



---

# **Sustainable Timber Harvest Determination**

**Companion Document to Mason, Bruce & Girard Sustainable Timber**

**Harvest Analysis**

**March 1, 2018**

## **Minnesota Department of Natural Resources**

Division of Forestry

500 Lafayette Road

St. Paul, MN 55115

651-259-5300

[mnforestry.dnr@state.mn.us](mailto:mnforestry.dnr@state.mn.us)

[mndnr.gov/forestry](http://mndnr.gov/forestry)

As requested by Minnesota Statute 3.197: This report cost approximately \$477,000 to prepare, including staff time, contractor analysis, printing and mailing expenses..

*Upon request, this material will be made available in an alternative format such as large print, Braille or audio recording. Printed on recycled paper.*

# Contents of This Report

- Sustainable Timber Harvest Level Decision ..... 1
  - Table 1: Comparison of Market Trends, DNR Timber Sales History, Select MB&G Analysis Scenarios, and Sustainable Timber Harvest Level by Tree Species..... 3
- Background ..... 4
  - Purpose ..... 4
  - Relevant Legislation ..... 4
    - Sustainable Timber Harvest Analysis ..... 4
    - Timber Lands..... 5
    - Sustainable Forest Resources ..... 5
    - Definition of Forest Resources..... 5
    - Forest Resource Management Policy, Principles of Multiple Use ..... 5
    - State Wildlife Management Area..... 6
    - School Trust Lands ..... 6
- Process ..... 6
  - DNR Project Team..... 7
  - Office of School Trust Lands ..... 7
  - Stakeholder Advisory Group ..... 7
  - Public Outreach..... 8
    - Public Comment..... 8
  - Market Considerations..... 9
- Analysis ..... 9
  - Mason, Bruce & Girard ..... 9
  - Analysis: A Decision Tool..... 10
  - Analysis Details ..... 11
  - Land Considerations..... 11
    - School Trust Lands ..... 12
    - Wildlife Management Areas ..... 12
    - State Forest Lands..... 12
    - Non-DNR Lands ..... 12
  - Climate Change ..... 12
  - Key Learnings from the Modeling Analysis..... 13

Decision Details.....	14
Aspen .....	14
Ash and Tamarack Initiative.....	14
Next Steps .....	15
Appendix A: Stakeholder Advisory Group Membership.....	16
Appendix B: Office of School Trust Letter.....	17
Appendix C: Sustainable Timber Harvest Analysis: Public Comment Form.....	19
Appendix D: Public Comments.....	21

# Sustainable Timber Harvest Level Decision

DNR has reached a final decision on a 10-year sustainable timber harvest level for DNR-managed forest lands after more than a year of scientific analysis, discussion with key partners, and public input. DNR's sustainable harvest decision was informed by rigorous science, independent analysis by Mason, Bruce & Girard (MB&G), input from a Stakeholder Advisory Group, public comments, environmental considerations, economic impacts, and discussions with the Office of School Trust.

A robust, thorough, third-party analysis was done by MB&G, an established professional forestry firm based in Portland, Oregon. The MB&G analysis modeled a range of scenarios as a way to demonstrate the tradeoffs between important forest resource values at various levels of timber harvest. The analysis considered six key forest values as identified by the Stakeholder Advisory Group: timber productivity, natural resource economies, biodiversity, water quality, wildlife habitat, and forest health. This strategic context was important as DNR determined a 10-year sustainable harvest level. In addition to the biological growth potential for various tree species, DNR also considered tradeoffs among various forest values, including the implications of near-term harvest for timber production and forest resources over the longer term. Stakeholder responses, public comments, and discussions with the Office of School Trust also informed DNR's decision.

**DNR determined 1 million cords of timber harvested annually from DNR-managed forest lands is not sustainable. The new 10-year sustainable timber harvest level is 870,000 cords of timber offered for sale annually from DNR-managed forest lands.** This strikes an appropriate balance among the needs of wildlife, biodiversity, forest industry, clean water, and recreation. This is expressed as a target for the number of cords offered, with the understanding that DNR seeks to minimize the difference between cords offered and cords sold. Details regarding the species mix reflected in this target and its relationship to recent volumes and market trends are shown in Table 1 below.

**Beyond the 10-year 870,000 cord annual target, DNR will offer up to an additional 30,000 cords of ash and tamarack annually for five years.** This special initiative is an effort to make productive use of these two species, which face significant insect threats, and promote reforestation of ash and tamarack sites.

Governor Dayton directed DNR to temporarily increase DNR's annual cords offered target from 800,000 to 900,000 cords in FY2017 and FY2018 while the new sustainable harvest level was analyzed. While this increase was attainable in the short-term, it is not a sustainable long-term level. The FY2012-FY2016 average timber volume offered was 837,000 cords and the average volume sold was 812,000 cords.

A harvest level of 870,000 cords annually represents a careful balancing of DNR's multiple objectives in managing its forest lands, including:

- serving as a consistent, reliable source of wood for Minnesota's forest products industry,
- ensuring DNR-managed forest lands continue to contribute to the natural resource and recreational functions Minnesotans expect, and
- fine tuning forest management objectives for different types of DNR-managed forest lands (i.e. acquired forest lands, wildlife management areas, and School Trust Lands).

