recorded and submitted to DNR along with majority opinions.

Recommendations were submitted to DNR staff in writing or through verbal communication at meetings. Over the course of 13 meetings, the Deer Management Plan Advisory Committee discussed numerous potential objectives and strategies, many of which informed and were ultimately incorporated into the plan<sup>25</sup>. In cases where the committee deemed it important to make a collective statement on deer plan content or when there was a substantial range of opinions regarding an issue, the committee used a voting process to indicate committee support. Overall, seven issues were deemed significant enough by the committee to warrant a tally of support and are documented below.

### Official Committee Recommendations (13 or more members supporting = recommendation)

#### Recommendation 1: Recreational deer feeding ban

*Prohibit feeding (including salts and minerals, but excluding food plots) of deer and other cervidae statewide. Update the emergency deer feeding and wild Cervidae health management account (i.e. 97A.075 subdivision 1. sub (d)) to reflect the prohibition on recreational and emergency cervidae feeding.*

June 2017: 15 members supported the recommendation, four members opposed, zero members abstain

#### Recommendation 2: Deer management in primary moose range

*Manage deer in the primary moose range at levels consistent with the Moose Management Plan.*

November 2017: 14 members supported including a version of this strategy, four members supported deleting this strategy, one member abstained (did not respond to online poll)

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<sup>25</sup> DMPAC meeting notes and a list of discussion items is available online:

<https://www.dnr.state.mn.us/mammals/deer/management/planning/committee.html>

\* In a follow-up discussion, nine members preferred using the language stated above; eight members preferred using the language “Manage deer in the primary moose range at levels consistent with the current (2011) Moose Management Plan.”

### **Recommendation 3: Population goal-setting team recommendations**

*Remove any constraints on the level of population increase or decrease a goal-setting team may recommend to DNR.*

November 2017: 15 members present; four absent. All members present supported this recommendation. Support for this recommendation was assessed at the meeting; no online poll was taken

### **Recommendation 4: Minimize risk of chronic wasting disease spread to wild deer from captive cervids**

*Collaborate with the Minnesota Board of Animal Health to minimize risk of interaction between captive cervidae and wild deer through measures including, but not limited to,*

- Pursuit of legislation to require mandatory double fencing of cervid farms to better ensure containment of farmed cervidae and exclusion of wild deer and to eliminate through-the-fence contact between farmed cervids and wild deer;
- Pursuit of legislation to require mandatory marking of farmed cervids at birth; and
- Other appropriate measures.

March 2018: 17 members present; two absent. 15 members supported the recommendation, one opposed, one abstained.

## **Proposed Recommendations (but lacking committee support)**

### **Item 1: Partnership with MN Department of Health**

*Partner with the MN Department of Health to develop information on the interaction and mitigation of deer and human health concerns, specifically Lyme disease.*

July 2017: Nine members voted to keep the strategy in the Deer Plan, eight members voted to eliminate it, two members were absent and did not vote.

\* Following a suggestion from multiple committee members, DNR updated the language of this strategy to read “Partner with the Minnesota Department of Health to develop information on the interaction and mitigation of deer and human health concerns, specifically tick-borne illnesses.”

### **Item 2: Consideration of potential elk restoration proposals**

*Require DNR to evaluate any potential cervid reintroduction proposal with particular consideration on the disease-free status of source animals, the potential for restored species to act as a vector for disease transfer with movement into and around the state, and the potential effects on agriculture and forestry.*

December 2017: 16 members present; three absent. Majority of committee members present did not support taking a vote to indicate support for this strategy.

**Item 3: Nontoxic ammunition**

*Promote the use of nontoxic bullets and support the phasing out of lead ammunition over time.*

December 2017: 16 members present; 3 absent. Majority of committee members present did not support taking a vote to indicate support for this strategy.

**Item 4a: Harvest objective**

*Inclusion of a statewide harvest objective in the deer plan.*

December 2017: Nine members supported, seven members opposed, three members absent.

**Item 4b:**

*Inclusion of a regional harvest objectives in the deer plan.*

December 2017: Two members supported, 14 members opposed, three members absent.

**Item 4c:**

*No harvest objective in the deer plan.*

December 2017: Seven members supported, nine members opposed, three members absent.

**Item 4d:**

*Inclusion of a 225,000 deer/year harvest objective in the plan.*

December 2017: Eight members supported, eight members opposed, three members absent.

**Item 4e:**

*Inclusion of a 210,000 deer/year harvest objective in the plan.*

December 2017: Seven members supported, nine members opposed, three members absent.

**Item 4f:**

*Inclusion of a 190,000 deer/year harvest objective in the plan.*

December 2017: Six members supported, 10 members opposed, three members absent.

**Item 4g:**

*Inclusion of a 170,000 deer/year harvest objective in the plan.*

December 2017: One member supported, 15 members opposed, three members absent.

## Appendix D – List of Acronyms

BOC – Budgetary Oversight Committee

bTB – Bovine Tuberculosis

CDMA – Cooperative Damage Management Agreement

CRP – Conservation Reserve Program

CWD – Chronic Wasting Disease

DNR – Minnesota Department of Natural Resources

DPA – Deer Permit Area

ECS – Ecological Classification System

ENRTF – Environment and Natural Resources Trust Fund

EQIP – Environmental Quality Incentives Program

FIA – Forest Inventory and Analysis

FSC – Forest Stewardship Council

LCCMR – Legislative-Citizen Commission on Natural Resources

LSOHC – Lessard-Sams Outdoor Heritage Council

OHF – Outdoor Heritage Fund

R3 – Recruitment, Retention, and Reactivation

RIM – Reinvest in Minnesota

SFRMP – Section Forest Resource Management Plan

SFI – Sustainable Forestry Initiative

USDA – United States Department of Agriculture

WCIL – Wildlife Complaint Inquiry Log

WIA – Walk-In Access

WMA – Wildlife Management Area