It is important to recognize that flexibility will be required to adjust to changing markets and incorporate local operational and environmental considerations. For example, storm or fire events may lead us to offer more timber on a temporary basis. Additionally, the mix of species over this 10-year period will need to change, with a gradual decrease in annual aspen offered from 400,000 to 360,000 cords. The harvest target for some other species will increase. Overall, this 10-year sustainable timber harvest target also reflects a commitment to maintaining a diverse age class structure, including older forest, and to managing wildlife lands in ways that may reduce harvest on those lands.

DNR focused on a 10-year, near-term planning period in determining the sustainable harvest level, while also carefully considering long-range impacts to ensure today's decisions will not harm future generations' ability to address multiple forest resource goals. DNR intends to conduct a similar analysis in 10 years to update the sustainable timber harvest level, ensuring that it reflects future forest environmental and economic conditions, updated inventory data, market trends, and climate change impacts.

**Table 1: Comparison of Market Trends, DNR Timber Sales History, Select MB&G Analysis Scenarios, and Sustainable Timber Harvest Level by Tree Species**

Tree species	Market Trend FY2010-FY2014	FY2012-FY2016 Average Cords Offered <sup>1</sup>	FY2012-FY2016 Average Cords Sold	Scenario 1.1.2 - Biological Timber Potential (with some restrictions) <sup>2,3</sup>	Scenario 1.2.4.3 – Prioritized for Non-Timber Values (biodiversity, old forest habitat, etc.)	Scenario 2.2.2 - Optimizing for Older Forests, While Offering 800,000 Cords	FY2019-FY2029 Target Volume Offered Range (cords)
<b>Ash</b>	flat	10,418	9,432	60,813	39,029	47,042	25,000 – 40,000
<b>Aspen and Balm of Gilead</b>	flat	395,803	401,092	386,939	110,107	210,234	400,000 – 360,000
<b>Balsam Fir</b>	decreasing	30,643	30,384	44,515	17,580	25,013	30,000 – 40,000
<b>Mixed Hardwoods</b>	maple flat oak increasing	103,927	99,926	163,100	91,824	111,966	110,000 – 120,000
<b>Birch</b>	decreasing	30,538	29,639	45,744	21,374	30,185	30,000
<b>Spruce</b>	increasing	106,736	97,538	127,681	96,218	114,035	105,000 – 115,000
<b>Pine</b>	increasing	104,429	103,108	176,936	101,797	135,032	110,000 – 120,000
<b>White Cedar</b>	flat	1,848	1,191	50,641	37,849	46,215	2,000
<b>Tamarack</b>	decreasing	52,373	39,339	71,193	42,003	74,934	40,000 – 30,000
<b>Other</b>		734	677				
<b>Totals</b>		<b>837,449</b>	<b>812,326</b>	<b>1,127,561</b>	<b>557,781</b>	<b>794,655</b>	<b>870,000</b>

<sup>1</sup> From FY2012 – FY2016, the DNR’s volume offered target was 800,000 cords per year. In FY2017, the DNR increased the offered volume target to 900,000 per Governor Dayton’s direction.

<sup>2</sup> Scenario information is the average annual model cord volume estimation over the next 10 years.

<sup>3</sup> Scenario 1.1.2 restrictions are statutory limits (species protections) and Minnesota Forest Resources Council site level guidelines for leave trees and RMZs.

# Background

## Purpose

Forests are dynamic and ever changing, and thus forest management needs to be periodically reviewed. DNR had an annual target of 800,000 cords of timber offered for sale for the past 15 years. It was time to do a new, independent analysis and thorough review. The number and mix of trees changes over time, as do other forest resource conditions. Blowdowns, fires, insects, and diseases have affected many acres since the last review. Additionally, the opportunity to reassess aspen harvest levels was timely. Over the past 20-30 years, DNR has purposefully reduced the large amount of older aspen on DNR-managed forest lands and created a more balanced age-class distribution for aspen.

DNR manages 5 million acres of forest lands and harvesting occurs on 2.75 million of these acres that are in state forests, wildlife management areas, and school and university trust lands. These lands provide about 30 percent of the state's wood supply for a forest products industry that employs 64,000 people and has a \$17.1 billion economic impact. Governor Mark Dayton directed the updated assessment to ensure DNR lands are managed to support this vital economic sector, while maintaining healthy forests and the multiple benefits they provide.

At the direction of Governor Dayton, DNR was tasked with assessing the sustainability of harvesting one million cords per year of timber from DNR-managed forest lands. If DNR determined that one million cords per year is unsustainable, DNR was directed to identify an alternative sustainable harvest level. The Minnesota Legislature provided funding to study if one million cords of wood could be sustainably harvested from DNR-administered lands.

This was an opportunity to find the right harvest level consistent with *Minnesota Statute 89A.02* on sustainable forest management. Put simply, sustainable forest management seeks to balance complex, interrelated goals, including commercial harvest, wildlife habitat, biodiversity, and clean water, today in a way that doesn't limit future generations' ability to do the same.

DNR conducts sustainable harvest analysis at periodic intervals. The most recent statewide look occurred in 2008, but did not change from the 800,000 cord target that had been in place since 2002. Another analysis will be conducted again in about 10 years to reflect future forest conditions, policies, and market trends.

## Relevant Legislation

### Sustainable Timber Harvest Analysis

Laws 2017, chapter 93. Article 1, section 3, subdivision 4

*(e) \$500,000 the first year is from the general fund for a study of the ability to sustainably harvest at least 1,000,000 cords of wood annually on state-administered forest lands. No later than March 1, 2018, the commissioner must report the study's findings to the legislative committees with jurisdiction over environment and natural resources policy and finance. This is a onetime appropriation.*



## Timber Lands

*Minnesota Statutes*, chapter 90

The State Timber Act is the primary statute governing the DNR Timber Sales and Scaling Program. Under this statute, the Division of Forestry is delegated by the commissioner to:

- manage the sale of forest products on all forest lands under the control of the Commissioner of Natural Resources and
- administer and supervise the sale of timber on other state lands not managed by DNR, such as Minnesota Department of Transportation.

The management and sale of timber on all state lands must conform with the purposes for which those lands are held and with all laws, regulations, policies, and procedures that pertain to the sale of state timber.

## Sustainable Forest Resources

*Minnesota Statutes*, section 89A.02

*It is the policy of the state to:*

- (1) pursue the sustainable management, use, and protection of the state's forest resources to achieve the state's economic, environmental, and social goals;*
- (2) encourage cooperation and collaboration between public and private sectors in the management of the state's forest resources;*
- (3) recognize and consider forest resource issues, concerns, and impacts at the site level and landscape level; and*
- (4) recognize the broad array of perspectives regarding the management, use, and protection of the state's forest resources, and establish and maintain processes and mechanisms that seek and incorporate these perspectives in the planning and management of the state's forest resources.*

## Definition of Forest Resources

*Minnesota Statutes*, section 89.001, subdivision 8

*"Forest resources" means those natural assets of forest lands, including timber and other forest crops; biological diversity; recreation; fish and wildlife habitat; wilderness; rare and distinctive flora and fauna; air; water; soil; climate; and educational, aesthetic, and historic values.*

## Forest Resource Management Policy, Principles of Multiple Use

*Minnesota Statutes*, section 89.002, subdivision 1

*The commissioner shall manage the forest resources of state forest lands under the authority of the commissioner according to the principles of multiple use and sustained yield. The forest resource management policy shall not supersede any existing duty or authority of the commissioner in managing forest lands, but the duties and authorities, as far as practicable, shall be exercised consistently with this*

*policy. The forest resource management policy is not intended to exclude extractive uses of forest lands under the authority of the commissioner pursuant to state law.*

## **State Wildlife Management Area**

*Minnesota Statutes, section 86A.05, subdivision 8*

*A state wildlife management area shall be established to protect those lands and waters which have a high potential for wildlife production and to develop and manage these lands and waters for the production of wildlife, for public hunting, fishing, and trapping, and for other compatible outdoor recreational uses.*

## **School Trust Lands**

*Minnesota Statutes, section 84.027, subdivision 18*

*(a) The commissioner of natural resources has the authority and responsibility for the administration of school trust lands under sections 92.121 and 127A.31. The commissioner shall biannually report to the Legislative Permanent School Fund Commission and the legislature on the management of the school trust lands that shows how the commissioner has and will continue to achieve the following goals:*

- (1) manage the school trust lands efficiently and in a manner that reflects the undivided loyalty to the beneficiaries consistent with the commissioner's fiduciary duties;*
- (2) reduce the management expenditures of school trust lands and maximize the revenues deposited in the permanent school trust fund;*
- (3) manage the sale, exchange, and commercial leasing of school trust lands, requiring returns of not less than fair market value, to maximize the revenues deposited in the permanent school trust fund and retain the value from the long-term appreciation of the school trust lands;*
- (4) manage the school trust lands to maximize the long-term economic return for the permanent school trust fund while maintaining sound natural resource conservation and management principles;*
- (5) optimize school trust land revenues and maximize the value of the trust consistent with the balancing of short-term and long-term interests, so that long-term benefits are not lost in an effort to maximize short-term gains; and*
- (6) maintain the integrity of the trust and prevent the misapplication of its lands and its revenues.*

## **Process**

The sustainable timber harvest level was determine following a multi-faceted assessment over 16 months that carefully weighed input from many sources. DNR formed a project team that included individuals from its Divisions of Forestry, Ecological and Water Resources, and Fish and Wildlife that guided project work. An independent contractor, MB&G, conducted an analysis. A 14-member stakeholder advisory group representing a broad range of interests, provided input to help guide the

analysis. Public comments on the analysis were received from over 140 people. Work on Section Forest Resource Management Planning (SFRMP) was deferred during the analysis.

In considering the results of MB&G's modeling and determining the 10-year sustainable harvest number, DNR also assessed market trends and economic factors affecting the sale of individual tree species.

DNR policies were not changed as part of this process. During the transition to implementation, if there is a need to revisit existing policies in connection with the new 10-year timber harvest target, this will be done through DNR's established policy development process, which includes stakeholder engagement.

## **DNR Project Team**

A team of DNR leadership and staff facilitated the assessment process. The overall project team included leadership, managers, and technical staff from the Divisions of Forestry, Ecological and Water Resources, and Fish and Wildlife. The DNR Project Team met weekly during the length of the project and consulted regularly with division leadership and the Commissioner's office.

## **Office of School Trust Lands**

School Trust lands comprise about 50 percent of DNR-managed forest lands. Representatives from the Minnesota Office of School Trust Lands were involved at the outset of the analysis. The Director of School Trust Lands served as a special consultant to the project and was also invited to all stakeholder advisory group meetings. DNR's objective was to ensure the Office of School Trust Lands' perspectives were fully understood and considered throughout the process, and to provide timely information and responses to the Office. The Office of School Trust Lands' recommendations emphasized the importance of the DNR's fiduciary responsibility to maximize long term revenue to the trust, consistent with sound natural resource management (See Appendix B for the Office of School Trust Lands' observations and advice). This factored into the decision for the overall harvest level and will continue to be incorporated into implementation. The sustainable harvest determination meets DNR's responsibility to secure long-term revenue while considering sound natural resource conservation.

## **Stakeholder Advisory Group**

A 14-member stakeholder advisory group representing a broad range of interests, including forest industry, environmental and conservation groups, academia, and federal, tribal, and county land managers, provided important input to help guide the analysis (see Appendix A). They met in person six times and also participated in conference calls. The individuals on the group provided valuable feedback throughout the project, and their comments significantly improved the final product. The SAG identified six broad forest management values to consider in the sustainable timber harvest analysis.

- Timber Productivity
- Natural Resource Economies
- Biodiversity
- Water Quality
- Wildlife Habitat
- Forest Health

Significant themes in the feedback from SAG members on the draft analysis report included:

- Forest industry allows for efficient management of Minnesota’s forests. It is vital to maintain a strong forest industry, and the DNR needs to set harvest level targets with that in mind.
- It is important to maintain a diverse mix of forest type and age class conditions on DNR forest lands.
- There may be some potential to increase harvest levels in some forest types in the near term. Some of those forest types have limited marketability and others provide important non-timber values. Consideration must be made for these factors.
- Climate change must not be ignored. The project included some elements to account for climate change, but the analysis should be repeated in 10-15 years to account for changing conditions.

## Public Outreach

Transparency was a priority throughout the project. In spring 2017, a [Sustainable Timber Harvest Analysis Project Website](#) was developed to communicate project status updates and facilitate public feedback. The webpage was viewed over 3,000 times. A GovDelivery list was established to distribute important project information. At this time, there are over 800 people subscribed to the GovDelivery list. Project updates and news releases were sent to this list several times throughout the year. A sustainable timber harvest analysis email address was used to gather input and respond to questions from the public.

Several products were posted to the webpage and GovDelivery list for the public review:

- Phase 1 MB&G Progress Report
- Introductory Video, explaining how the analysis was conducted (received over 600 views)
- Phase 2 MB&G Draft Analysis Report
- MB&G Final Report
- Summary of Public Comments
- Frequently Asked Questions
- DNR Sustainable Timber Harvest Report (this document)

## Public Comment

The public was invited to comment on the Phase 2 MB&G Draft Analysis Report and provide input on the sustainable timber harvest level. SnapSurvey was used to collect public comments online, and written comments and email comments were also encouraged (see Appendix C for the comment form). In total, over 140 individuals or groups provided comments (see Appendix D for a list of organizations that commented). Comments pertinent to the MB&G analysis were shared with MB&G and incorporated into its final report. The DNR project team reviewed all comments, grouped them into like themes, and created a response document (available on the [Sustainable Timber Harvest Analysis Project Website](#)). Major public comment themes asked DNR to consider:

- operational realities around marketability, inventory, and best management practices while determining the sustainable timber harvest level;
- maintaining a diverse and healthy forest statewide;

- climate change and the effect of natural disturbance events;
- other forest lands (e.g. private, federal, and county) in context with DNR-managed forest lands;
- balancing Minnesota’s forest industries needs with other factors;
- recreation, wildlife, and biodiversity factors important to all Minnesotans;
- factors other than steady timber supply;
- contribution of DNR forest lands to Minnesota’s overall water quality; and
- providing enough wildlife habitat to support thriving populations of all game and non-game animals.

## Market Considerations

From the outset, DNR, MB&G, and the Stakeholder Advisory Group all recognized that market demand varies by tree species and location. As a result, the sustainable supply of some tree species exceeds what is marketable. To compare model outputs to recent DNR operations and projected market conditions, DNR conducted post-modeling market analysis based on data from U.S. Forest Service Timber Products Output Reports. A few key findings from this market analysis include:

- About half of DNR’s annual harvest is aspen, with a sell rate of over 95 percent.
- Pine and spruce markets remain strong, with high sell rates.
- Ash, white cedar, and tamarack make up a large part of DNR timber inventory and as a result the modeling analysis shows the potential for significantly higher harvest levels compared to recent years. Currently, each of these species has weak markets, low prices, and operability or inventory concerns.

It is important that DNR minimizes differences between cords offered and cords sold, to ensure we are efficiently offering wood the market wants. Offering timber for sale requires staff time to plan the sale, appraise, and auction the timber. If planned sales go unsold, DNR has expended resources with no return on investment.

## Analysis

### Mason, Bruce & Girard

On February 6, 2017, DNR issued a request for proposals for an independent contractor to provide an objective analysis of the sustainable timber harvest from DNR-managed forest lands. The selected contractor, Mason, Bruce & Girard, is a long standing and established professional forestry firm based in Portland, Oregon. MB&G’s proposal clearly communicated the firm’s experience with the type of modeling and analysis we requested. They brought a diverse team of experts to the project who understood the economic, environmental, and social goals that we strive to meet as a public agency. They have conducted similar analyses for other large forest management agencies. More information about MB&G can be found at the [Mason, Bruce & Girard Website](#).

## Analysis: A Decision Tool

The MB&G analysis did not identify DNR's sustainable timber harvest level. The analysis was designed to inform, but not to determine, the appropriate balance of the various environmental and economic considerations.

According to the MB&G analysis, DNR-administered forest lands theoretically have the biological potential to produce a harvest of 1.127 million cords of timber annually for about 20 years, while maintaining compliance with statutory species protections and Minnesota Forest Resources Council site level guidelines,<sup>4</sup> before dropping to about 900,000 cords for the long-term. However, this projection is based on several assumptions made to simplify a tremendously complex modeling challenge. These assumptions include:

- our forest inventory is 100 percent accurate,
- every acre produces the modeled volume,
- nearby markets are available for all tree species, and
- no operational adjustments are needed to reflect on-the-ground reality.

Thus, the model's projected biological potential likely exceeds what is actually available and certainly exceeds what is commercially viable. It does not account for non-timber forest values, beyond statutory species protections and Minnesota Forest Resources Council site level guidelines, that are widely expected from DNR-managed forest lands.

On the other end of the spectrum, when non-timber values (biodiversity, water quality, old forest habitat, etc.) are prioritized, the analysis showed that around 600,000 cords of timber could be harvested annually. The MB&G analysis also examined a range of model scenarios that projected timber harvest volumes somewhere between these two figures, depending on the type and level of forest values incorporated into model runs. This allowed DNR, the Stakeholder Advisory Group, and the general public to see the trade-offs between timber volume production and additional non-timber values.

It is important to understand that the MB&G analysis provides a strategic look at the biological potential for timber harvest across a spectrum of modeling scenarios. DNR did not choose a single scenario to inform the decision. Instead, DNR leadership compared the results of multiple scenarios to decide what DNR's harvest level target should be for the next 10 years.

The MB&G analysis was not a full economic analysis of DNR timber harvest operations and did not predict future markets or timber prices. The MB&G Final Report identifies the need to incorporate operational realities and commercial viability at the conclusion of any such strategic analysis in making a decision about near-term sustainable harvest levels. To compare model outputs to recent DNR

---

<sup>4</sup> Minnesota's Sustainable Forest Resources Act mandated development of voluntary site-level [timber harvesting and forest management guidelines](#) that recommend economical ways to conduct management activities with limited impacts to forest functions and values. These timber harvesting and forest management guidelines address the management, use, and protection of historic and cultural resources, riparian areas, soil productivity, water quality and wetlands, wildlife habitat, and visual quality.

operations and projected market conditions for tree specific, DNR conducted post-modeling market analysis from U.S. Forest Service Timber Products Output Reports.

## Analysis Details

DNR staff reviewed and updated information in the DNR Forest Inventory Module (FIM) in the spring of 2017. The base data set for the STHA was established from FIM, and then additional planning fields were added to help model and analyze outputs at sub-statewide scales and incorporate non-timber values. The base dataset used for the modeling and analysis of overall forest considerations included all DNR lands in FIM. However, DNR-managed forest lands generally not available for timber harvest (Scientific and Natural Areas, State Parks, Camp Ripley, designated old growth, etc.), non-forested acres (lowland brush, lowland grass, marsh, etc.), and non-productive forest types (stagnant black spruce, stagnant tamarack, etc.) were excluded from harvest volume model calculations. These acres were, however, considered in identifying contributions to other forest values (e.g., wildlife, biodiversity, clean water, and recreation). MB&G identified some limitations with the FIM dataset that affected their ability to more precisely model current and future forest conditions and management. Specifically, DNR inventory does not currently collect sufficient data to capture the effects of intermediate harvests or individual tree details in its stand inventories.

Phase 1 of the analysis took place from April – June 2017, and was a time for MB&G to access and understand the available data and construct the basic framework of the forest planning models. MB&G prepared a progress report on the initial nine scenarios that was posted to the project website. The progress report included initial model run results focused on timber outputs. MB&G and DNR did not draw any conclusions about sustainability from the initial modeling. Phase I was a “test run” of the model to make sure it was operating as expected and set the stage for full modeling and analysis work to be done in Phase 2.

Phase 2 of the analysis, from July 2017 – February 2018, built upon earlier work and expanded the number of modeling scenarios greatly (22 scenarios and more than 30 days of computer modeling time). It attempted to incorporate non-timber values, account for statutory considerations, include spatial wildlife habitat elements, and estimate tree species composition changes over time. Many of these metrics were new to DNR and even MB&G. As a result, the biodiversity, watershed, and old forest metrics needed refinement and will be looked at more closely in future analyses. As part of Phase 2, MB&G did sensitivity analysis around discount rates relating to timber stumpage revenue and also around DNR’s growth and yield tables, which project tree growth. All of the additional modeling and analysis conducted during Phase 2 formed the basis for the MG&B Final Report.

## Land Considerations

Harvesting takes place on 2.75 million acres of state forest, wildlife management areas, and school and university trust lands. Each of these land types has its own slightly different set of management objectives that were examined in the analysis. The sustainable timber harvest analysis used general guidance for applying these forest management objectives to various land types. However, the DNR Transition Team will determine how to apply more specific management strategies across these different land types over the next four months.

## School Trust Lands

DNR serves as Trustee for the 2.5 million acres of School Trust Lands and an additional 1 million acres of severed mineral rights on behalf of Minnesota's public schools, according to state statute. All School Trust lands were included in the analysis.

School trust lands were treated the similarly in all model scenarios so that the model runs could more accurately display the biological potential of each scenario. These lands were not treated with an economic preference because DNR's standard practice already uses economic rotation age to determine final harvest.

The sustainable harvest decision assumes School Trust lands within State Forests and WMAs will be managed based on economic criteria to meet DNR's responsibility to secure long-term revenue consistent with sound natural resource practices. It is anticipated that School Trust lands will see an equal increase of harvest to State Forest lands.

## Wildlife Management Areas

Under statutory guidance, WMAs are managed with wildlife habitat values as a priority. To accommodate this, some model scenarios included different management assumptions than standard forestry practice. These wildlife habitat considerations included increased rotation ages for most species, higher levels of acres reserved for habitat, and higher rates of thinning compared to final harvest. These considerations reduced the overall harvest level compared to the scenarios without these wildlife assumptions.

School trust lands within WMAs were treated with standard forestry practice and did not receive the additional wildlife habitat considerations.

## State Forest Lands

State Forests are managed for multiple purposes to provide environmental, economic, and recreational opportunities. State forest lands were treated similarly in all model scenarios so that the model runs could more accurately display the biological potential of each scenario. These lands were not treated with an economic preference because DNR's standard practice already uses economic rotation age to determine final harvest.

## Non-DNR Lands

While data on other ownership types was not included in this analysis, DNR staff and Stakeholder Advisory Group members had those trends in mind. DNR did specifically consider ownership trends and the presence of abundant, mature aspen on private and federal lands, when determining the gradual reduction of aspen harvest from DNR-managed forest lands over the next 10 years. Observed harvest levels and Forest Inventory and Analysis (FIA) data from the U.S. Forest Service show Minnesota's forests, across all ownerships, continue to grow older.

## Climate Change

Some likely impacts from climate change were considered in the MB&G analysis and DNR decision process. To incorporate climate change, the MB&G analysis changed forest cover type over time. Trees



predicted to be “climate change winners” were increased over the long term. Only native tree species, adapted to native plant communities, were considered. Because of modeling restrictions and limited data the project did not assume major shifts in tree species across the landscape, introduction of non-native species, or any reduction in winter access for harvesting.

DNR manages for diverse forest conditions to support a forest more resilient to climate change impacts. Limited This will be a priority during SFRMP planning as we implement the new sustainable timber harvest level. SFRMP plans consider climate change when setting forest type conversion goals (e.g. aspen to mixed hardwoods or pine). DNR recognizes that operational and planning changes may be necessary to address future conditions from climate-related events, including large-scale tamarack and ash mortality, natural disturbance events, and increased wildfires.

Seasonal climate considerations were deemed out of scope for the MB&G analysis, but DNR will continue to monitor and adjust practices. Warmer winters may impact when and how harvesting is done in the future, as most harvesting occurs during frozen conditions when there is less impact to soils and plants.

## Key Learnings from the Modeling Analysis

This project took a comprehensive approach and attempted to model a number of forest management factors beyond timber availability. These included spatial distribution of wildlife habitat, biodiversity elements, and watershed considerations. The modeling work produced several key learnings.

- We now have a more holistic picture of DNR-managed forest lands as a result of more refined details of land by forest or non-forest type, land administrator, ownership status, and merchantable or non-merchantable timber.
- Model results from Phase 1 and Phase 2 were not far out of line from previous DNR-led analyses. However, incorporating new model elements added dimensions not previously explored by DNR.
- By using scenarios that sequentially included additional increased non-timber values, DNR now has a better understanding of the trade-offs among those values and harvest levels.
- All scenarios projected harvesting aspen at lower levels in the future. It is important for DNR to gradually transition to a reduced harvest level for aspen.
- Growth and yield tables are important factors in estimating long term harvest levels. MB&G and the DNR Project Team discussed DNR’s approach to building yield tables, reviewed literature, and searched for alternatives. During this process, potential opportunities to refine our growth and yield tables were identified. This will be considered in our future forest management work.
- Forest inventory data collection and storage standards should be modified to improve the accuracy of our growth and yield tables and allow us to use the forest model in a more robust way. Information from this analysis is helping to improve DNR’s NextGen forest information system, which is currently under development.
- The sustainable timber harvest level is most sensitive to resource objectives that seek to maximize wildlife habitat requiring mature and older forests.

## Decision Details

### Aspen

Over the next ten years, DNR will gradually reduce the amount of aspen offered for sale by 10 percent, from 400,000 to 360,000 cords offered annually. Further reductions may be necessary in subsequent years. A minimum level of older aspen on DNR-managed forest lands is necessary to meet habitat and biodiversity needs. Market demand is predicted to remain strong, but the MB&G analysis showed an immediate and long-term decline in available aspen volume from current harvest levels under all modeling scenarios. Previous to 2017, there was an abundance of older-aged aspen on DNR-managed forest lands. DNR has worked purposefully over the past 20-30 years to adjust the amount and age of aspen on the landscape through harvest. As a result, we now have a more desired distribution of aspen by age and location that still supports valuable wildlife populations, biodiversity, and water quality. Harvest of aspen on DNR land into the future cannot be sustained at the levels of recent years, when we were working to reduce the over-abundance of mature aspen on DNR lands.

A thoughtful, gradual transition to a lower aspen harvest level on DNR lands over the next 10 years will minimize the impact to forest industry, providing time for increased aspen harvest from other ownerships with significant mature aspen (e.g., private lands and National Forest lands) and increased use of other tree species. Failing to initiate this transition now increases risks to biological resources and may cause more severe and abrupt market disruptions later. In addition, over the longer term, all scenarios modeled indicate that further reductions in aspen harvest will be needed. Fifty years out, even the most aggressive harvest scenarios, which fail to maintain the older age stands needed for habitat and biodiversity, show less than 300,000 cords of aspen available from DNR-managed forest lands.

### Ash and Tamarack Initiative

DNR recognizes a short-term opportunity to accelerate harvesting ash and tamarack and regenerate these stands to younger healthy trees, in advance of the spread of the deadly emerald ash borer and eastern larch beetle. Eastern larch beetle is estimated to have already killed almost half of the tamarack in Minnesota, and emerald ash borer is expected to kill all ash trees in its path.

This five-year pilot initiative has the potential to result in about 30,000 additional cords offered each year. However, this level of increase would require substantial growth in ash and tamarack markets. After five years, the DNR will reassess conditions to determine if the initiative should continue. Transitioning ash and tamarack stands through management is preferable to recovering from the effects of insect and disease outbreaks. Additional reforestation funding will be necessary for this initiative to be successful. Current DNR reforestation funding cannot support such an intensive, short-term effort.

The ash and tamarack initiative will help industry in the short term by making use of a resource that would otherwise be lost. Plus it gives DNR the best chance to make sure the land stays forested in the long-term through thoughtful reforestation work in a timely manner.

## Next Steps

DNR will incorporate the new sustainable timber harvest level into the Conservation Agenda and section forest resource management plan (SFRMP) process. It will ultimately be manifested on-the-ground in the selection and design of timber sales. The DNR forest planning process will be informed and improved by this effort. This is an opportunity to gain efficiency in the SFRMP and timber sale processes and increase the ability to monitor statewide forest conditions on DNR-managed forest lands.

DNR is identifying a transition team to guide application of the statewide analysis results and DNR's sustainable harvest determination to the SFRMP process. The team will begin working immediately, and SFRMP work is anticipated to begin again in mid-summer 2018. Some tasks for the DNR Transition Team include:

- Create base models for each SFRMP planning unit.
- Identify model parameters and complete a baseline School Trust Lands model scenario.
- Identify expectations for upcoming SFRMP teams.
- Determine how to apply management strategies to wildlife management areas, state forests, and School Trust Land.

Looking further ahead, DNR will conduct a mid-point assessment that reviews progress made and identifies future improvements needed. Every year, staff will work to implement the DNR harvest target and incorporate the findings from the MB&G analysis throughout all forest management. Over the next ten years, staff will specifically work to:

- Update and complete SFRMPs.
- Monitor progress on timber targets and species mix annually.
- Continue to address habitat needs at the site and landscape level.
- Create more accurate and up-to-date inventory.
- Monitor market demand by tree species.

DNR intends to conduct a similar sustainable timber harvest analysis in 10 years to update the timber harvest target. This will allow DNR to consider future forest environmental and economic conditions, updated inventory data, market trends, climate change impacts, and future stakeholder perspectives in making any needed adjustments to the sustainable timber harvest target.

# Appendix A: Stakeholder Advisory Group Membership

Name	Organization/Affiliation
Cheryl Adams	Blandin
Don Arnosti	Izaak Walton League
Brian Bignall	Potlatch
Wayne Brandt	Minnesota Forest Industries
Connie Cummins	United States Forest Service
Craig Engwall	Minnesota Deer Hunter's Association
Calder Hibbard	Minnesota Forest Resources Council
Jim Manolis	The Nature Conservancy
Meadow Kouffeld	Ruffed Grouse Society
Steve Olson	Fond Du Lac Tribal Forestry
Bob Stine	University of Minnesota
Dale Erickson	Timber Producers Association
Mark Weber	Minnesota Association of County Land Commissioners
Molly Peterson	Audubon Minnesota

# Appendix B: Office of School Trust Letter



**To: Tom Landwehr, DNR Commissioner**  
**From: Aaron Vande Linde, OSTL Director**  
**Date: February 16, 2018**  
**Re: Sustainable Timber Harvest Analysis**

As part of the Sustainable Timber Harvest Analysis (STHA) process, DNR requested that Office of School Trust Lands (OSTL) serve as a consultant to the STHA project team. The project team offered OSTL a number of opportunities to attend and observe stakeholder meetings, assisted OSTL in understanding the STHA parameters and modeling scenarios, and sought OSTL feedback regarding the analysis and content in the STHA draft and final reports related to school trust lands. Below are our observations and advice based on our involvement throughout the STHA process.

## **Observations**

1. School trust timberland accounts for 53% of the merchantable acres yet only 44% of final total inventory. This suggests school trust timberlands on a whole are less productive than other DNR administered lands due to a variety of factors, such as:
  - a. Less merchantable cover types and stands on school trust lands;
  - b. Lower site indexes in comparison to other DNR administered timberlands; and
  - c. May be losing economic value based on age class distributions.
2. The least restrictive modeling scenarios (1.1.1 and 1.1.2) reveal that during the first 15-20 years there is potential to harvest in excess of 1 million cords on DNR administered lands. This potential is due to the large supply of older mature wood currently on state lands.
3. The least restrictive modeling scenarios (1.1.1 and 1.1.2) also reveal that, after YR15, annual harvest levels above 800,000 cords are sustainable to YR100.
4. Harvest levels on school trust timberlands under modeling scenarios 4.1.2 and 4.2.2 have the potential to produce in excess of 600,000 cords between YR1 and YR15, and suggest sustainable harvest levels over 400,000 cords to year 100.
5. Annual harvest levels on school trust timberlands between FY2008 and FY2017 averaged approximately 378,000 cords. This suggests that there may be additional sale/harvest opportunities on school trust timberlands (dependent on markets and species).
6. Aspen and Balm of Gilead cover types decline over the 100-year model.

## **Advice**

1. Implement increased harvest levels on school trust lands based on modeling scenario 4.1.2 for at least the first 10-year period.
2. Direct SFRMPs to employ modeling scenario 4.1.2 for school trust lands with:
  - a. only Forest management regime constraints applied;

- b. a 20% even flow;
  - c. a 4% discount rate; and
  - d. instructions **not to exceed** a 5% leave tree on school trust lands per MFRC guidelines.
3. Capitalize on revenue opportunities from declining Aspen and Balm of Gilead cover types between YR1 and YR20.
  4. Transfer management of all school trust land acres to Division of Forestry (i.e. Fish & Wildlife administered school trust lands become Forestry administered school trust lands).
  5. Reduce acres of school trust lands under HCVF management constraints and compensate the School Trust if application of HCVF constraints reduce timber revenues.
  6. Use current technologies to improve the existing timber inventory datasets:
    - a. Collect tree level data (recognizing the additional costs to do so); and
    - b. Generate landscape level inventory across all ownerships (state, federal, county, private) utilizing LiDAR/drones/other technologies.
  7. Engage OSTL for SFRMP processes in the same manner as did the STHA project team.
  8. Replicate the STHA process in ten years.

I am available if you need clarification or have any questions.

# Appendix C: Sustainable Timber Harvest

## Analysis: Public Comment Form

Thank you for your interest in the Minnesota Department of Natural Resources (DNR) Sustainable Timber Harvest Analysis project. Background and context information regarding this analysis is available on the website.

We are asking citizens of Minnesota for their input on the draft analysis report, also located on the website.

### **About You:**

Name:

Zip code:

**Are you submitting comments today on behalf of yourself or an organization/affiliation?**

Self

Organization/affiliation (fill-in below)

### **Feedback on the Report:**

This feedback form will ask for your input on the Sustainable Timber Harvest Analysis report. Please read the draft analysis report and then answer these questions:

**After reading the report, do you feel that the results were reported clearly and that you understood them?**

Yes, the results were reported clearly

No, the results were not reported clearly

**After reading the report, do you feel that the analysis is accurate in its reporting?**

Yes, the analysis is accurate

No, the analysis is not accurate

The DNR's mission 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. This requires us to consider and weigh a variety of values. The following forest values are important to this project.

- a. Timber Productivity
- b. Wildlife Habitat
- c. Biodiversity
- d. Water Quality and Water Quantity
- e. Forest Community Health and Invasive Species
- f. Economic Impact

**Please tell us a little about the importance these forest-related values hold for you:**

**Based on your response to the above question about forest values, which level(s) of timber harvest would you support? (Please check all that apply)**

600-750 thousand cords

750-900 thousand cords

900-1050 thousand cords

1050-1200 thousand cords

**After reading the report, do you feel that the analysis is complete and includes all necessary information? Are all significant forest values and interests adequately accounted for?**

Yes, everything was adequately addressed

No, there are things which were not adequately addressed

After reading the report, is there anything else you would like us to consider that was not covered above?

Thank you so much for your input and participation. The public comment period is open December 1st-31st, 2017. The DNR's project team will review comments and incorporate as applicable into the final analysis.

**Please visit the project webpage for more information.**



# Appendix D: Public Comments

From December 1, 2017 to January 8, 2018, a public comment link was available on the [Sustainable Timber Harvest Analysis website](#). During that time we also received email to the general “[stha.dnr@state.mn.us](mailto:stha.dnr@state.mn.us)” email as well as letters at our St. Paul office.

- **Over 140** individuals provided comments through the online Public Comment Form, email, or letter. This included XX people representing following organizations or businesses:
  - Audubon Minnesota
  - Blandin
  - Fond du Lac Band of Lake Superior Chippewa
  - Friends of the Boundary Waters Wilderness
  - Leech Lake Band of Ojibwe Division of Resource Management
  - MFI- Minnesota Forest Industries
  - Minnesota Chapter Wildlife Society
  - Minnesota Deer Hunting Association
  - Minnesota Power
  - Minnesota Sharp-tailed Grouse Society (MSGs)
  - Minnesota Waterfowl Association
  - Mississippi Headwaters Audubon Society comment letter
  - PCA – Packaging Corporation of America
  - Potlatch
  - Ruffed Grouse Society and American Woodcock Society
  - Sappi
  - The Nature Conservancy
  - W.J. McCabe (Duluth) Chapter of the Izaak Walton League